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The first page of the manuscri pt must comprise the title of the article, the initial ones of the first names and the names of the authors, the denomination and the complete address of the institution in which work was carried out, titles and teaching hospital affiliations of each author, the complete address with fax and telephone number of the author, who must be sent the corre spondence.

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An English summary and a French summary not exceeding 250 words accompany the manuscript. This summary must be stru ctured in the following way, for original work : objectives, methods, results and conclusions. For the clinical facts and the technical notes, the summary should not excced 100 words. 3 to 5 English and French key words must appear under the summaries.
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ANNALES 1ER SEMESTRE 2013

ANNALES AFRICAINES DE CHIRURGIE THORACIQUE ET CARDIO-VASCULAIRE
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CHIRURGIE CARDIAQUE / CARDIAC SURGERY

SUIVI A LONG TERME DE 80 PATIENTS OPERES D'UNE DISSECTION AORTIQUE AIGUË DE TYPE A / LONG-TERM FOLLOW-UP OF 80 PATIENTS OPERATED FOR AN ACUTE AORTIC DISSECTION TYPE A

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Résumé

But : Identifier et évaluer les facteurs de risque de morbi-mortalité à court et long terme d'une dissection aortique aiguë de type A de Stanford.

Patients et méthodes : C'est une étude rétrospective de 80 patients (57 hommes et 23 femmes) consécutifs opérés d'une dissection aortique aiguë de type A de Stanford entre janvier 1991 et Décembre 2008. 59 dissections concernaient l'aorte thoracique ascendante et descendante (type I De Bakey) et 21, l'aorte ascendante uniquement (type II De Bakey). Suivant les techniques chirurgicales, la mortalité et la morbidité ont été évaluées par des courbes actuarielles. Les facteurs pronostiques pré, per et post opératoires ont été évalués par analyse uni et multi variée. Les variables quantitatives ont été comparées par le test paramétrique de Student et les variables qualitatives par le test de khi deux. L'évaluation morphologique de l'aorte a été faite par IRM ou TDM chez les survivants.

Résultats : La mortalité hospitalière a été de 17,5 %. La survie actuarielle à 17 ans est de 27 ± 7%. En analyse univariée, les facteurs associés à la mortalité hospitalière ont été: IDM pré-opératoire et ischémie mésentérique (p = 0,01), le taux de prothrombine < 72 % (p = 0,01) et l'altération de la fonction ventriculaire droite et / ou gauche (p = 0,01). La mortalité précoce post-opératoire était liée à l'insuffisance rénale sévère (p = 0,03), l'IDM pré-opératoire (p = 0,002) et au choc cardiogénique pré-opératoire (p=0,05). Les complications précoces étaient une infection broncho-pulmonaire (43,75 %), une insuffisance rénale transitoire (22 %) et les arythmies sévères (15,20%). Les complications tardives ont été la dissection chronique (n = 12), la persistance d'un faux chenal circulant post-opératoire (n = 27) et des faux anévrismes post-opératoires (n = 12). La morbi-mortalité était élevée dans le type I de De Bakey. La survie à 1 an, à 5 ans, à 10 ans et à 15 ans était respectivement de 75 %, 66 %, 52 % et 30 %

Conclusion : La chirurgie de la dissection aiguë de l'aorte de type A de Stanford donne des résultats satisfaisants à moyen et long terme notamment dans le type II de De Bakey.

Mots clés : Dissection aiguë –aorte, mortalité, morbidité, suivi.

Summary

Aim: Identify and assess the risk factors of morbidity and mortality in the short and long term of an acute aortic dissection type A Stanford.

Patients and methods: From January 1991 to December 2008, 80 consecutive patients (57 men and 23 women) were surgically treated and followed up for an acute aortic dissection type A, were analyzed retrospectively. Aortic dissections were stratified as follows: type I De Bakey (n = 59) and type II De Bakey, (n = 21). Mortality and morbidity were evaluated by actuarial curves. Pronostic factors in per and post-operative period were statistically evaluated. Quantitative variables were compared by the Student test qualitative variables in the chi-2 test. The morphological evaluation of the aorta was made by MRI or Tomodensitometry.

Results: The hospital mortality was 17.5 %. The actuarial survival at 17 years is 27 ± 7 %. In univariated analysis, the factors associated with hospital mortality were: pre-operative myocardial infarction (MP) and mesenteric ischemia (p = 0.01), the rate of prothrombine less than 72 % (p = 0.01), and alteration of the right ventricular function and / or left (p = 0.01). The early post-operative mortality was linked to severe kidney failure (p = 0.03), pre-operative MI (p = 0002) and pre-operative shock (p = 0.05). The early complications were lung infection (43.75 %), transitional renal failure (22 %) and severe arrhythmias (15.20%). The late complications were a chronic dissection (n = 12), a persistence of a false channel (n = 27) and post operative false aneurysms (n = 12). Early morbidity and mortality was high in the type I De Bakey. Survival at 1 year, 5 years to 10 years and 15 years was respectively, 75 %, 66 %, 52 % and 30% .

Conclusion: In acute aortic dissection type A Stanford, surgery gives satisfactory results in the medium and long term, especially in the type II De Bakey.

Keywords: Acute-aortic-dissection, mortality, morbidity, follow-up.

Introduction

La dissection aortique aiguë (DAA) est une urgence cardio-vasculaire grave caractérisée par un clivage de la paroi artérielle aortique suite à une irruption spontanée de sang dans la média de l'artère, créant ainsi un cylindre interne et un cylindre externe[1]. Plusieurs classifications ont été utilisées dont celle de Stanford qui classe les dissections touchant l'aorte ascendante (type A) et l'aorte descendante (type B). En Europe, elle constitue de par son pronostic sévère, l'une des premières urgences chirurgicales cardiovasculaires[2,3]. Son évolution naturelle est effroyable dans les 48 premières heures malgré l'efficacité de l'imagerie diagnostique et l'amélioration de la prise en charge utilisant les colles biologiques. Dans la littérature, la mortalité précoce demeure élevée, entre 15% et 20%[4,5]. En effet la survie à long terme dépend des événements péri opératoires et de la gravité de l'urgence.
Le but de ce travail est d'identifier et évaluer les facteurs de risques de morbi-mortalité à court et long terme.

Patients et méthodes

Patients

Entre Janvier 1991 et Décembre 2008, 80 patients ont été opérés d'une dissection aiguë de l'aorte type A au CHU de Tours (France). L'âge médian était de 61 ans avec des extrêmes de 17 ans et 76 ans. Les caractéristiques démographiques et cliniques de cette population sont rapportées dans le **Tableau I**.

TABLEAU I : Caractéristiques démographiques et cliniques des patients

	Effectif(n) , Moyennes	% / Extrême
Age (ans)	61	(17 – 76)
Sexe (M/ F)	57 /23	71,25 / 28,75
Antécédents et Facteurs de risque cardio-vasculaire :		
Anévrisme de l'aorte ascendante	12	15
Séquelle de valvulotomie aortique pour RVA congénitale	1	1,25
Insuffisance aortique isolée	3	3,75
Hypertension artérielle	58	73
Tabac	23	29
Obésité	20	25
Diagnostic :		
Douleur thoracique / Torsade	60	75
Techniques chirurgicales :		
Tube Ao sus-coronaire sans RVA / Resuspension valvulaire	50	62,5
Tube Ao sus-coronaire avec RVA	9	11,25
Bentall / Cabrol	9	11,25
Résection elliptique de la crosse de l'aorte	7	8,75
Réparation directe	3	3,75
Durée moyenne de clampage aortique (en min)	107 ± 43	
Durée moyenne de la CEC (min)	170 ± 64	
Durée opératoire moyenne (min)	303 ± 99	
Durée moyenne d'arrêt circulatoire (min)	22 ± 13	
Nombre d'arrêt circulatoire	12	

Ao : Aorte ; RVA : remplacement valvulaire aortique ; CEC : circulation extra-corporelle.

Le délai moyen entre douleur - opération (H) était de 18,4 ± 26,4 heures versus 71,5 ± 12,35 heures pour la dissection de type I De Bakey (n = 59) et type II De Bakey (n = 21). Le bilan biologique pré-opératoire réalisé était constitué de la créatinémie, de l'ionogramme sanguin, de l'hémogramme, du taux de prothrombine et du temps de céphaline-kaolin. Le bilan morphologique pré-opératoire était basé sur l'échocardiographie trans-thoracique et/ou trans-œsophagienne et la tomodensitométrie (TDM). Cette imagerie médicale mettait en évidence la dilatation de l'aorte ascendante et le flap intimal (***Figure 1, 2 et 3***) chez tous les patients.

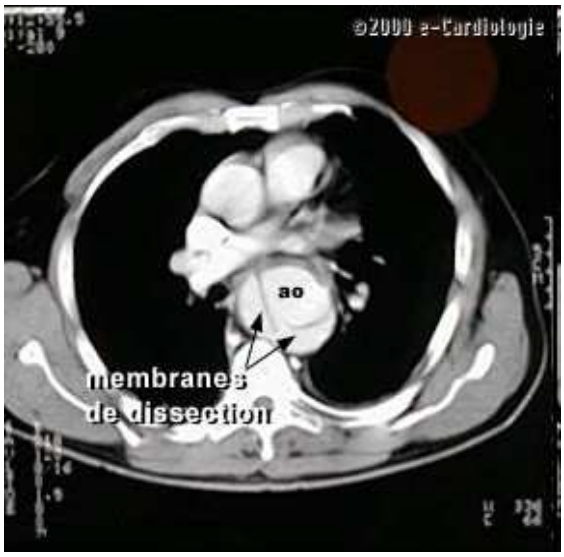

Fig 1 : Coupe thoracique angio-scanographique montrant les membranes de la dissection aiguë de l'aorte.

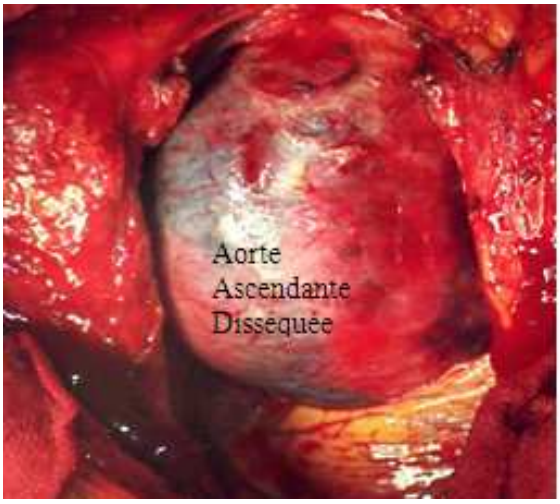

Fig 2 : Vue per-opératoire d'une dissection aiguë de l'aorte type A, 24 heures après le début de la douleur thoracique.

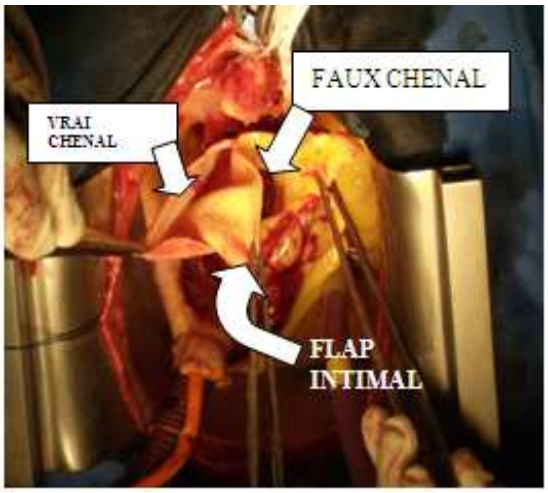

Fig 3 : Vue per-opératoire d'une dissection aiguë de l'aorte type A, après une transsection du culot aortique.

Méthodes

Techniques chirurgicales et prise en charge post-opératoire :

Tous les patients ont été opérés après une sternotomie médiane verticale, et une circulation extra-corporelle (CEC) installée après une cannulation fémorale exclusive (n=65) ou fémorale et autres sites (n=15). Les gestes associés à cette chirurgie de l'aorte ascendante (***Figure 4***) étaient de 2 pontages croisés femoro-fémoraux pour une ischémie aiguë des membres inférieurs, 3 pontages entre la poche aortique et l'oreillette droite (fistule de Cabrol) et une assistance ventriculaire gauche.

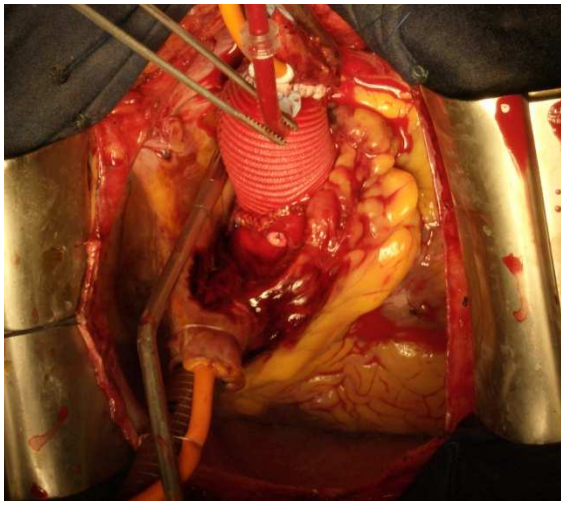

Fig 4 : Vue per-opératoire d'une dissection aiguë de l'aorte type A opérée par la technique de Bentall

Ces interventions se sont déroulées sous protection myocardique à l'aide d'une solution de cardioplégie froide. En post-opératoire, tous les patients ont été admis en réanimation pour une surveillance post opératoire. Une échocardiographie systématique était réalisée pour rechercher une insuffisance aortique (IAo) post opératoire (si IAo supérieure au grade II). La TDM (***Figure 5***) a été utilisée pour le suivi post-opératoire.

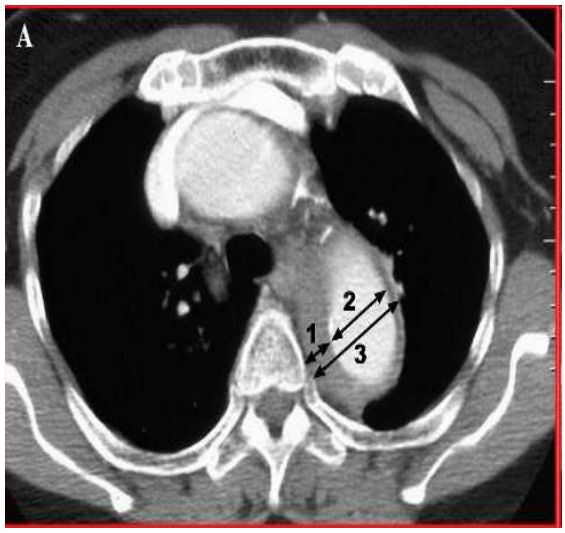

Fig 5 : Coupe angio-scanographique thoracique montrant le faux chenal thrombosé non circulant « 1 », le vrai chenal « 2 » et diamètre total aorte thoracique « 3 » après le traitement de la DAA par la technique de Bentall.

Paramètres étudiés :

Les paramètres étudiés ont été : la morbidité post-opératoire d'une part, la mortalité et survie à long terme, d'autre part. La morbidité post-opératoire a été définie par la survenue après une intervention chirurgicale d'un évènement à l'origine d'une prolongation du séjour en réanimation au-delà de 4 jours. Les évènements pris en compte sont : une infection broncho-pulmonaire post-opératoire à l'origine d'une difficulté de sevrage ventilatoire, une insuffisance rénale transitoire, une fièvre inexpliquée, une tamponnade, un infarctus du myocarde, une insuffisance aortique précoce, un faux chénal circulant post-opératoire (***Figure 5***). La mortalité précoce a été définie par la survenue d'un décès à l'hôpital ou pendant les 30 jours suivant l'intervention. Ainsi les paramètres pré et per-opératoires présumés liés à la mortalité ont été analysés. Ces paramètres suivants ont été recueillis :

- ♣ Données pré-opératoires : ischémie viscérale, Taux de Prothrombine (TP)<72%, altération de la fonction ventriculaire droite ou gauche, insuffisance rénale, Infarctus du Myocarde (IDM) pré-opératoire, choc hémodynamique.
- ♣ Données per-opératoires : type de dissection aortique selon De Bakey.

La survie à long terme a été évaluée par l'absence d'un décès ou d'une ré-intervention soit pour un faux anévrisme, une insuffisance aortique secondaire ou une re-dissection.

Suivi et collecte des données :

Le taux de perdus de vue est de **7,5 %** (n = 6). Le suivi a été réalisé par un courrier adressé aux médecins traitants et aux cardiologues, complété par des appels téléphoniques quand cela était nécessaire. Les données recueillies ont été traitées et stockées sous le logiciel « Access 97 » dans une base de données spécifiques permettant le triage de l'information et l'analyse croisée.

Analyse statistique :

Les données continues ont été exprimées par la moyenne ± l'écart-type (ET). Les données qualitatives ont été exprimées en nombre (n) et en pourcentage (%). Pour étudier la relation entre les différentes variables et la mortalité, une analyse univariée et une régression logistique ont été réalisées utilisant le logiciel « Statview » et « épi info 6 ». Nous avons adopté une logique actuarielle pour le calcul des survies et le calcul d'absence d'évènements dans le temps ("Freedom" des anglosaxons). Les courbes actuarielles ont été comparées par le test du logrank. Le seuil de significativité a été retenu pour une valeur de (p) inférieure ou égale à 0,05.

Résultats

Mortalité hospitalière :

La mortalité hospitalière était de 17,5 % (14 / 80). On notait 7 décès au bloc opératoire dont les causes étaient respectivement des hémorragies (n = 4), une défaillance ventriculaire droite et/ou gauche (n = 2) et un syndrome de détresse respiratoire aiguë (SDRA) sévère (n = 1).
En réanimation, 7 patients étaient décédés dont 5 de choc cardiogénique et 2 de choc septique. Tous les patients décédés (n = 14) avaient une dissection aiguë de l'aorte type I de De Bakey.
L'analyse univariée montrait 3 facteurs indépendants qui influençaient directement la mortalité hospitalière : IDM pré opératoire, le taux de Prothrombine < 72 % (TP < 72 %) et l'altération de la fonction ventriculaire droite et / ou gauche. Deux facteurs indépendants influençaient la mortalité post-opératoire précoce : la dialyse post-opératoire et l'altération de la fonction ventriculaire droite et/ou gauche associée à un état de choc pré-opératoire (**Tableau II**).

Tableau II : Facteurs influençant la mortalité hospitalière

Mortalité	Facteurs	RR	IC 95 %	P
Hospitalière	**Ischémie viscérale, IDM**	17,73	**1,69 -186,20**	0,01
	TP < 72 %	5,83	**1,44 – 23,71**	0,01
	VG/VD altéré(s)	6,78	**1,63 – 28,14**	0,01
Post-opératoire	**Dialyse**	7,50	**1,35 – 41,72**	0,03
	IDM pré op	48,75	**4,09– 581,11**	0,002
	Choc pré op	5,36	0,96 – 29,9	0,05

RR : Risque Relatif
IC : Intervalle de Confiance
IDM : Infarctus du Myocarde
VG : Ventricule Gauche
VD : Ventricule Droite

Morbidité :

Le taux de morbidité globale était de 75% (n=60). Les complications en réanimation étaient une infection pulmonaire (n=33 ;43,75%), une insuffisance rénale transitoire (n=16; 22%), une arythmie à type de fibrillation (n=12 ; 15,20 %), une tamponnade (n=5 ; 6,25%), un IDM post-opératoire (n=5 ; 6,25%), un accident vasculaire cérébral (n=5 ; 6,25%), une fièvre inexpliquée (n=5 ; 6,25%). Sept patients présentaient une IAo post-opératoire après une re-suspension de la valve aortique (n=5) et un remplacement valvulaire aortique (n=1). Parmi eux, une insuffisance aortique (IAo) était survenue sans geste initial sur la valve native. La différence statistique existant entre l'IAo post-opératoire après à une dissection aortique de type I (n=6 ; 11%) versus type II de De Bakey (n=2 ; 9,5%), n'était pas significative. On notait le faux chenal circulant post-opératoire chez 68% (n=40) des dissections aortiques de type I. Le flap intimal situé dans la crosse aortique persistait après une chirurgie chez 2 patients (9,5%) présentant une dissection de type II de De Bakey.
En post-opératoire, la durée moyenne d'intubation était de 8,6 ± 14,6 jours avec une médiane de 5 jours. 56,7% des patients ont été intubés en moins de 48 Heures. Le séjour moyen en réanimation était de 10,6 ± 13,9 jours. La durée globale de séjour hospitalier moyen était 20,1 ± 16,6 jours et 56,7% des patients ont été hospitalisés en moins de 15 jours.
Tardivement, les patients ont présenté des complications à type de dissection chronique (n=12), de persistance d'un faux chenal circulant post opératoire (n=27) et des faux anévrismes post opératoires (n=12). La dissection chronique était statistiquement plus élevée en cas de type I de De Bakey ($p < 0,05$)

A long terme, les taux de faux anévrysmes post-opératoires et d'insuffisance aortique post-opératoire n'étaient pas statistiquement différents entre les patients ayant eu une procédure de Bentall / Cabrol et les autres (**Tableau III**).

Tableau III : Taux de faux anévrysme et d'insuffisance aortique à long terme selon la technique opératoire.

	Faux anévrysme	**Insuffisance aortique**
Bentall / Cabrol	14,3%	14,3%
Autres	22,6%	30,2%
p	0,98	0,66

En revanche, le taux d'insuffisance aortique post-opératoire était statistiquement plus élevé dans le groupe ayant eu une resuspension valvulaire aortique (45,4%) versus remplacement valvulaire (13,3%) versus aucune procédure valvulaire (13%) [p = 0,02].

Survie à long terme:

Le suivi total est de 419 patients – année. Le suivi moyen est de 5,6 ans.
Le taux de ré-intervention était de 25 % (15/60). Les patients sortis de l'hôpital étaient réopérés pour un faux anévrisme (n = 6), une IAo isolée (n=3), une re-dissection aortique (n=2), une fenestration aortique (n=2), une infection de prothèse (n=1) et une ligature de la fistule Aorte-Oreillette Droite (n=1). Le taux moyen d'absence de ré-interventions à 17 ans est de 63,2 ± 10,5 % (Fig. **6**).

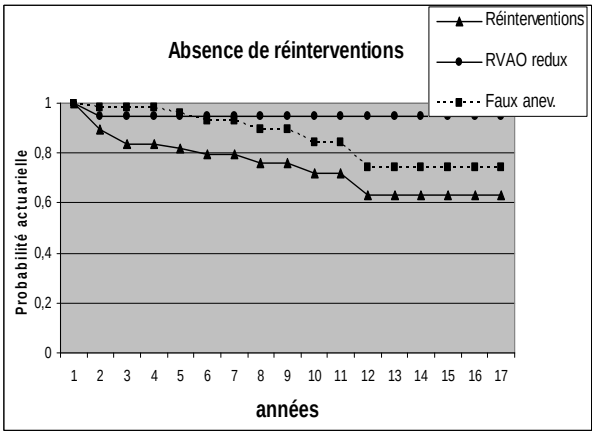

Fig. 6 : Courbe actuarielle d'absence de réinterventions

Ce taux est plus élevé dans les dissections de type II (De Bakey) (Fig. **7**).

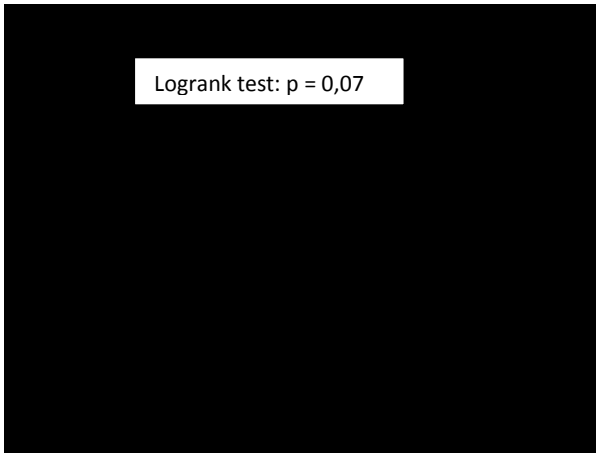

Fig. 7 : Courbe actuarielle d'absence de réintervention par type de dissection.

La survie à 17 ans était de 27,2 ± 7,4 %. La survie en fonction de l'âge ne montrait pas de différence significative à 17 ans (Fig. **8**).

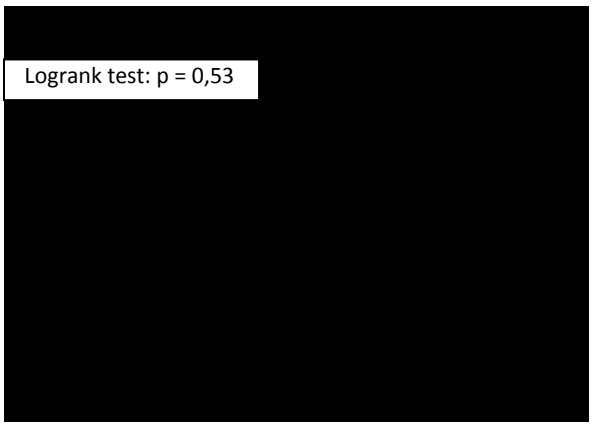

Fig. 8 : Survie en fonction de l'âge

La survie selon le type de dissection est illustrée à la figure 4. Dans notre série, la survie à 1 an, à 5 ans, à 10 ans et à 15 ans était respectivement de 75 %, 66 %, 52 % et 30 % (Fig.**9**).

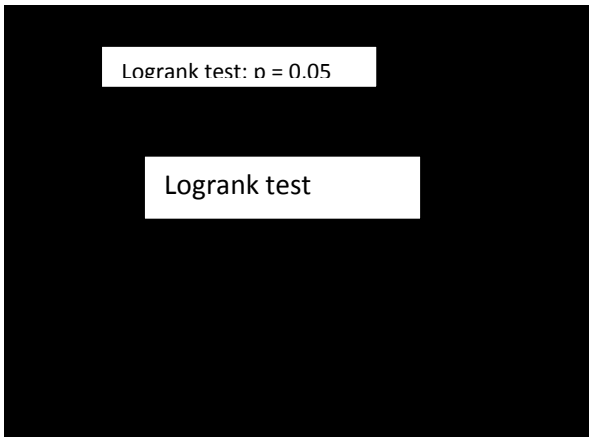

Fig. 9 : Survie en fonction du type de dissection

Discussion

La dissection aiguë de l'aorte continue d'alourdir la morbi-mortalité des urgences chirurgicales en chirurgie cardio-vasculaire. Malgré les nombreuses techniques[5,6] avancées dans la prise en charge, quelques inquiétudes demeurent en ce qui concerne la mortalité précoce et la survie à long terme.

Dans notre étude, cette mortalité précoce est proche de celle retrouvée dans la littérature se situant entre 20 et 30%[4,5]. Le faible taux de mortalité immédiate de notre série, s'explique par notre stratégie de prise en charge centralisée de cette affection. La prise en charge a été rapide aux fins de réduire la mortalité des 72 heures qui avoisine 75%[7]. Si l'âge supérieur à 75 ans est considéré comme un facteur de risque de mortalité péri-hospitalière[5,6,8], ce facteur n'est pas étudié dans notre travail puisque trois patients seulement se retrouvent dans cette situation. Comme nous, KIRCH[8] ne trouve pas d'intérêt à se focaliser sur l'âge devant cette urgence. Si les dissections de type II de De Bakey sont responsables d'un plus grand nombre d'épanchements intra-péricardiques, avec une tamponnade et d'un plus grand nombre d'hématomes de la paroi[9]; leur mortalité hospitalière est nulle dans notre série. Cela peut s'expliquer par la rapidité de la prise en charge médico-chirurgicale de ces formes et la proximité des centres hospitaliers convoyeurs en France. En revanche la mortalité immédiate est élevée en cas de dissection de type I. Cette mortalité est dûe à l'évolution spontanée ou au type de traitement chirurgical[10]. Plusieurs études[6,8,11] ont montré que l'état de choc pré-opératoire est un facteur de risque de mortalité péri-opératoire. Cette notion de choc hémodynamique a été parfois difficile à préciser dans notre travail. En effet, les patients qui étaient pris en charge par le SAMU à domicile ou dans un hôpital régional ont été tous stabilisés, perfusés ou transfusés avant leur arrivée dans notre centre. Parfois, les drogues nécessaires à l'équilibre partiel de la situation hémodynamique à l'arrivée des patients, étaient administrées dans notre établissement hospitalier. Ainsi, le facteur "état de choc pré-opératoire" n'a été incriminé que dans la mortalité post-opératoire et cela à la limite de la significativité statistique (p=0,05). Comme dans la littérature[6,8] nous avons retrouvé dans notre étude les facteurs pré-opératoires de surmortalité hospitalière tels que : l'IDM et l'Infarctus mésentérique. Dans notre série, la mortalité hospitalière est aussi liée au faible taux de prothrombine pré-opératoire. Ceci pourrait s'expliquer par l'existence, au stade latent d'un syndrome de consommation de la crase sanguine pouvant aboutir à des risques hémorragiques accrus per ou post-opératoires, ou par la présence d'un foie cardiaque congestif.

Dans notre série, la morbidité post-opératoire a concerné les trois quarts de nos patients. Notre taux de morbidité est comparable aux résultats des séries consultées[6,8,12]. Après la chirurgie de l'aorte ascendante, les complications post-opératoires sont dominées par : les infections broncho-pulmonaires liées au retentissement inflammatoire de la CEC et l'insuffisance aortique dûe soit à la resuspension de la valve aortique soit à l'évolution de la maladie elle-même. Pour Macrina et al[10], la durée de l'arrêt circulatoire, l'insuffisance rénale chronique, le type de chirurgie de l'aorte ascendante étendue à l'hémi-arche et la présence de la maladie de Marfan sont des facteurs électifs de risque de décès.

La proportion élevée de faux chenal perméable post-opératoire est fréquemment retrouvée dans la littérature[2,4,13]. Mais le taux de patients gardant ce faux chenal circulant dans notre étude est inférieur aux 80 et 100% retrouvés dans la littérature[12,13,14]. Pour l'éviter, David Tirone et al[15] proposent un arrêt circulatoire systématique et une confection d'une anastomose distale sans clampage aortique qui réduirait le taux de faux chenal circulant post-opératoire à 59 %.

Tardivement, les complications à type de faux anévrismes et de persistance d'IAo post-opératoire étaient à l'origine des réinterventions comme dans la littérature[12,16]. Le taux de faux-anévrismes de l'aorte thoracique ascendante et de la crosse aortique pourrait être diminué en explorant systématiquement la crosse de l'aorte sous arrêt circulatoire[15,17] et en utilisant une technique de suture distale sans clampage sous arrêt circulatoire renforcée par une attelle de téflon[18]. Plusieurs études ont montré que le taux de réinterventions est abaissé lorsque la chirurgie est étendue à la crosse de l'aorte lors de la première cure chirurgicale[18,19]. Cette vision chirurgicale est désuète actuellement selon Macrina et al[10]. Pour eux, étendre la chirurgie à la crosse en cas de la dissection de type A, constitue un facteur de risque de mortalité.

Les résultats des techniques de Yacoub et David Tirone[19,20] sont encourageants mais ne paraissent pas changer la prévalence de la régurgitation aortique à moyen terme ; par contre, elles diminuent le taux de dilatation du culot aortique[21].

Cette morbidité relativement élevée incite donc à accroître la vigilance lors de la prise en charge post-opératoire de ces patients.

La survie à long terme de nos patients est comparable à celle de la littérature[5,22]. Cette survie est meilleure en cas de type II de De

Bakey dans notre série. Cette notion ne paraît pas être surprenante dans la mesure où le faux chenal circulant chronique est l'élément déterminant de la mortalité à long terme[12,22]. Ce faux chenal circulant chronique est rare après une cure chirurgicale des dissections de type II alors qu'il est très fréquent après une cure chirurgicale des dissections de type I.

Conclusion

Les résultats à court, moyen et long terme de la dissection aiguë de type A de Stanford sont satisfaisants notamment en cas de type II de De Bakey. Les facteurs associés à la mortalité hospitalière sont : l'Infarctus : viscéral et/ou myocardique ; le taux de prothrombine < 72% et l'altération de la fonction ventriculaire avant une chirurgie. Les facteurs prédictifs de mortalité précoce post-opératoire sont : l'insuffisance rénale sévère chronique ; l'IDM pré opératoire et le choc cardiogénique pré-opératoire.

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CHIRURGIE CARDIAQUE / CARDIAC SURGERY

CALCIFIED PSEUDO-ANEURYSM OF ASCENDING AORTA FROM CANNULATION SITE ERODING INTO THE STERNUM : A CASE REPORT
/
PSEUDO-ANÉVRISME CALCIFIÉ DE L'AORTE ASCENDANTE PROVENANT DU SITE DE CANULATION AORTIQUE AVEC ÉROSION STERNALE : UN CAS CLINIQUE

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Summary

We report the successful surgical treatment of a nonmycotic pseudoaneurysm of the ascending aorta in a 15 year old male who underwent surgical closure of an atrial septal defect at the age of 3 years. A Computed Tomography (CT) scan was performed to investigate the palpable mass on the healed sternotomy scar. It revealed a densely calcified nonmycotic pseudoaneurysm of the ascending aorta (9.5x 5.5 cm) arising from the prior cannulation site, and eroding into the sternum. Since the aneurysm and the ascending aorta were heavily calcified and adherent to the adjoining structures, it was repaired using a bovine pericardial gusset. The cause of the pseudoaneurysm was considered iatrogenic.

Key Words: Pseudoaneurysm, Aortic cannulation site, Congenital Heart Disease, Calcified ascending aorta

Résumé

Nous rapportons le traitement chirurgical satisfaisant d'un pseudo-anévrisme non mycotique de l'aorte ascendante chez un adolescent de 15 ans qui avait subi la fermeture chirurgicale d'une communication auriculaire à l'âge de 3 ans. Une Tomodensitométrie (TDM) a été prescrite pour examiner la masse palpable sous la cicatrice de sternotomie guérie. Elle a révélé un pseudo-anévrisme non mycotique densément calcifié de l'aorte ascendante (9.5x 5.5 cm) siégeant au site de la cannulation antérieure et accolée à la face interne du sternum. Puisque cet anévrisme de l'aorte ascendante était très calcifié, comprimant et adhérant aux structures contiguës, il a été procédé à une mise à plate-greffe par une prothèse péricardique d'origine bovine. Ce pseudo-anévrisme a été considéré comme d'origine iatrogène.

Mots clés: Pseudo-aneurysm, site cannulation Aortic, Cardiopathies congénitales, Calcification aorte ascendante.

Introduction

A post-operative pseudo-aneurysm of the ascending aorta is a known complication after open heart cardiac surgery, and has been reported to occur in less than 0.5% of cardiac operations and is associated with increased morbidity and mortality[1,6].
We describe a case of an ascending aortic pseudoaneurysm occurring 12 years after closure of an ASD. The pseudoaneurysm originated from the previous aortic cannulation site.

Case Report:

A 15 year old male, who underwent operation for atrial septal defect (ASD) at 3 years of age, presented with recent syncopal attacks, swelling, and pain at the sternal wound site for the past two months. Evaluation at our hospital with Computed Tomography (CT) angiography (**Figure 1**), revealed a saccular aneurysm of the ascending aorta (5.5cm in diameter) eroding into the sternum (**Figure 2**).

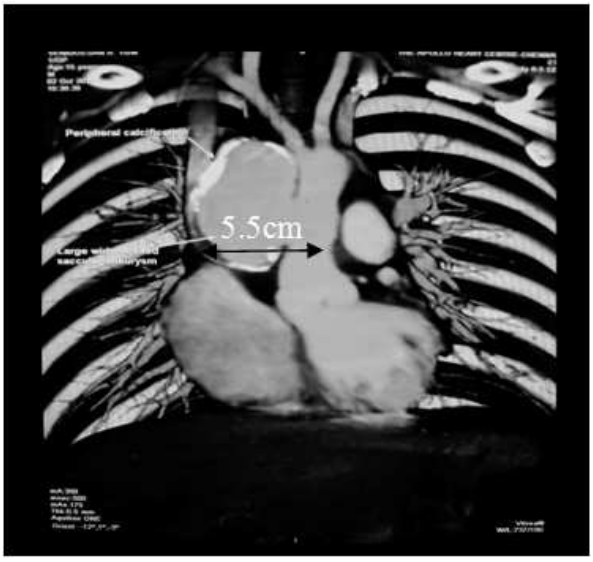

Figure 1: Computed Tomography (CT) angiography, coronal view, showing saccular aneurysm of ascending aorta (5.5cm in diameter).

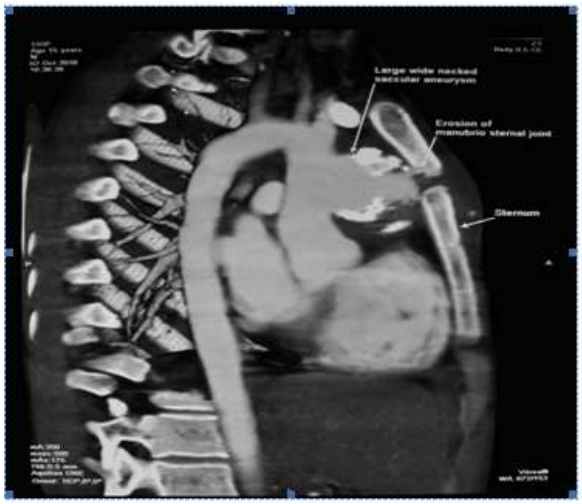

Figure 2: Computed Tomography (CT) angiography, sagittal view, showing ascending calcified aortic aneurysm eroding into the sternum.

The operation was performed employing femoro-femoral bypass, with an additional venous cannula placed in the pulmonary artery following redo sternotomy The apex of the left ventricle was identified by transthoracic echocardiography (TEE) and vented via a small left anterior thoracotomy. Redo-median sternotomy was done, and the patient taken to deep hypothermic circulatory arrest (18 C°).The pseudo- saccular ascending aortic aneurysm was dissected and found to originate at the previous aortic cannulation site, and eroding into the sternum. It was opened, and excised proximally, starting from the sinotubular junction and extending distally to 1 cm below the origin of the innominate artery. The entire aneurysm and the adjacent part of the ascending aorta was heavily calcified. The right coronary artery and aortic valve were not involved, Myocardial protection was maintained with antegrade root cardioplegia delivered via a 16F Foley catheter (**Figure 3**).

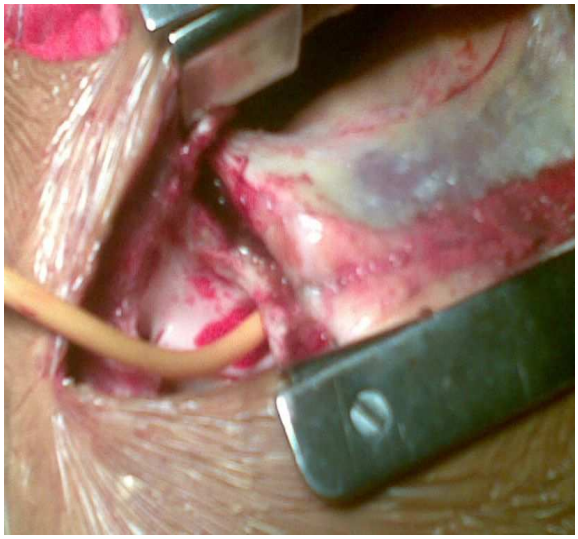

Figure 3: *Intra operative picture showing antegrade root cardioplegia through the aneurysm, delivered through a 16F foley catheter.*

The aneurysm was repaired using a 7 X 5 cm decellularised bovine pericardial gusset (**Figure 4**) with # 3-0 Prolene suture (Ethicon,Somerville, NJ).

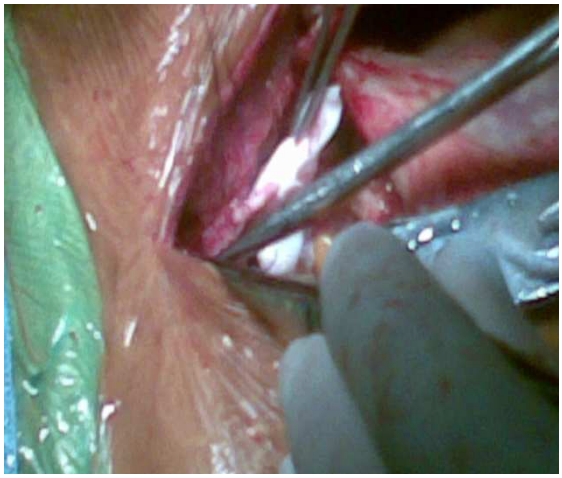

Figure 4: Intra-operative picture showing the aneurysm repair using a 7X5cm decellularised bovine pericardial gusset with #3-0 polypropylene suture.

The patient was slowly rewarmed and weaned off cardiopulmonary bypass without inotropic support. He was extubated on the first post-operative day and had an uneventful recovery, and was discharged on the eigth post-operative day.

Discussion

Aortic non-mycotic pseudo-aneurysm is a rare complication following open heart surgery. The potential locations include the aortotomy suture line, coronary graft site anastomosis, and cardioplegia or aortic cannula sites. Late presentation is not unusual, having been reported at 26 and 40 years following surgery[4,6]. Once diagnosed, they require urgent surgical intervention to prevent iatrogenic rupture. Employing cardiopulmonary bypass (CPB) via femoral access prior to sternotomy should be considered a viable option in such scenarios. This judgment is made pre-operatively using CT-scan, which has a greater advantage of imaging the surrounding anatomic structures, thus helping to define a surgical strategy.

In this case, the pseudo-aneurysm originated from the previous aortic cannulation site, and extended into the sternum. Since sternal re-entry carried a high risk of fatal hemorrhage, we initiated femoro-femoral CPB, prior to opening the sternum across the aneurysm. Although moderate hypothermia with low flow or deep hypothermic circulatory arrest (DHCA) has been reported[1], we preferred a short period (20 minutes) of total circulatory arrest (TCA) to carry out the procedure.

Usually the aneurysmal aorta is replaced by prosthetic grafts or homograft in presence of infection, but in our case, as there was a well defined rent with healthy viable aortic tissue and no evidence of infection, it was repaired using a decellularised bovine pericardial gusset.

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CHIRURGIE CARDIAQUE / CARDIAC SURGERY

DEVICE OCCLUSION OF ATRIAL SEPTAL DEFECT THROUGH MINIMALLY INVASIVE RIGHT ANTERIOR CHEST APPROACH

/

FERMETURE D'UNE COMMUNICATION INTER-AURICULAIRE PAR UNE PROTHÈSE INTRODUITE PAR VOIE THORACIQUE ANTÉRIEURE DROITE MINI-INVASIVE

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Summary

Occlusion of atrial septal defects through a small right chest incision is minimally invasive and safe.

Résumé

La fermeture d'une communication inter-auriculaire à travers une incision minime thoracique droite est peu invasive et sécurisante.

Introduction

Atrial septal defect (ASD) is one of the more common congenital heart defects, with an incidence of 3.2-5.7/10,000 live births[1]. Presently, there are 3 therapeutic approaches: medical management with aspirin; open heart surgery with cardiopulmonary bypass, and primary or patch closure; and percutaneous transcatheter closure[2]. Surgery is safe with excellent results, but more invasive. The transcatheter occlusion approach is minimal invasive, but can be complex and time consuming .It is also difficult to control when complications arise[3]. It is difficult to perform in patients less than 2 or 3 years old because of smaller femoral venous access.

Patient Presentation

A 12-month-old Chinese girl presented with a secondum ASD. The diameter was 1.8 cm by transthoracic echocardiography (TTE) and the pulmonary artery pressure was 40 mmHg. She had a persistant cough and recurrent upper respiratory tract infections. Because of small femoral venous access, a trans-thoracic per-atrial approach, utilizing an Amplatz device, was employed.

Operative Procedure

The operation was performed under general endo-tracheal anesthesia. Pre-incision and intra-operative TEE (HP Sonus 4500 Doppler, 4-7mHz) was used. A 2cm incision extending from the sternum along the right fourth intercostal space provided access through the 4th intercostal space (**fig.1a, b**). The pericardium was opened vertically, 2cm anterior to the phrenic nerve and marsupiliazed to the skin. Two purse-strings were placed in the right atrium using 4-0 polypropylene (Prolene®) suture. The patient was administered 1mg/kg IV heparin systemically.

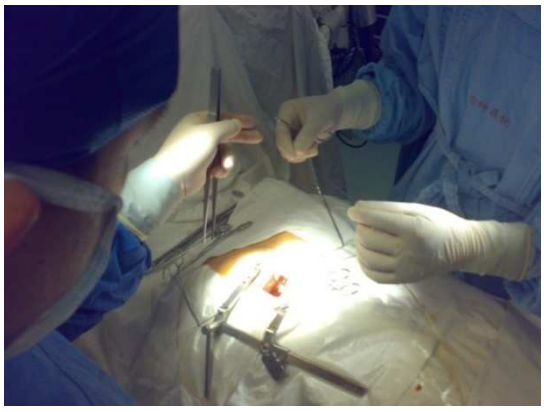

Fig 1(a) : Right anterior approach through 4th intercostal space

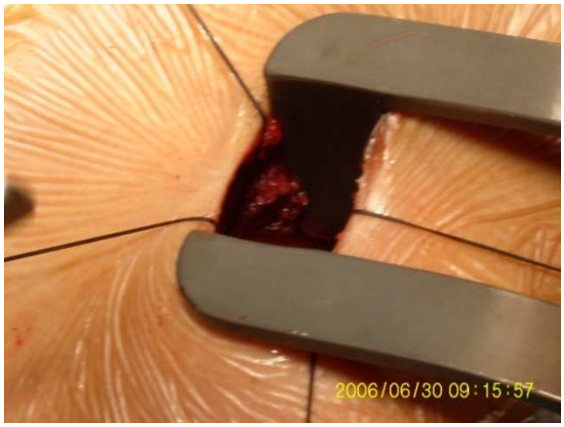

Fig 1(b) :

Device / Deployment

The occluder system (Shanghai Memory Alloy Company, Shanghai, China) is composed of an Amplatz-like occluder, and is woven to form 2 disks with a connecting waist, and a sheath with a pusher (**fig. 2a,b,c**). Utilizing the TEE data, the appropriate size occluder (in this case, a 2.0cm occluder) was placed into the sheath. An incision was made within the purse string to place the sheath into the right atrium, and with TEE guidance, the sheath was advanced through the ASD and the first disc released, then withdrawing the sheath just to the right atrium, releasing the second disk, then pushing and pulling the occluder repeatedly to assure that the occluder is not removable (fig.3 a,b). Finally, it is assessed with TEE to check for leakage, and whether the mitral valve, tricuspid valve, and the superior and inferior vena cava are affected by the occluder. If all is satisfactory, the sheath is removed and the purse string tied (fig. 4). Heparin is neutralized with protamine, and the surgical wound is closed in routine fashion without chest tube drainage.

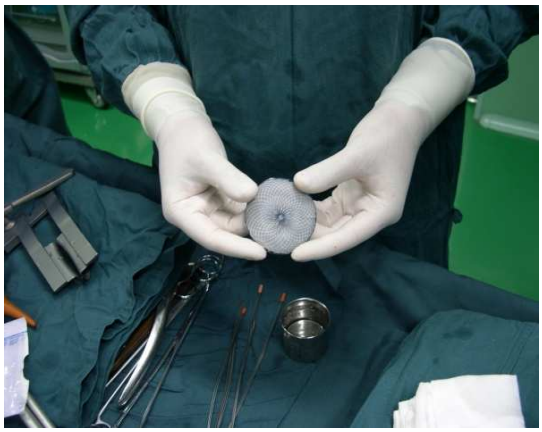

Fig 2 (a): Amplatz occluder device

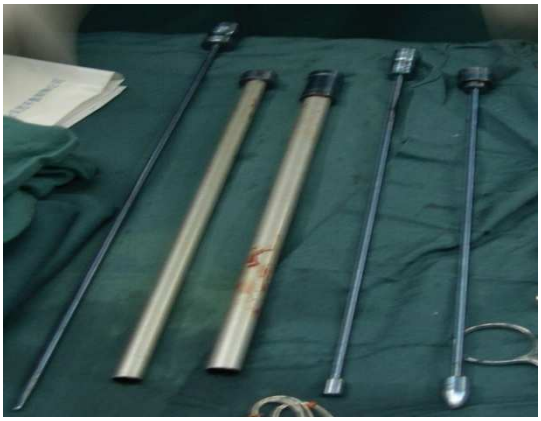

Figure 2 (b) : First generation introducer device

Fig 2 (c): Current sheath and pusher device

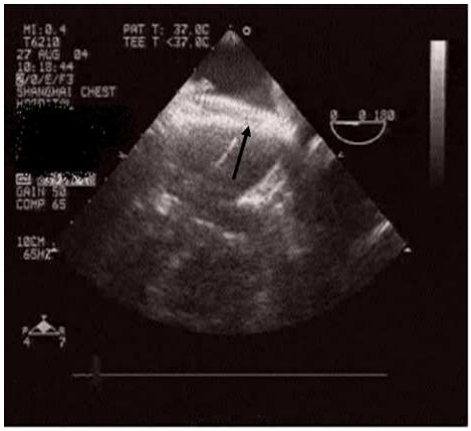

Fig. 3 (a): Pushing the occluder to test. (Black arrow points to the occluder)

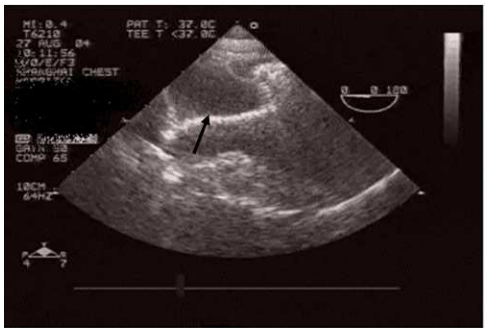

Fig. 3 (b): Pulling the occluder (Black arrow points to the occluder)

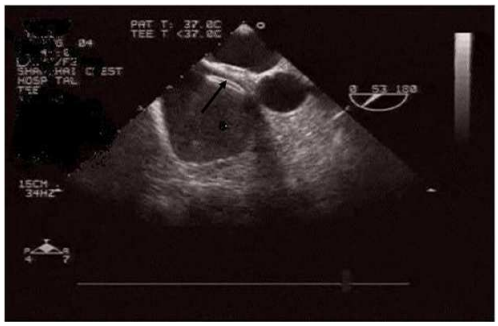

Fig. 4: The occlusion is completed (Black arrow points to the occluder).

Discussion

The technical aspects of this technique are important to elucidate. Transcatheter closure of secundum atrial septal defects utilizing the Amplatzer septal occluder is well suited for small and medium size ASDs, yet seldom for larger ones[2,5]. The occlusion of ASDs through a small right anterior chest incision has distinct advantages compared with the transcatheter route. These include a shorter entrance route, the convenience to manipulate the stiff and straight sheath, the shorter time of intra-cardiac manipulation (usually within 5 minutes), and no radiation exposure[6,7]. Per-atrial technique is not restricted to patient's age whereas the transcatheter technique is only suitable for patients older than 3 years of age because of smaller peripheral vessel diameter. An important aspect of the technique is releasing the occluder while the sheath is vertical to the atrial septum. This can be performed precisely and quickly, even in large ASDs. We use a one sheath technique and the occluder is placed inside the sheath in advance, so once the sheath is inside the left atrium, the occluder is released only once. In contrast, with the transcatheter closure, the catheter is easy to parallel the atrial septum in larger ASDs, but can be very difficult to release the occluder, thus utilizing more time, and often failing to occlude. With the surgical approach, the sheath is bigger than the catheter, so it can accomodate a stiffer occluder. After the stiffer occluder is released, it becomes flatter than the occluder released by catheter. The flat occluder will cause less obstruction within the atrium as well as not obstruct the mitral valve, tricuspid valve, or superior and inferior vena cava. The stiffer occluder also generates more support, making it less likely to dislodge, or drop from its position. This allows occlusion of ASD's with shorter rims, and even no rims in other locations. This is more difficult with the interventional transcathter approach[4].

After the occluder is released, it is pulled and pushed repeatedly to determine the optimal way to prevent it from dropping out of position. Because the sheath is stiff and the performing route is short, it is very easy to pull and push. Serious complications from droping off seldom occure. If the occluder is easy to drop off when pulling and pushing, and occluder size mismatch is ruled out, we advise enlarging the incision and converting to open repair of the ASD utilizing CPB.

The procedure is done under TEE, which is clear and reliable, and doesn't affect the operative field. When there is no TEE available or unable to be performed, then TTE on the operative field is employed. Six cases in our experience were completed with TTE, and the operative time was not prolonged.

An important decision at operation is to choose the proper occluder size. Clinically, the waist diameter of the ASD is the size of the occluder. If there is only one ASD orifice, an imaging plane is selected so that the largest diameter is calculated. When the ASD rim is soft, the soft rim should be recognized as part of the defect of the ASD. Usually the size of occluder is the biggest diameter of ASD plus 2-4mm, adjusting for left atrial septum size, the position of the mitral and tricuspid valves, and the age of patient[6]. For example, we choose as small as possible occluder for infants. If the occluder is too large, the waist cannot be stretched naturally, the disks of the left and right atrium cannot clamp the tissue of both atria, and the occlusion will fail. When there are 2 or more atrial septal orificies, then each orifice size and position and the tissue between orifices should be considered. In our experience, there were 2 cases of 2 orifices, and both were occluded successfully with only one large occluder.

Other considerations to discuss include comparison of this technique to surgical closure or the transcatheter approach.

Complications related to the catheter placed Amplatzer device have been reviewed by Hamden et al[3]. In four series with 100 or more cases, the complication rate was 1.0% to 5.0%. The most common complication was displacement. Other complications included heart block, arrhythmia, esophageal tear, deep vein thrombosis, endocarditis, CVA, TIA and marker band embolization.

Other complications include thrombosis and mitral valve regurgitation[6,8].

In summary, occlusion of atrial septal defects through a right small right chest incision is minimally invasive and safe. It is suitable for most secundum ASDs, even in patients with severe pulmonary hypertension, as well as in young females and infants. It is cosmetic, and has excellent early and midterm results.

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CHIRURGIE THORACIQUE / THORACIC SURGERY

TRAITEMENT DES HYPERPLASIES THYMIQUES : A PROPOS DE 5 CAS OPERES / SURGICAL TREATMENT OF THYMIC HYPERPLASIA : 5 CASES

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Résumé

Introduction : Les hyperplasies thymiques se caractérisent par une pathogénèse complexe et des tableaux cliniques variés sources d'attitudes thérapeutiques controversées.

Objectif : Insister sur la rareté, les difficultés diagnostiques et rapporter les résultats de la chirurgie dans les hyperplasies thymiques.

Malades et méthodes : Dans cette étude rétrospective 5 dossiers de patients opérés pour une hyperplasie thymique entre 1995 et 2005 ont été étudiés. Il s'agissait de 2 cas d'hyperplasie thymique vraie (type I), de 2 cas d'hyperplasie thymique lympho-folliculaire (type II) et d'un cas d'hyperplasie thymique massive (type III). Les données pré-opératoires, la technique chirurgicale et ses résultats ont été analysés. Le recul moyen a été de 3,38 ans.

Résultats : La série comptait 3 hommes (1 pour chaque type) et 2 femmes (1 pour le type I et 1 pour le type II), d'âge moyen égal à 14,70 ans. Dans les types I et III, les signes respiratoires étaient dominants. Dans le type II, en plus des signes respiratoires, un syndrome myasthénique était présent. L'imagerie thoracique avait permis d'objectiver une augmentation de la taille du thymus dans 4 cas (2 cas pour le type I, 1 pour le type II et 1 pour le type III). Tous les patients avaient bénéficié d'une thymectomie totale par sternotomie médiane. Les suites opératoires étaient simples. Après un recul moyen de 3,38 ans, les résultats étaient jugés satisfaisants.

Conclusion : Les hyperplasies thymiques sont rares. Elles constituent un groupe hétérogène dont le traitement reste controversé. La chirurgie demeure le traitement de choix en milieu sous médicalisé ou lorsque le suivi médical des patients est aléatoire.

Mots-clés : Hyperplasie thymique, Diagnostic, Chirurgie.

Summary

Introduction: Thymic hyperplasias are characterized by polymorphic clinical presentations and complex pathogenesis which lead to controversial therapeutic modalities.

Objective: To emphasize on the rareness, the diagnostic difficulties and to report the results of the surgery in thymic hyperplasias.

Patients and methods: In a retrospective study, 5 files of patients operated on for thymic hyperplasia between 1995 and 2005, were reviewed. There were 2 cases of true thymic hyperplasia (type I), 2 cases of follicular thymic hyperplasia (type II) and 1 case of massive thymic hyperplasia (type III). Preoperative data, surgical treatment and its results were studied. The average follow up time was 3.38 years.

Results: There were 3 men (1 of each type) and 2 women (1 of type I and 1 of type II), with mean age of 14.70 years. In types I and III the respiratory signs were dominant. In types II, in addition to respiratory signs, myasthenic syndrome was present. The thoracic imaging showed an increased size of the thymus in 4 cases (2 cases for type I, 1 for type II and 1 for type III). All patients underwent total thymectomy by median sternotomy. After an average follow up time of 3.38 years the results were deemed to be satisfactory.

Conclusion: Thymic hyperplasias are rare. They form a heteregenous pathological group whose treatment remains controversial. Surgery remains the treatment of choice in an under developed medical area or when the medical follow up of patients is irregular.

Key words: Thymic hyperplasia, Diagnosis, Surgery.

Introduction

Les hyperplasies thymiques (HT) sont des pathologies pseudo-tumorales bénignes de la glande thymique. Selon leur aspect morphologique et leur présentation clinique trois types sont décrits. Le type I comprend les hyperplasies thymiques vraies, le type II les hyperplasies thymiques lympho-follicualires et le type III les hyperplasies thymiques massives (1,2). Leur pathogenèse complexe et distincte ainsi que les difficultés diagnostiques avec les autres tumeurs du médiastin antérieur notamment les thymomes sont sources d'attitudes thérapeutiques controversées.
Nous rapportons une série chirurgicale de 5 cas d'hyperplasie thymique.

Patients et Méthodes

Les dossiers de 5 patients opérés entre Mai 1995 et Juin 2005 pour une hyperplasie thymique ont été analysés de façon rétrospective. La série comporte 2 patients (N° 1 et N° 2) du type I, 2 patients (N° 4 et N° 5) du type II et 1 patient (N° 3) du type III. Pour chaque patient, les antécédents, les données cliniques et paracliniques, le traitement chirurgical et ses résultats ont été analysés. La durée moyenne du suivi a été de 3,38 ans (1 an et 10 ans).

Résultats

Caractéristiques cliniques des patients

Les patients étaient tous symptomatiques. Le patient n°1 avait un thorax en carène. Il était admis pour une détresse respiratoire et avait des antécédents de dyspnée nocturne et de broncho-pneumopathies répétées. La patiente n°2 avait consulté pour des douleurs retro-sternales spontanées, intermittentes, fixes, aggravées par le décubitus dorsal évoluant depuis 3 mois. Elle avait bénéficié d'une lobo-isthmectomie gauche pour un goitre euthyroïdien 2 ans auparavant. Le patient n°3 était admis pour une détresse respiratoire. Il avait un passé de pneumopathies trainantes et récidivantes avec des épisodes de dyspnée nocturne remontant à la naissance. Le patient n°4 était hospitalisé pour une détresse respiratoire**.** L'interrogatoire révélait l'existence depuis 3 mois d'une dyspnée d'effort, d'une dysphagie intermittente et d'une faiblesse musculaire des membres. La patiente n°5 était suivie depuis 8 mois pour une myasthénie généralisée mal contrôlée par le traitement médical. Le Tableau I résume les caractéristiques des patients.

Méthodes diagnostiques

L'imagerie du thorax (radiographie et tomodensitométrie) avait permis de noter un élargissement du médiastin aux dépens de thymus chez les patients n°1, n°2, n°3, et n°4 ; cette augmentation était diffuse et homogène sans masse focale ni modification de la forme triangulaire normale de la glande (**Figure 1**).

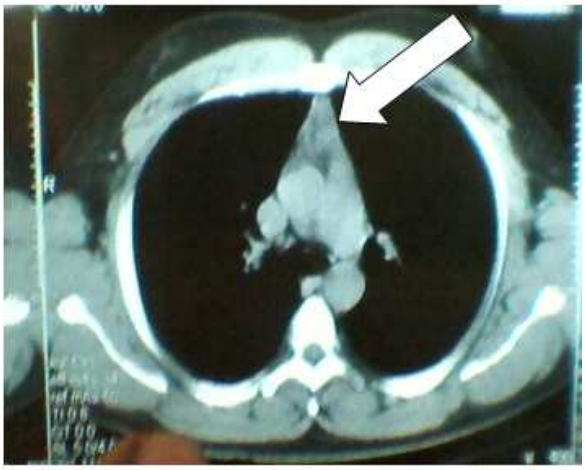

Figure 1: Image tomodensitométrique d'une hyperplasie thymique (flèche).

Le thymus avait une taille normale chez la patiente n°5. L'échographie et la scintigraphie ont mis en évidence un lobe thyroïdien restant normal chez la patiente n°2.
La myasthénie était authentifiée chez le patient n°4 par la découverte d'un bloc neuro-musculaire à l'électromyographie et par la présence dans le sérum d'anticorps anti-récepteurs de l'acétylcholine.

Approches thérapeutiques

Tous les patients ont été opérés. La voie d'abord était une sternotomie médiane totale. A l'exploration chirurgicale du médiastin antérieur, on retrouvait une augmentation diffuse et homogène de la taille du thymus sans masse focale palpable chez les patients n°1, n°2, n°3 et n°4. La taille de la glande était normale la patiente n°5. Une thymectomie totale était réalisée chez tous les patients. La **Figure 2** illustre une pièce opératoire de thymectomie.

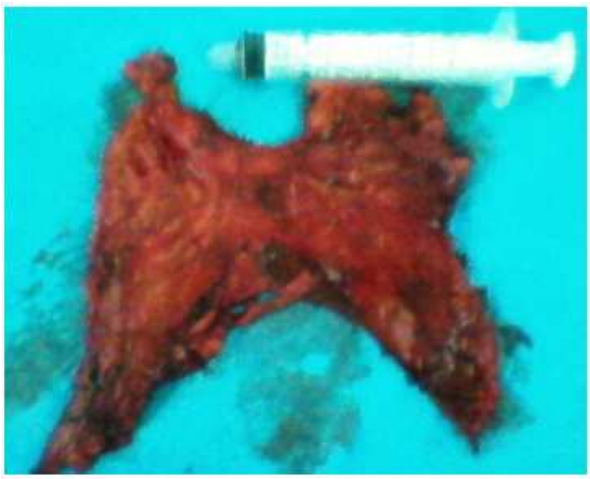

Figure 2 : Pièce opératoire de thymectomie pour hyperplasie thymique

En raison de l'indisponibilité de l'examen anatomopathologique extemporané, une ablation complète de toute la graisse médiastinale antérieure inter-pulmonaire était également effectuée.
La synthèse sternale était faite sur un drain retrosternal aspiratif passant dans la cavité pleurale droite dans deux cas de brèche pleurale accidentelle. Le poids moyen du thymus était de 253,8 grammes (20 et 534 grammes) (**Tableau I**).

Tableau I : Caractéristiques cliniques des patients

Patient N°	Age/ Sexe	Signes clinques	Biologie	EMG	Poids du thymus (Normal) (15)
1	3 ans/M	Dyspnée, DR, BP répétées	Normale	NE	150 g (26g)
2	40 ans/F	Douleurs retrosternales	Normale	NE	140 g (21g)
3	6 mois/M	DR, BP récidivantes	Lymphocytose sanguine	NE	534 g (20g)
4	16 ans/M	Dyspnée, DR, Dysphagie, Faiblesse musculaire	aaRac = 78,70 mmol/l	BNM	425 g (21g)
5	14 ans/F	Myasthénie généralisée	aaRac = 80,50 mmol/l	BNM	20 g (26g)

Abréviations *: EMG = électromyogramme, DR = détresse respiratoire, BP = broncho-pneumopathies, NE = non effectué, aaRac = anticorps anti-récepteurs de l'acétylcholine, BNM = bloc neuro-musculaire*

Résultats histologiques

L'examen histologique des pièces opératoires retrouvait 2 cas d'hyperplasie thymique de type I (patients n°1 et n°2), 2 cas de type II (patients n °4 et n°5) et 1 cas de type III (patient n°3).

Résultats du traitement et survie

Les suites opératoires étaient simples pour les patients avec une régression des symptômes. Le traitement anti-cholinestérasique à base de pyridostigmine était poursuivi chez les 2 patients ayant une myasthénie. Une rémission complète de la myasthénie était obtenue 6 mois après la thymectomie pour le patient n°4. Pour la patiente n°5 une amélioration notable était constatée 9 mois après la chirurgie autorisant une réduction des doses de pyridostigmine. La durée moyenne du suivi était de 3,38 ans (1 an et 10 ans) et aucune récidive thymique n'était notée.

Discussion

Les hyperplasies thymiques regroupent 3 types histologiques[1,2]. Le type I regroupe les hyperplasies thymiques vraies qui se définissent comme une hypertrophie du cortex et de la médullaire de la glande thymique sans anomalie histologique. Le type II comprend les hyperplasies thymiques lympho-folliculaires caractérisées par une prolifération des cellules folliculaires avec ou sans augmentation de taille du thymus. Le type III englobe les hyperplasies thymiques massives qui présentent les mêmes caractéristiques histologiques que les hyperplasies vraies, mais se singularisent par une augmentation de la masse du thymus supérieure à l'ombre cardiaque sur le télécoeur radiologique de face et/ou par un poids du thymus supérieur à 2 % de la masse corporelle[1,2,3].

Les HT sont rares et représentent 1 % de l'ensemble des lésions du thymus[4]. Nous avons colligés 5 cas en 10 ans.

L'âge de survenue des HT varie selon le type. Le type I survient à tout âge[5]. Le type II atteint surtout l'adolescent et l'adulte jeune[4,5] tandis que le type III est l'apanage du nouveau-né, du nourrisson et de l'enfant[2,3].

Selon le sexe, les types I et III atteignent équitablement les hommes et les femmes alors que le type II est plus fréquent chez la femme[2,5,6].

Les facteurs étiologiques et les circonstances de survenue des HT restent obscures, complexes et variables d'un type à l'autre. Le type I peut être idiopathique ou être lié à un phénomène de rebond immunologique en réponse à un stress important (chimiothérapie anticancéreuse, irradiation ou brûlure) ou encore accompagner certains traitements et maladies endocriniens voire certaines affections infectieuses[1,4,5]. Les 2 types I de notre étude sont probablement idiopathiques car aucune des étiologies ni circonstances favorisantes décrites dans la littérature n'était retrouvée. Le type II est fréquemment associé à certaines maladies auto-immunes, en particulier à la myasthénie qui est retrouvée dans plus de 65 % des cas[1,4,5]. Nos 2 patients atteints du type II avaient également une myasthénie. Le type III ne semble lié à aucune des conditions ou circonstances décrites pour les types I et II. En revanche, une lymphocytose sanguine est rencontrée chez environ 30 % des patients[2]. Les types I et III peuvent être découverts fortuitement lors d'un bilan systématique ou devant des douleurs thoraciques, une dyspnée, mais surtout des infections respiratoires récurrentes voire une détresse respiratoire[2,5,7,8,9] comme nous l'avons noté chez nos 3 patients. Les mêmes signes révélateurs peuvent être rencontrés dans le type II. Ils sont toutefois très souvent associés à ceux d'une maladie auto-immune[5] comme chez nos 2 patients. Tous ces signes, même peu spécifiques, ont cependant le mérite de faire réaliser une radiographie du thorax. L'élargissement du médiastin antérieur sur le cliché radiologique du thorax, lorsqu'il existe, a une valeur d'orientation vers le thymus surtout chez le sujet jeune[7]. Il était présent chez 4 de nos patients. La tomodensitométrie et l'imagerie par résonnance magnétique (IRM) confirment la nature thymique de l'élargissement radiologique du médiastin, précisent ses limites et ses extensions. L'IRM au 18 Fluoro-Désoxy-Glucose (FDG) peut même permettre de suspecter le type histologique de l'atteinte thymique sans cependant éliminer formellement les autres causes de masses thymiques, en particulier les thymomes[10]. Pour les types I et III, l'augmentation de la taille concerne aussi bien le cortex que la médullaire. Elle est diffuse, homogène, symétrique et conserve la forme triangulaire normale de la glande, simulant ainsi le tissu thymique sain**.** Dans le type II, les caractéristiques du thymus sont plus variables et peu spécifiques. La glande conserve d'habitude sa forme normale, mais elle peut être élargie ou présenter une masse focale[10]**.** Par contre, un élargissement diffus ou une masse focale du thymus chez un patient ayant une myasthénie, rappelle indifféremment une HT de type II ou un thymome[10]. Quatre de nos patients avaient un élargissement diffus et homogène du thymus à forme conservée, sans masse focale. La cytoponction au cours de l'examen tomodensitométrique, lorsqu'elle est contributive, permet un diagnostic histologique

peu invasif[11]. La biopsie sous thoracoscopie[12], à ciel ouvert pré-opératoire ou en cours d'examen (extemporané) permet un diagnostic histologique définitif et formel**.** Les types I et III se caractérisent par une architecture normale et une augmentation de taille et du poids du thymus pour un groupe d'âge et de sexe donné. Dans le type II, il existe une multiplication des follicules lymphoïdes du thymus, avec ou sans augmentation de taille de la glande[5].

La prise en charge thérapeutique des HT n'est pas consensuelle. En effet, l'attitude thérapeutique dépend de l'âge du patient, des manifestations cliniques et du type histologique. Dans les types I et III chez les patients symptomatiques et âgés de plus d'un an, la thymectomie est très souvent indiquée en raison des risques imprévisibles d'accidents respiratoires aigus[3,8,9]. Mlika et al[5] ainsi que Szarf et al[3] quant à eux**,** préconisent une corticothérapie première à base de prédnisone par voie orale à la dose de 60 mg/m^2 pendant 7 à 10 jours. Cette attitude nous semble légitime chez les patients âgés de moins d'un an car elle prévient les effets néfastes de la thymectomie sur l'immunité dans cette tranche d'âge. En l'absence de diminution de la taille du thymus, la thymectomie est recommandée[3,5,13]. Chez les patients asymptomatiques, une surveillance par une tomodensitométrie thoracique tous les 3 à 6 mois après la confirmation histologique est recommandée[5,13]. Cependant des complications évolutives aussi graves qu'imprévisibles comme les hémorragies et les accidents respiratoires aigus notamment la détresse respiratoire peuvent émailler cette surveillance[3,8,9,10]. Deux de nos patients avaient présenté une détresse respiratoire ayant motivé leur hospitalisation en urgence. Pour ces raisons, la thymectomie nous semble licite surtout lorsque le suivi médical est irrégulier et incertain[3] comme dans nos conditions d'exercice.

Pour les types II, l'attitude thérapeutique est moins discutée en raison de leur fréquente association avec certaines maladies auto-immunes comme la myasthénie. Dans la myasthénie associée à une HT lympho-folliculaire (type II), la réponse au traitement médical seul (anticholinestérasique et corticoïde) peut être incomplète tant sur les signes liés à la masse thymique que sur ceux de la myasthénie[5,6]. En revanche, la thymectomie augmente le taux d'amélioration et de régression de la myasthénie surtout lorsqu'elle est réalisée précocement[5,6]. La thymectomie avait permis une rémission complète et une amélioration clinique de la myasthénie chez nos 2 patients ayant une HT de type II**.**

Il existe de nombreuses voies d'abord pour la thymectomie. Des abords mini-invasifs sont de plus en plus proposés avec comme avantages leur faible morbidité opératoire et surtout leur caractère esthétique[14]. Elles ont cependant comme inconvénients un accès malaisé à l'ensemble du médiastin et aux deux plèvres médiastinales à l'origine d'exérèse incomplète et difficile d'un volumineux thymus ou d'omission de thymus ectopiques. Elles peuvent aussi être sources de difficultés opératoires avec des durées d'intervention parfois longues et imposent dans certains cas un travail en double équipe. Ainsi l'utilisation de ces techniques dépend de l'état du patient, de la taille, du siège et des extensions du thymus ainsi que des habitudes et des moyens de l'équipe chirurgicale. Nous avons opté comme Mlika et al[5] et Lakhoo et al[6] pour la sternotomie médiane totale qui permet l'exploration complète du médiastin antérieur sur toute sa hauteur à la recherche de thymus ectopique, associée à l'exérèse extracapsulaire en bloc du thymus et à l'ablation de toute la graisse médiastinale antérieure.

Les suites opératoires après thymectomie pour HT sont plus liées au terrain sous-jacent qu'au geste chirurgical lui-même. Pour les types I et III elles sont souvent simples[2,5]. Dans les types II souvent associés à une myasthénie, l'effet bénéfique de la thymectomie sur celle-ci est reconnue[5,6]. En effet Lakhoo et al[6] rapporte des taux respectifs de rémission et d'amélioration de la myasthénie de 50% et 33,3% après thymectomie et Mlika et al[5] des taux respectifs de 22,22% et 66,67%. Nous avons noté une rémission complète et une amélioration notable de la myasthénie chez nos 2 patients après la thymectomie. Après un suivi moyen de 3,38 ans (1 an et 10 ans), les résultats sont satisfaisants.

Conclusion

Les hyperplasies thymiques sont rares. Elles forment un groupe hétérogène du point de vue de leur pathogenèse et de leurs manifestations cliniques à l'origine de controverses thérapeutiques. La chirurgie demeure le traitement de choix en milieu sous médicalisé ou lorsque le suivi médical des patients est aléatoire.

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CHIRURGIE THORACIQUE / THORACIC SURGERY

PEDIATRIC THORACIC HYDATID CYSTS IN PERU : CASE REPORT AND REVIEW
/
KYSTES HYDATIQUES THORACIQUES CHEZ L'ENFANT AU PÉROU : CAS CLINIQUE ET REVUE DE LA LITTÉRATURE

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Abstract

Hydatid cyst secondary to the parasite *Echinococcus granulosus*, involving the lung parenchyma, is an endemic disease in Peru, especially in the rural areas involved with animal domestication. Despite aggressive government public health directives for prevention, poor recognition and compliance remain major factors in human infection, especially in children. Medical treatment alone is not effective in the majority of either asymptomatic or symptomatic patients with documented thoracic disease. Surgery remains the primary recommended approach. Over 30 thoracic procedures are performed annually at the Instituto Nacional de Salud del Nino, in Lima, Peru for thoracic hydatid cysts. The present clinical case illustrates the contemporary surgical approach to this preventable disease in Peru, along with some unifying surgical concepts.

Key Words: Hydatid cyst disease**;** Capitonnage**;** Endoplication Simple cyst; Lung sparing surgery; Endemic disease.

Résumé

Le kyste Hydatique du parenchyme poumonaire dû à une infection par le parasite « Echinococcus granulosus », est une maladie endémique au Pérou, particulièrement dans les zones rurales concernées par la domestication animale. Malgré les conseils répétés du ministère de la santé publique pour la prévention, la faible connaissance et le non respect des règles demeurent les facteurs majeurs de l'infection humaine, particulièrement chez les enfants. Le traitement médical seul n'est pas efficace chez la majorité de patients asymptomatiques ou symptomatiques porteurs du kyste hydatique pulmonaire. La chirurgie reste la principale approche recommandée. Plus de 30 interventions chirurgicales thoraciques sont exécutées annuellement à l'Institut National de Salud del Nino, à Lima, Pérou, pour des kystes hydatiques thoraciques. Le cas clinique présent illustre l'approche chirurgicale actuelle et harmonisée de cette maladie au Pérou.

Mots Clés : Kyste Hydatique; Capitonnage; Simple Endoplication kystique; Chirurgie pulmonaire; maladie endémique.

Introduction

Hydatid cystic disease is caused by the parasite tapeworm Echinococcus granulosis. It is endemic in Africa, the Mediterranean region, the Middle East, South America, Australia, and New Zealand (**figure 1**)[1,2].

There are 2 other clinical forms of echinococcus in humans, the alveolar and polysystic forms, secondary to E. multilocularis in the former, and E. vogel, or E. oligarthrus in the latter[1,2]. These less common species will not be discussed.

E. granulosis is especially prevalent in rural Peru and other endemic regions[1,7]. These rural areas have large domestic animal raising regions, especially sheep, goats, cattle, and hogs. Humans are one of the intermediate hosts. Whereas the target organ is the liver (50-70%) versus lung (20-30%) in adults, the opposite is true for children. Coexistent lung and liver disease is not common, occurring in <15% of cases[4]. Early symptoms are more common in children, given more rapid concentric enlargement of the cyst with compression of adjacent structures, and an increased incidence of rupture with bronchial perforation. Medical treatment alone is not totally effective in the majority of patients, and is reserved primarily for those who have multiple bilateral cysts, prohibitive associated morbidity, or will not tolerate surgical treatment[8,9]. Surgery is the currently accepted primary recommended modality of care in the majority of cases, including both the asymptomatic and symptomatic groups. Lung sparing surgery is especially important and recommended in the pediatric age group. A variety of surgical techniques have been described and advocated for the variety of clinical presentations. The present case illustrates the contemporary approach to hydatid lung cyst disease in children in Peru.

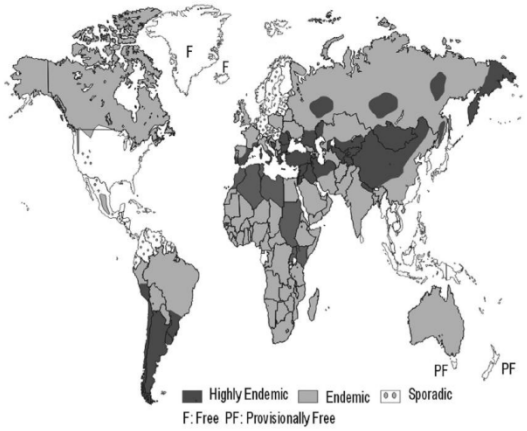

Figure 1: Approximate global distribution of *E. granulosus* (as of 2002). The exact identification of areas of normal and high endemicity is difficult because of incomplete or lacking data. Modified from WHO/OIE 2001

Case Report

A 9 year female, from Cerro de Pasco city in rural Peru, presented to Instituto Nacional de Salud del Nino, in Lima, Peru on July 13, 2008. The mother recounts that her daughter's symptoms started 30 days prior to admission, characterized by an insidious and progressive dry cough, sporadic posterior chest pain, and associated hemoptysis for 8 days prior, with approximate volume of 250 ml. (2 cups). She presented to her local hospital where she remained hospitalised for 8 days, and was subsequently transferred to the National Institute of Health of the Child for further evaluation and treatment.

The past history revealed that the patient was the product of fourth gestation, with no prenatal care, and uneventful birth. Development milestones were normal, and immunizations were current. Physical examination revealed temperature 37ºC, respiratory rate 24, heart rate 86 beats per minute and regular, pulse oximetry satsuration (SpO2) 98 %, and weight 31.5 kg. Heart and lung examination were unremarkable.

Laboratory studies included: Hematocrit 46 %, Hemoglobin 14.50 gm/dL, Leukocytes 7,810, Eosinophiles 9 %, Erythrocyte sedimentation rate (ESR) 15, Blood Group A (+), HBagS (hepatitis screen) not reactivate, HIV negative, Glucose: 172 mg/dl, Calcium 9.9 mg/dl, Na 143, K 3.20, Cl 112, and Western Blot Positive. The chest x-ray (CXR) revealed bilateral solitary cysts, with both suspicious for being complicated (**figure 2**).

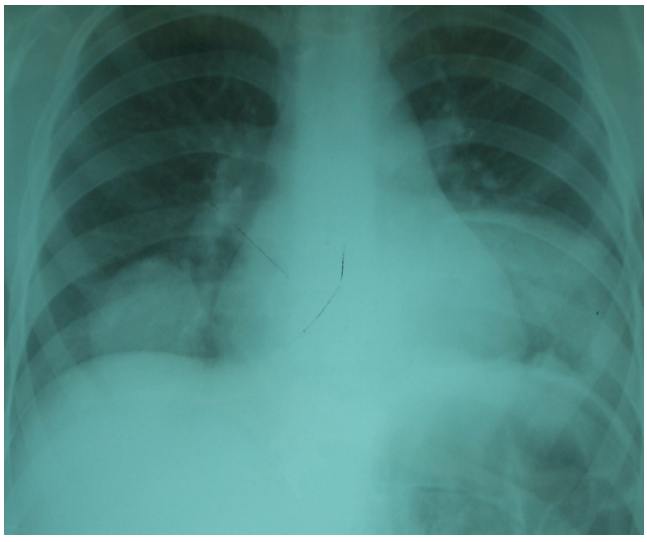

Figure 2: CXR showing bilateral complicated cysts in lower lung fields

The CT chest scan confirmed bilateral complicated cysts (**figure 3**).

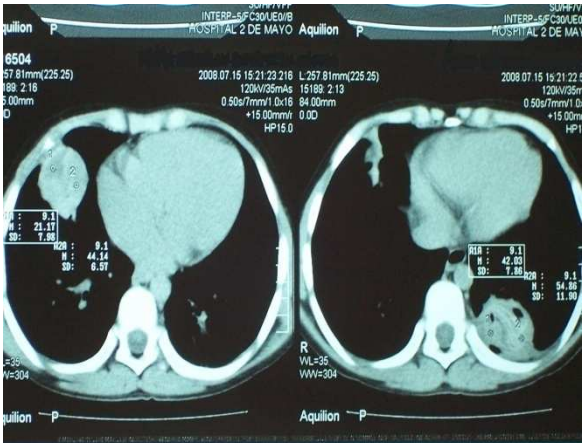

Figure 3: CT scan showing bilateral complicated cysts.
Note the aerated areas within the cysts, and no evidence of mediastinal disease.

An abdominal ultrasound was negative for the presence of liver cysts.
With a preoperative diagnosis of bilateral complicated hydatid cysts, and moderate to severe hemoptysis, surgery was recommended. Following one week of preoperative broad spectrum antibiotic and albendazole (10mgs/kg/day) treatment, the patient underwent a right anterior thoracotomy via the 4th intercostal space on July 23, 2008. A single lumen endotracheal tube was employed. The procedure included cystotomy, evacuation of the ruptured laminal membrane, identification and closure of multiple bronchial air leaks with polypropylene suture (Prolene, Ethicon Inc.. Somerville, New Jersey, USA), open cavity without capitonnage, and pleural drainage of the apical/anterior and posterior/basal chest cavity with 2 chest tubes and connected to under wáter seal drainage at low suction. The operative findings revealed a complicated and infected hydatid cyst (6 x 6 x 6 cms), localized to the lateral right lower lobe (**figures 4-6**).

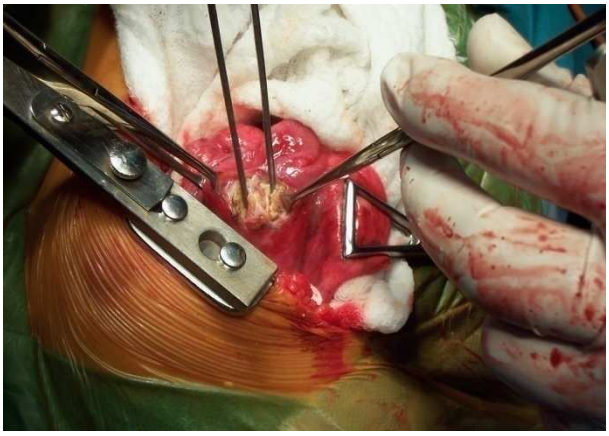

Figure 4: Opened pericyst revealing a ruptured cyst with membranes

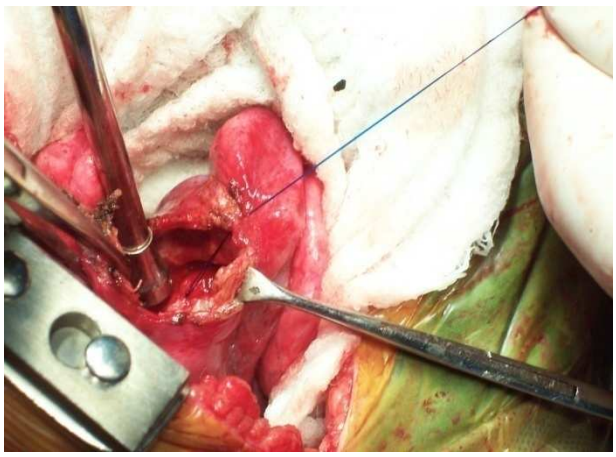

Figure 5: Cyst removed leaving open cavity and surrounding pericystic wall or adventitia.

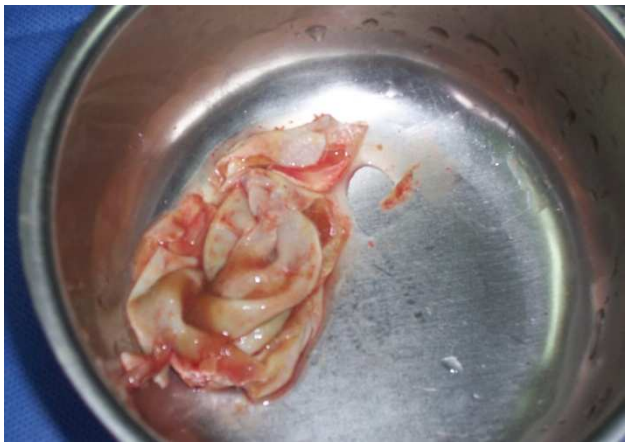

Figure 6: Removed cystic membrane.

Subsequently, during the same hospitalization, and after a satisfactory postoperative course, the second stage operation was performed on August 8, 2008 via a left lateral thoracotomy through the 4th intercostal space. The operation included cystotomy, evacuation of the ruptured lamina membrane, closure of multiple bronchial air leaks with Prolene suture, capitonnage, and pleural drainage with 2 chest tubes, one placed anteroapical, and the other lower posterior. Drainage was applied as first operation. The operative findings revealed dense adhesions of the left lower lobe to the diaphragm and chest wall, The cyst was complicated (6 x 6 x 6 cms), and localized to the mid-left lower lobe (**figure 7- 9**).

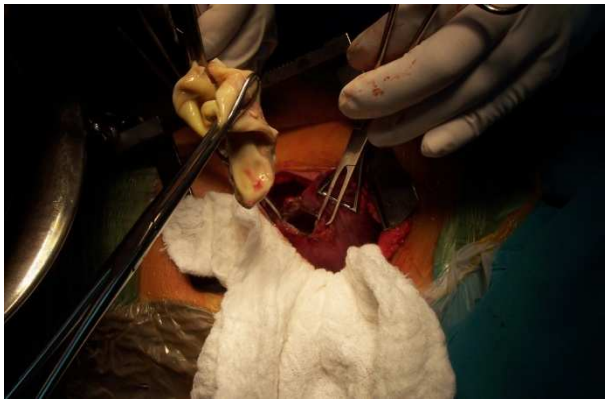

Figure 7: Opened cavity revealing removed ruptured cyst membrane**.**

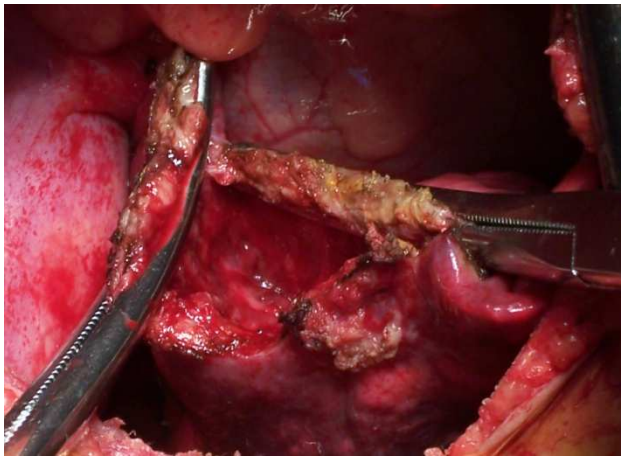

Figure 8: Open cavity with thickened pericyst or adventitial wall. This cavity is cleansed and bronchial fistulae closed with figure of eight suture

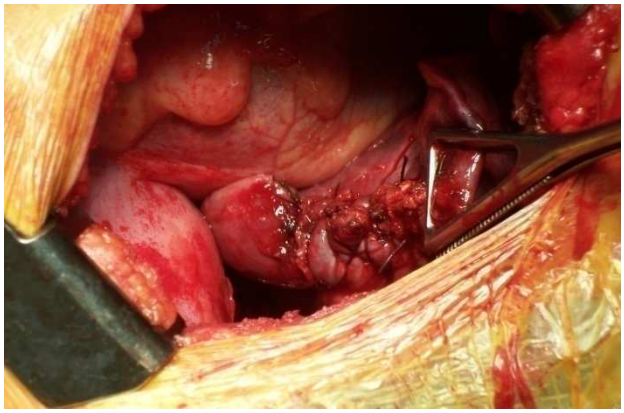

Figure 9: Obliterated cyst utilizing capitonnage method. Cavity is obliterated and the pericyst or adventia layers closed over the end.

The postoperative course was uneventful, and the patient was discharged home on August 16, 2008. Albendazole drug treatment was not continued.

Discussion

A large worldwide surgical experience of hydatid lung cyst disease in children living in endemic countries, especially Turkey, has been reported[10,16]. In Peru**,** human hydatid disease, secondary to the parasite *Echinococcus granulosus* (Taenia echinococcus) genetic type 1 and 5, is caused by the larval form of the cestode “dog” tapeworm[1]. The incidence in Peru is 1.1 per 100,000 population. The incidence is higher in males, and occurs primarily in rural areas of farming and animal domestication. Most infections involve a single cyst. 65% of solitary cysts are found in the liver, with 25% in the lung and the remainder in other organs including kidney, spleen, heart, mediastinum, bone, brain, uterus, fallopian tubes, mesentery, diaphragm, and muscles. In children the ratio of liver to lung is reversed . Approximately 10-15% of lung cysts will have an associated hepatic cyst (http://en.wikipedia.org/wiki/Echinococcus)**.** The life cycle is illustrated in **figure 10** (http://en.wikipedia.org/wiki/File:Echinococcus_Life_Cycle.png).

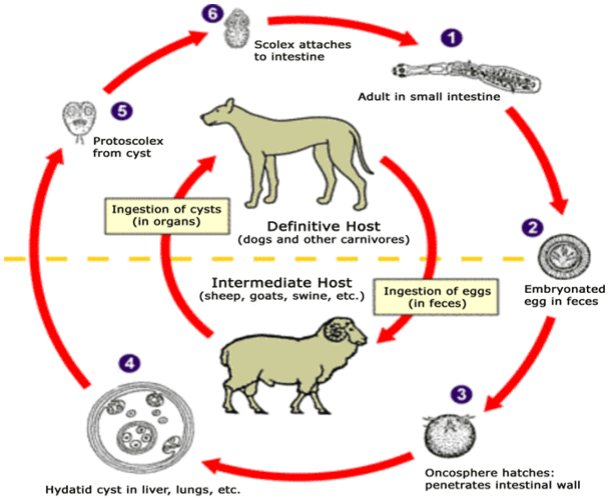

Figure 10: The life cycle.

Echinococcus eggs contain an embryo (oncosphere or hexacanth). These eggs are passed in the feces of the definitive host, and the ingestion of these eggs lead to infection in the intermediate host. The released egg embryo develops a *hydatid cyst*, which can grow to about 5–10 cm within the first year and can survive within organs for years. At a diameter of 1 cm, the wall differentiates into a thick outer, non-cellular laminer membrane that covers the thin inner germinal epithelial layer. From this epithelium, cells begin to grow within the cyst. These cells then become vacuolated (brood capsules), from which protoscolices develop. Daughter cysts also form within these cysts[4].

The intermediate human host becomes infected, more commonly by direct contact with the definitive dog host, especially contaminated feces, or by ingestion of contaminated water or food, contracts the Echinococcus tapeworm eggs that contain the embryo (oncosphere or hexacanth). Sheep are the usual intermediate or secondary hosts. Larval cysts expand slowly over years or decades becoming symptomatic as they enlarge and impinge on local structures. The cysts contain hundreds of viable scoleces that are capable of developing into adult tapeworms upon ingestion by a definitive host, such as the domestic dog. The cysts grow independently. Pressure within the intact cyst ranges from 20-60 cm H2O, and contains antigens capable of immediate host anaphylaxis[2]. The germinal membrane lining the cyst produces new scoleces on an ongoing basis. Each scolex is capable of becoming a new daughter cyst, either within the original cyst, or elsewhere should the original cyst rupture. The established hydatid lung cyst wall is composed of 3 layers. This includes: the inner germinal layer, the outer laminated layer, and the outer adventicial or pericyst layer which is the host reactive area, and composed of fibrous and compressed inflammatory lung tissue[2].

Humans become infected, as noted, primarily by ingesting contaminated infected food or water, and rarely by direct contact with infested dogs or domesticated farm animals. There are three mechanisms of lung involvement: hematogenous spread through the liver; lymphatic spread from the thoracic duct to the right heart and then into the lung parenchyma; or direct exposure from egg inhalation[4].

Most cysts are asymptomatic. Symptoms develop when they become complicated i.e infected or rupture into adjacent structures, most commonly the bronchial tree, or cause compression of adjacent structures. Symptoms are more common in children due to the large expansion and compression of local structures in a fixed thoracic space, given that their lung tissue is more elastic and expansive than restrictive liver tissue. There is also a higher incidence of rupture in about 30% of cases[5]. Common symptoms include fever, dry or productive cough, chest pain, dyspnea, and occasionally hemoptysis with complicated cysts. The expectoration of large amounts of salty fluid, or smaller amounts of ruptured cyst walls (“grape skins”) are characteristic of a complicated cyst, and an associated bronchial connection. Rarely, with rupture or erosion of a liver cyst through the diaphragm into the lung a bronchobiliary fistula can develop with resultant expectoration of bile fluid (biloptysis). Ruptured cysts also have a higher incidence of associated problems, including anaphylaxis, pneumonia, pneumothorax, and empyema. Thoracic deformities and growth retardation have been reported in children, but are extremely rare.

The initial CXR (PA/lateral) is highly suspicious for hydatid cyst disease. The simple cyst is usually a spherical well-defined homogeneous mass or opacity with sharp margins. The size determines the degree of symptoms and associated features that include distal atelectasis or pneumonitis. There are several radiographic findings that are seen, especially with complicated cysts (i.e. ruptured or infected). These are the result of bronchial communication creating air fluid levels. They create a meniscus of air between the pericyst and endocyst. This is called the water lily or crescent sign[4,6]. The right lower lobe is the most common location. The incidence of solitary cysts is about 60%, and multi unilateral or bilateral cysts range from 20 to 50%. It is important to document the number of cysts present either unilaterally or bilaterally since documentation at surgery can be difficult for the deeper seated or smaller cysts. Associated pneumothorax or empyema can also be present from ruptured complicated hydatid cysts. The presence of air or loculations within the space is confirmatory or suspicious for rupture and/or infection. CT scanning (sensitivity > 90 %) has become routine for surveying both the chest and abdominal cavities. Confirmation of other cysts and the presence of rupture can be confirmed, as well as associated hepatic involvement. The differential diagnosis in children is limited, given that carcinoma, tuberculoma, or congenital cysts are rare or uncommon. Abdominal ultrasound is routinely performed, though the incidence of hepatic cysts is less common in children.

Laboratory tests complement the clinical and radiological findings. Serological testing with IgG ELISA (enzyme-linked immunosorbent assay) (sensitivity 80-99%; specificity > 60%), and immunoelectrophoresis (IEP) (sensitivity > 70%; specificity 100%) are the current recommended laboratory tests[1,5]. Serology is usually positive with hepatic cysts but sensitivity drops below 50% with solitary pulmonary cysts even when the cyst is large.

Eosinophilia > 5 - 8 % is observed in 20-34% of cases, especially with complicated cysts. An elevated peripheral WBC count is suggestive of infectious contamination of a ruptured cyst. The Casoni skin test,and the Weinberg complement fixation test are no longer utilized[3]. Serology testing is also helpful in in both early and long-term postoperative surveillance.

Diagnostic bronchoscopy is no longer routinely done or recommended. There is concern that it may provoke bronchial rupture, or worsening hemoptysis when present[5]. However, it may be useful in patients without a diagnosis, especially older children to rule out carcinoma, tuberculoma, or in suspected complicated, ruptured cysts. Therapeutic bronchoscopy has not been well described, but may play a role in massive hemoptysis to isolate the side of bleeding with bilateral cystic disease. Needle thoracentesis may be helpful for evaluation of pleural effusions, especially for a coexistant ruptured cyst with pleural extension.

There is no unified surgical classification of thoracic hydatid cysts regarding definition, size, location, distribution, associated adjacent structure involvement, or definitive guidelines regarding treatment (**Table N°1**)[17].

Table 1 : Surgical classification of thoracic hydatid cysts

localisations	Site	
Intrapul-monary	Complicated cyst (infected/ruptured) vs. Simple cyst (intact)	
	Giant (>10cm)	
	Single lobe, usually lower	
	Single bilateral	
	Unilateral/ Multilateral	
	Multiple cysts: unilateral or bilateral	
	Lung location: hilar, mid-lung, or peripheral	
Extrapul-monary/ Intrathoracic	Pleural extension	
	Local extension from lung:	Bronchus
		Pulmonary artery
		Aorta
	Mediastinum	
	Pericardium	
	Heart	
Extra-thoracic	Liver: direct penetration or rupture into thorax, or separate cyst	

Treatment

Medical

Every identified pulmonary hydatid cyst should be treated[5]. However, medical treatment alone is not effective since drugs cannot penetrate the hydatid cyst wall. Drugs are useful in acute therapy situations when cysts rupture (spontaneously or due to surgical mishap) and scoleces are lying free before encysting again. They are also useful in patients who are not candidates for surgery, and as adjunctive therapy perioperatively, especially for complicated contaminated cysts.

The benzimidazole compounds albendazole (ABZ) or mebendazole (MBZ) are the drugs of choice for intact hydatid cysts that are not operable, such as multiple or disseminated, or in non compliant or high risk patients with severe prohibitive comorbidity[1]. They are also the adjunctive drugs of choice, when used, for surgery. However, a trial of ABZ may be considered for solitary cysts that are < 10 cm. Response is generally slow and complete in a minority of cases. However, when used, ABZ is preferred, given better GI absorption and higher plasma levels. Reported response rates with chemotherapy alone range from 25-70%[1,3,5]. With medical treatment alone the recommended dose of ABZ is 400mgs bid x 1-6 months; children-15mg/kg/day for 1-6 weeks.

Surgery is recommended for the majority of solitary cysts, especially in the pediatric population. When surgery is planned, preoperative broad spectrum, or culture proven specific antibiotics, are recommended for proven or suspected complicated cysts.

There is no unified consensus regarding ABZ or MBZ as adjuvant treatment[11,17]. There is concern that routine pre-operative ABZ may, in fact, increase the risk of operative rupture of intact cysts, secondary to weakening of the cyst wall[8,9]. Yet there are potentional advantages that include: reduction in size, decreased intraluminal pressure, and decreased cyst fertility or growth[11]. Our approach is to administer ABZ for 7-10 days prior to surgery, or to continue medication previously initiated, as well as appropriate antibiotics if an infected cyst is suspected or confirmed. When used postoperatively, ABZ treatment is continued in cycles of 28 days for 1-3 months, or longer, in doses of 10-14mgs/kg/day with a 14 day rest period between cycles[5]. However, ABZ treatment is individualized, given that non-compliance, and access to drugs may be limiting factors.

Interventional

Puncture-aspiration-injection-reaspiration (PAIR) is an invasive technique used primarily for liver cysts[1]. It is not recommended for lung, heart, brain, or spinal disease[1,5]. In fact, it may be contraindicated, since pneumothorax, development of new cysts, and anaphylaxis are possible complications. Percutaneous thermal ablation has also been advocated, but not for parenchymal lung disease[1].

Surgery

Operative Aspects

Surgery is the treatment of choice for the majority of hydatid cysts in both asymptomatic and symptomatic pediatric patients, since most patients will ultimately become symptomatic and develop complications[10,16].
Children develop symptoms with progressive concentric enlargement of cysts and compression of adjacent structures, as well as a higher incidence of rupture.The principle goals of surgery is to remove the involved cyst(s), utilize precautions to prevent cyst rupture and contamination, meticulous closer of all bronchial air leaks, preservation of lung tissue when feasible, especially in children, and prevent recurrence from residual disease or incomplete resection.
Careful planning and timing of surgery, access incisions, exposure, and identification of the involved areas are important. The cysts are usually classified as superficial or deep, and simple (intact) or complicated (i.e. ruptured and/ or infected) (Table N°1). The latter is usually diagnosed on the preoperative CXR and thoracic CT scan, but sometimes it is confirmed only at operation. A variety of scenarios can occur with regard to the extent of disease (**figure 11**).

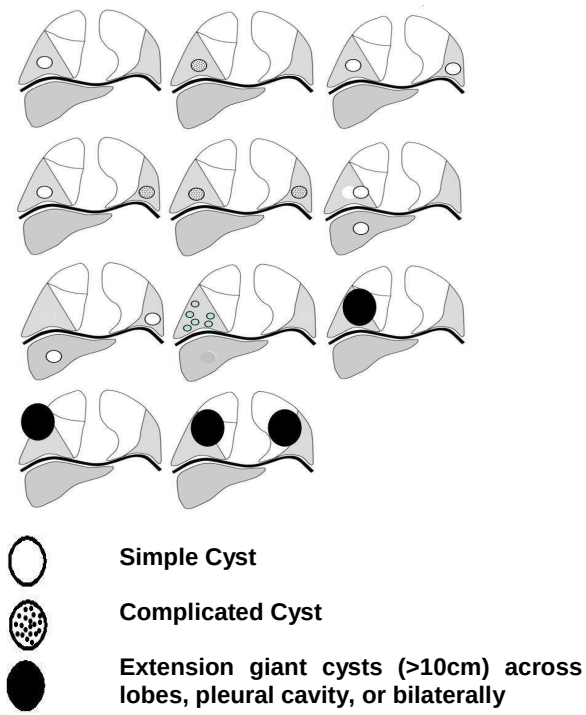

Figure 11: Sample of varying presentations of pulmonary hydatid cysts.

Anesthetic techniques usually require one lung ventilation with a double lumen endotracheal tube (DLT), or a bronchial blocker. This is especially helpful for complicated cysts, or bilateral cysts, to mitigate intra-bronchial spillage, aspiration, or contamination, especially in the lower lobes[18]. However, double lumen tubes or bronchial blockers can be difficult to place in children, and are not routinely used in our patients. Other disadvantages of DLT include misplacement, hypoxemia related to unilateral lung collapse or positioning, and traumatic intubation injury to the trachea or bronchus on intubation. Our routine in children is to employ single lumen endotracheal intubation for simple, non-infected cysts, and reserve DLT's for adolescents with large or infected cysts (complicated).
Access for open procedures include: anterior thoracotomy, posterlateral thoracotomy, simultaneous bilateral thoracotomy, bilateral trans-sternal thoracotomy, median sternotomy, staged bilateral thoracotomy, right transdiaphragmatic approach to the liver, and video assisted thoracoscopic surgery (VATS).
A number of surgical techniques have been described and advocated[19,23]. These include:

1. Enucleation (intact endocystectomy- Ugon or Barrett's technique)

This procedure is performed with or without aspiration/injection of scolicidal agent[5,6,7,11,19,20]. If>5cm, the cyst is aspirated, injected with scolicidal agent, then reaspirated (15-30 minute dwell time). Then dissection of the visceral pleura from the adventia or pericyst is performed. The operative field is protected with scolicidal soaked sterile sponges. A cruciate incision is made over the underlying endocyst. Careful enucleation of the intact cyst is then performed. The cavity is then cleaned and all identified bronchial leaks oversewn with figure of eight sutures. The cavity is left open if small and peripheral. Otherwise capitonnage is performed.

2. Cystotomy/ Cystecomy with or without capitonnage

Cystectomy involves removal of the cyst structure that includes the laminated and germinative layers encompassing the cyst content. The host reaction adventitia or pericyst layer is retained. Capitonnage is the term for closer or obliteration of the residual cavity. After cleansing of the cavity with 10-20% hypertonic saline soaked sponges, the bronchial leaks are closed with non-absorbable polypropylene, catgut, or coated polyglactin suture. Small peripheral cyst cavities do not usually require closure or capitonnage. Finally, a two layer method with suture closure of pericystic adventitial walls is followed, then horizontal mattress sutures obliterates the cavity, Capitonnage of deep cysts must avoid potential distortion of the remaining lobe, and avoid potential dead spaces. This procedure is commonly performed for large, deep and complicated (ruptured or infected) cysts.

3. Pericystectomy with or without capitonnage (Perez-Fontana technique)[5,6,22].

This is an extended operation that removes the adventia or pericyst as well. There are no defined margins, and parenchymal lung remains to be repaired or obliterated with capitonnage, so as to control bleeding and air leaks. This is a more complex procedure.

4. Combined approaches for lung and liver cysts

Following treatment of the lung cyst a phrenotomy or transdiaphragmatic resection of the liver cyst is performed over the right hepatic dome[19,20]. Liver cysts are different, insofar as they contain more daughter vesicles, and require scolicidal agents for local control. Via a lower right thoracotomy through the 8th or 9th interspace, the diaphragm is exposed. The scolocidal agent is injected into the cyst that is palpated over the diaphragm. The diaphragm and cyst are opened. The daughter cysts or vesicles are aspirated or removed with spatula. A latex drain is placed in the cavity and exited out the side below the diaphragm. The cyst edges are marsupialized along the borders to the adjacent diaphragmatic edges.

5. Lung resection includes wedge resection, segmentectomy, lobectomy, or pneumonectomy[5,6,15]

Less than10% of children require resection for simple cysts vs. > 20% for complicated cysts. If > 50% of the lobe is involved then resection is recommended. **Balcic et al**.[15], in a group of 63 children, noted a higher resection rate with ruptured or complicated cysts (6.3% wedge, 3% segment, and 12.7% lobectomy). **Dincer et al.**[16], in a series of 44 children, reported an incidence of 16% lung resection as opposed to 5% in adults. This was due, in part, to a higher incidence of advanced disease in their pediatric patients, and a mean cyst diameter of 11.6cm.

6. VATS.

VATS has not been widely performed for hydatid cystic disease, given the concern for potential cyst rupture and allergic reaction contamination during or following the procedure[23].

Specific Concerns

Ongoing surgical concerns include: the use of scolicidal agents, massive hemoptysis; complicated cysts; giant cysts (>10cm); capitonnage; one stage vs. 2 stage approach for bilateral disease; lung with associated liver cyst; extension of cysts to pleural and extrapulmonary locations; and the future role of VATS.

A number of scolicidal agents have been utilized to prevent anaphylaxis during surgery[4]. They include: 10-30% hypertonic saline, 0.5% silver nitrate, 1-3% hydrogen peroxide, 1.5% centrimide-0.15% chlorhexidine, 40% centrimide, 70-95% ethyl alcohol, 1% formaline in 0.9% saline, 10% polyvinylpirrolidone-iodine, and 10% diluted povidone-iodine. We prefer saline since it doesn't impair tissue healing. The injected dwell time ranges 20-30 minutes prior to reaspiration. Intraoperative cyst rupture or leakage can cause a severe allergic reaction, as well as seeding of daughter cysts in adjacent structures. Severe anaphylaxis can occur, but is rare. Recognition

and immediate treatment with epinephrine and supportive measures is crucial.

Massive hemoptysis in children is rarely caused by hydatid cysts, and is usually caused by erosion into a branch pulmonary or bronchial vessels[24]. In the presence of an infected or complicated cyst resection is the treatment of choice, given lung sparing is not an option.

Complicated cysts with rupture into the bronchus or pleura have an increased incidence of morbidity and mortality, as well as requiring more extensive surgery and longer hospital stay[25]. This justifies a more aggressive approach to earlier recognition and surgical treatment.

Giant cysts are usually defined as >10cm in diameter[26,27]. The incidence is higher in children given the increased elasticity of lung parenchyma allows more rapid growth. They occur more commonly in the right lower lobe.Surprisingly, they are treated effectively with conservative cystectomy and capitonnage. Adjacent atelectatic compressed lung expands to obliterate dead space, thus decreasing the need for lung resection (6-13%)[26]. When recognized, early surgery is recommended to decrease the incidence of spontaneous rupture with resultant contamination and possible anaphylaxis.

There is continued debate regarding the necessity of capitonnage, i.e. obliteration of the residual cavity with circumferential pursestring suture, or imbricating reefing sutures[28,29]. **Delbet** first described capitonnage in 1899 as an infolding of the adventitia or pericyst to obliterated the cavity following cyst removal. **Crausaz** in 1967 described the evolution of this procedure to the placement of circumferential sutures from the base upward to obliterate the space or cavity[28]. The major advantage of this technique is to avoid a residual cavity as a focus for infection, as well as preventing air leaks from residual bronchial fistulae. A disadvantage is lung distortion and residual atelectasis[29].

A one stage versus two stage operation have been recommended for bilateral cysts. Unilateral cysts are more common in pediatric patients. However, with bilateral cysts, a staged thoracotomy is our preference. Other approaches include a single stage operation via a bilateral thoracotomy or median sternotomy approach[13,30,31]. **Lone et al**.[30] recommend a bilateral less invasive approach. This involves a supine position and bilateral small anterior thoracotomy (405 cm) through the 5th intercostal space. This approach is suitable for small simple cysts located more anteriorly. Posterior cysts, especially on the left, are more difficult to reach.

The median sternotomy approach to bilateral hydatid cysts has been reported by several groups, and primarily in adults. **Petrov et al**.[31] reported excellent results via this approach in 82 patients. They caution that this approach is unsuitable for large infected cysts, pleural involvement with empyema or adhesions, and patients with severe comorbidity. Some suggest that concomitant abdominal cysts can be approached with extension of the median sternotomy incision.

A one stage operation for lung and an associated liver cyst has also been described[19,32-36]. We prefer to refer the abdominal hydatid cysts to the pediatric surgeons following the thoracic procedure at the same sitting or later. They are approached via an endoscopic or open procedure. **Kurul et al.**[32] from Turkey have reported a large series of 405 patients with right lung and right subdiaphragmatic liver dome cysts. Other deeper or lower liver cysts were referred to general surgery. Following resection of the lung cyst the diaphragm was opened over the dome cyst. Aspiration and cystotomy was performed. All bile leaks were sutured, then the liver pericyst was inverted with sutures to obliterate the cyst cavity. A subdiaphragmatic latex drain was placed. Placement of an omental flap into the residual liver cavity has also been described[33].

Extrapulmonary or intrathoracic cysts are defined as primary cysts not involved with pulmonary parenchyma, nor an extension of an abdominal process[39]. They require an individualized approach. They can involve the pleura, pericardium, mediastinal structures, or the heart. Yet pleural complications of hydatid cysts can occur more commonly with rupture of a parenchymal lung cyst into the pleural cavity or erosion of a liver cyst into the thoracic cavity[37-40]. Concommitent decortication for empyema is usually performed for superficial parenchymal cysts that rupture into the pleural space. Local extension of pulmonary cysts into the pericardial cavity, pulmonary artery or chest wall are less common. Thoracic rupture of liver cysts with resultant empyema or broncho-biliary fistula require an aggressive complex surgical approach[40].

A classification of bronchobiliary fistulae has been established. Primary cardiac cysts has not been discussed.

The role of VATS for hydatid cysts has not been well defined[23,41-44]. The advantage of a less invasive approach must be balanced with the risk of contamination and incomplete resection and control of bronchial fistula. Simple and small peripheral cysts are more suitable with this approach.

The major postoperative outcomes of surgery include mortality (0-2%), morbidity (3.5-27%), and cure (> 98%)[27]. These are related to the extent of disease, and the operative procedures performed. Bleeding, atelectasis, lung collapse, persistent air leak, empyema, and wound infection are the early complications. Recurrence, or failure to eradicate the disease, is the major long-term complication and concern. Recurrence can occur from exogenous reinfection, or endogenous reinfection from incomplete surgical extirpation[11].

Table 2: Summarizes a contemporary series of pediatric patients treated surgically.

		Mortality	(%)	Morbidity	(%)
Elburjo, Libya (10)	**1995,**	43	0	NA	1
Rebhandl, Austria(11)	**1999,**	33	0	42.4	2
Celik, Turkey(12)	**2000,**	122	0	4	1
Topcu, Turkey(13)	**2000,**	128	0	15.6	1
Cangir, Turkey(14)	**2001,**	33	NA	NA	1
Balci, Turkey(15)	**2002,**	63	4.7	25.4	NA
Dincer, Turkey(16)	**2006,**	44	4.5	13.6	4.5%

In summary, our surgical approach is not to routinely aspirate simple and solitary non-infected intact cysts. For infected or complex cysts, these maneuvers are also not performed, given that infection has already destroyed the active cyst contents. Lung sparing is performed whenever feasable. Pleural adhesions are lysed, the involved lung and inferior pulmonary ligament mobilized, and identification/localization of the cyst by direct observation or palpation. Rarely, for larger intact cysts, aspiration is performed. Prior to aspiration or opening the cyst, the area is surrounded with soaked 10% saline packs/sponges. Then 20cc of hypertonic 20% normal saline is injected, followed by re-aspiration. Then the cyst is opened. A hypertonic saline soaked sponge is placed into the cavity to clean and debride. Identified bronchial leaks are closed with interrupted polypropylene (Prolene) or polyglactin (Vicryl, Ethicon) suture. The redundent adventicial or pericystic wall is excised. The cavity is left open if small or peripheral. Otherwise capitonnage is performed, if large or deep. The adventitia or pericyst layers are then closed primarily over the capitonnage. Two chest tubes are placed to drain the anterior and posterior chest space, and attached to low suction under water seal drainage. They are removed following full lung expansion on CXR, and no air leak at 24 - 48 hours.

For complicated cysts ABZ treatment is usually continued in cycles of 28 days for 1 week-3 months in doses of 10-14mgs/kg/day with 14 day rest period between cycles[5]. Liver function tests are monitored. Broad spectrum antibiotics are given in selected situations that include contaminated cysts with positive bacterial operative cultures. With bilateral cysts, the 2nd stage operation is performed at 10-14 days following the first stage procedure. If the liver is involved, then an open abdominal or laparoscopic surgery is done concomitantly by the pediatric surgery team **Topcu et al.**[13] present a reasonable algorithm for pediatric pulmonary hydatid cysts (figure 12) at the second stage chest procedure.

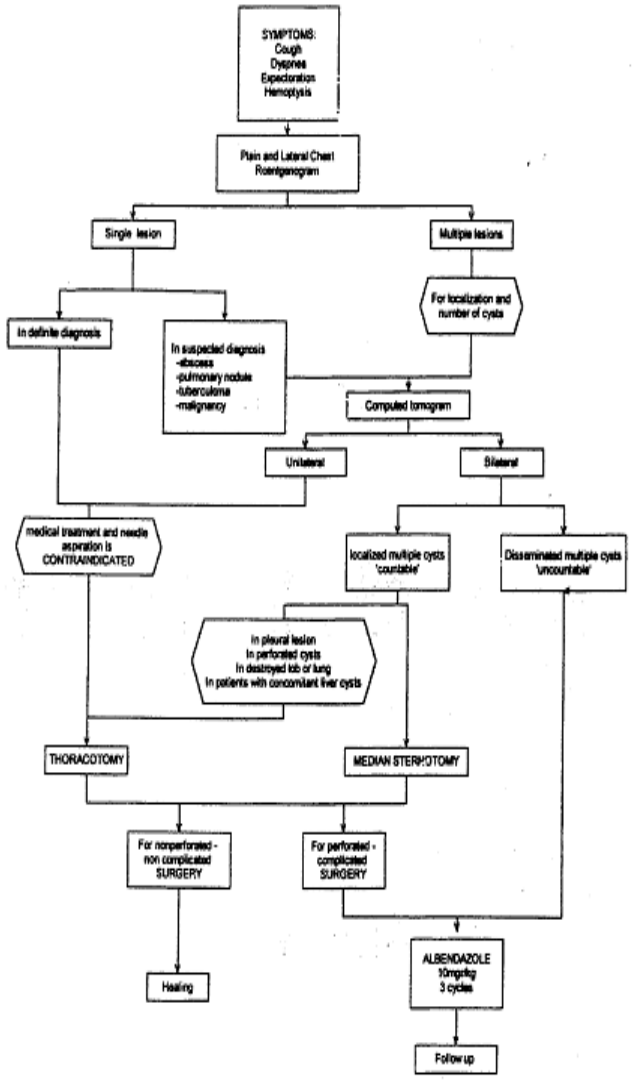

Figure 12: Treatment algorithm for pulmonary hydatid disease

Transdiaphragmatic procedures are not routinely done. Our approach differs somewhat in that we favor a staged thoracotomy for bilateral cysts, vs. the one stage median sternotomy approach.

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RESUMES/ABSTRACTS

PREMIERE CONFERENCE SCIENTIFIQUE ANNUELLE DE L'ASSOCIATION AFRICAINE DES CHIRURGIENS THORACIQUES ET CARDIO-VASCULAIRES (AATCVS) 30-31 AOUT 2013, ACCRA (GHANA) / FIRST ANNUAL SCIENTIFIC CONFERENCE OF THE AFRICAN ASSOCIATION OF THORACIC AND CARDIOVASCULAR SURGEONS (AATCVS) AUGUST 30TH- 31ST , 2013,ACCRA(GHANA)

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1. ADULT CONGENITAL HEART SURGERY IN A GENERAL CARDIAC PRACTICE

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Background: In Argentina pediatric and adult heart surgery are performed almost exclusively by different teams leaving adults with congenital heart disease somehow in the middle. We used a multidisciplinary team approach. The aim of this study was to analyze our results for the first 8 years of this experience.
Patients and Methods: Between June 2005 and June 2013, 45 patients were operated on by our pediatric-adult cardiac surgery team. We performed a retrospective analysis of the data in our database.
Results: In this population the mean age was 36.4 years (range 15-74), and 69 % (31) were women. By far the two most common pathologies were ASDs accounting for 69% (31) of the cases, followed by VSDs 15% (7). There was also a miscellaneous array of different pathologies including patent ductus arteriosus, coartaction, and others. Associated valve disease was observed in 22%, the most common being tricuspid insufficiency in 7 cases, mitral valve disease in 6 and aortic valve disease in 1. There were 3 reoperations. Valve repair was the most common valve procedure and mini-sternotomy was the preferred approach in almost half of the patients 21 (47%). The mean perfusion time for the entire group was 55 min (range 20-120), with an aortic cross clamp of 35 min (range 11-95 min), and for the isolated ASD 35 and 19 min respectively. Mortality for the entire group was 2 patients.
Conclusions: The team approach solves two of the problems associated with these patients. First considering that one third of the cases are other pathologies than simple ASD, pediatric surgeons are more used to solving them, and secondly, almost a quarter of the patients presented with valve disease, which is the adult cardiac surgeons' territory.

2. AN UNUSUAL PRESENTATION OF CONGENITAL DIAPHRAGMATIC HERNIA: CASE REPORT AND LITERATURE REVIEW

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Congenital diaphragmatic hernia is a rare congenital anomaly. It causes severe respiratory distress in the newborn. The risk of mortality is very high when the diagnosis is missed, more so with an unusual presentation. An index of suspicion is needed for early diagnosis and intervention. Management involves initial stabilization and subsequent surgical repair of the hernia. An 11 day old neonate presented to the neonatal unit of our Institution with a history of progressively worsening shortness of breath since birth. He was not cyanosed and was able to maintain O_2 saturation above 90% on room air. Bowel sounds were present in the right mid and lower lung zones. Chest x-ray revealed multiple cystic opacities in the lower half of the right hemithorax. This was confirmed on ultrasound to be herniation of bowel into the chest. Echocardiography showed there was no associated congenital cardiac anomaly. He was initially stabilized at the neonatal care unit and subsequently had a primary hernia repair. He did well post operatively. Congenital diaphragmatic hernia should be considered a differential in newborns with respiratory distress, more so with unusual radiological findings.

3. ANALYSIS OF CORONARY ARTERY SURGERY IN GHANA

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Background: It is well documented that coronary artery disease is uncommon in Africa. In the last decade, Africa has been going through the transition phase of the burden of disease, and as such the incidence of coronary artery disease is rising in keeping with westernization of most of the urban cities in Africa. Actually, some people still question the validity of the low incidence of coronary artery disease in African patients, where hypertension, dyslipidemia and obesity, the main risk factors for heart disease, are very common. Therefore, some believe that the limitations in providing reliable data concerning the incidence of coronary artery disease may be the reason for the supposed rarity of the disease in Africa. This paper assesses the results of coronary artery surgery performed at the National Cardiothoracic Centre in Accra.
Patients and Methods: We retrospectively analyzed all cases of coronary artery bypass graft (CABG) done here between 1995 and 2012. We defined our indication for surgery as coronary occlusion of more than 70%. The operation database and clinical records provided the necessary information.
Results: The study enlisted 44 patients. There were 39 males (88.63%) and 5 females (11.36%). The mean age was 58 ± 8yrs. The risk factors were hypertension (93.18%) hyperlipidemia (79.54%) and diabetes (25%). Smoking was only found in two Ghanaian patients and one foreigner. All patients underwent conventional on-pump bypass with St Thomas crystalloid cardioplegia. The mean ischemic time was 74.34 ± 13.21 minutes and total bypass time of 128.27 ± 23.52 minutes. The culprit vessel was the LAD; mean number of grafts was 2.5 ± 0.60. The mean ICU stay was 3.53 ± 0.87 days and the total hospital stay was 13.60 ± 2.30 days. Overall survival was 93.18%, 81.81% and 63.64% in the first, third and fifth years respectively.

Conclusion: The limitations in providing reliable data concerning the incidence and treatment of coronary artery disease may be the reason for the supposed rarity of coronary artery bypass graft in Africa. The few cases that underwent coronary artery bypass had comparable results with that reported in the literature.

4. ANOMALOUS ORIGIN OF THE LEFT COMMON CAROTID ARTERY

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The aortic arch and its branches have a complex embryological origin, and therefore congenital anomalies involving them are common. A common brachiocephalic trunk is the most frequent normal variant of aortic arch branching. We report the case of a 56-year-old female who was brought to our Institution with a history of sudden collapse associated with a pulsating right-sided neck swelling. Investigations ruled out aneurysmal dilatation. An abnormal branching pattern of the aortic arch branches was found instead. We highlight the anatomic variants of the aortic arch and discuss the embryological aberrations with emphasis on the significance of such variations for clinical practice.

5. BEATING HEART VALVE SURGERY

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Background: With a better understandingof the anatomy and the physiology of the heart, advanced methods and techniques can be developed to enable cardiac surgeons offer better services to their patients. And even though cardiac surgery is one of the fastest growing areas of Medicine due to the advancement of technology, there is still a group of patients with valve disease and low ejection fractions who are at high risk of inability to restart the heart after the cardiac arrest (which is required for the procedure). It is in line with this that the option of performing valve surgery without stopping the heart has been investigated. A descriptive observational prospective study was carried out.
Patients andMethods: The study enlistedacohort of adult patients admitted with valvulopathy, ejection fraction less than 45%, and NYHA class III-IV admitted in Hospital Hermanos Ameijeiras, Havana from 2001 to 2006.
Results:A total of 27 patients were included in this study with a male predominance of 70%. This group had valve replacement on pump with continuous normothermic oxygenated blood perfusion through the coronary sinus. The total bypass was 75 ± 18.42 minutes, and clamp time of 65± 15.24 minutes. The cardiac ischaemic enzymes (Troponin I, CK-MB and Lactic Acid) were normal peri-operatively, only elevated three hours post operatively. The complications of this technique are similar to the conventional technique. The ejection fraction improved above 45% in the first 15 days post-operatively in 7 patients (28%), at one month post-operatively in 16 patients (64%), at three months in 18 patients (75%), at six months (88%) and 80% after a year. The patient survival in this group was higher than those on medical treatment.
Conclusions: In our experience, valve replacement can effectively be done without stopping the heart in high risk patients with continuous oxygenated blood perfusion. The clamp time, bypass time and hospital stay is similar to conventional surgery. More than three-quarters of our patients improved in functional class and ejection fraction.

6. BIDIRECTIONAL GLENN SHUNT FOR UNIVENTRICULAR PHYSIOLOGIES AND NON CORRECTABLE PULMONARY ATRESIAS – CAN WE AVOID A FONTAN OPERATION IN SUCH SELECTED CASES?

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Background: A Fontan Operation in non-optimal situations carries a higher mortality and morbidity with much longer hospital stays and recurrent pleural effusions and chylothorax.We wanted to know if patients can remain well on Glenn shunt alone at 2 years follow-up without Fontan surgery.
Patients and Methods: We studied 32 cases of varying types of univentricular hearts (Single Ventricular Pulmonic stenosis – 11, tricuspid atresia – 8, L-TGA with VSD and PS or Single Ventricle ,VSD straddling A-V valve or common A-V valve – 6, and Pulmonary Atresia with DORV or remote VSD's – 7 with suboptimal features for Fontan like high left ventricular end-diastolic pressure or mild increase in PA pressures (mean PA pressure 14-18 m Hg) or mild A-V valve regurgitation or double SVC or IVC interruption for which a Bidirectional Glenn surgery was done successfully and patient followed up for a period of 2 years. Average age of patient was 5 years (range 9 months – 12 years), pre-op oxygen saturation varied from 71% to 80 %. Bidirectional Glenn shunt was performed with aortic cross clamp – 4 patients, off bypass in 5 patients and with cardiopulmonary bypass in 17 patients. The operation mean time was 2 hours. Average ICU stay was 4 days. No mortality occurred.
Results: At the end of one year all the patients were doing well with good improvement in milestones, weight gain and improvement of oxygen saturation at an average of 5 % in the whole group. All patients were studied with cardiac catheterization at end of two years and 5 patients underwent Fontan surgery. The rest of 27 patients were doing well at 24 months on Glenn shunt alone.

Conclusion: The bidirectional Glenn Shunt as a final surgery remains an attractive operation in patients who are at high risk for post-operative morbidity after the Fontan operation.

7. BLUNT CHEST TRAUMA IN A CHILD FROM AIR BAG DEPLOYMENT: A CASE REPORT

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The dashboard airbags in cars are one of the main reasons forpreventing children from occupying the front seats. The airbag may be deployed even in low-speed collisions causing injury from the large volumes they occupy on deployment. An 18-month old girl presented in the emergency unit with progressive dyspnoea for 6 hours after a road traffic accident. She was on the mother's lap (who was not wearing a seat belt herself) horizontally when the car had a low-speed collision with a stationary car off the road. The mother propelled forward, hitting her head against the dashboard and sustaining a laceration on her forehead. The child sustained a blunt chest injury: bilateral haemothorax and lung contusion.He child was managed conservatively, with a good outcome.

8. BOVINE PERICARDIAL CONDUIT REPAIR IN PULMONARY ATRESIA – SINGLE CENTER EXPERIENCE

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Background: Unifocalization and then correction of pulmonary atresia for both confluent and non-confluent pulmonary arteries are extremely challenging in third world countries because of the high cost involved in multiple surgeries and the extra cost of valved-conduits. We report our experience with 50 cases of pulmonary atresia with confluent and non-confluent pulmonary arteries in which total repair was done after unifocalization and antegrade flow into PA's established using a RV-PA conduit fashioned with bovine pericardium.
Patients and Methods: Patients were followed up for an average period of 2 years. The age range was 2 – 20 yrs, 34 males, and 16 females. Twenty patients had a left BT shunt and 15 a right BT shunt. Out of these patients, 26 were studied with Echo Doppler and CT angiogram for pulmonary atresia and major aorto-pulmonary collaterals. The other 24 patients were subjected to cardiac catheterization to detect any evidence of pulmonary hypertension (especially patients with old BT shunts). The average bypass time was 3 hrs. Post ICU care required 8 days. Blood requirement was 1.3 units per patient.
Results: Post- operative ECHO Doppler on 2nd day showed an average conduit gradient of 25 mm Hg. Only 9 patients had significant RV dysfunction. Five patients remained in low cardiac output, of which 4 were put on ECMO support and of which 2 children died after 7 -14 days (post ECMO implant). Two others died of other causes. The other 43 patients were well at end of one month. The cost analysis showed an average cost reduction of 40 % when compared to patients implanted with commercially available RV –PA conduits.
Conclusions: Unifocalization and ICR for pulmonary atresia of all types are safe and feasible at lower costs.

9. CABG: OFF PUMP, ARTERIAL GRAFTING AND COMPLETENESS OF REVASCULARIZATION IN 330 CONSECUTIVE CASES IN A LOW VOLUME CENTER

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Background: The aim of this study was to describe our results using a selective approach with off pump and arterial grafting in a low volume center (less than 500 cardiac cases a year) in Argentina.
Patients and Methods: An all comers study was conducted during a three-year period (June 2010-June 2013). All 332 patients were operated on by two surgeons with 10 years' experience at the beginning of the study. Prospective data was collected and retrospectively analyzed.
Results: The mean age was 62.9 years (37 – 84) and 85 % were male. The operative mortality was 4.81 % for the entire group and 2.2% (4/183) for elective cases. Off pump was electively done in 76.49% of the time, with a conversion rate of 3.61 %. Complete revascularization was achieved in 81.8% with no difference between on pump (off pump: 80.96 %; on pump 84.5 % p=ns). The most common reason for incomplete revascularization was ungraftable vessels. Arterial grafting to LAD was performed in 98.67 %. Multiple arterial grafting using radial, RIMA or GEA was done in 49.12 % and total arterial grafting in 21.59%.
Conclusions: Low mortality and complete revascularization is feasible using either off or on pump. Arterial grafting to LAD is almost always possible. The quality of the vessels is the main reason for incomplete revascularization in both groups.

10. CHALLENGES IN MANAGEMENT OF MALIGNANT PLEURAL EFFUSION AT THE NATIONAL CARDIOTHORACIC CENTRE, ACCRA, GHANA

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Background: Malignant pleural effusion (MPE) presenting with dyspnea is a common emergency. In managing these patients, some challenges are encountered and these compound their morbidity. This study was designed to identify these challenges and the effect on patients' morbidity.
Patients and Methods: A 5-year (2008-2012) retrospective analysis was done using the ward admission and discharge records and the patients' case notes.

Results: The total number of patients was 64. There were 14 (21.9%) males and 50 (78.1%) females. Twenty-two (42.2%) and 42 (57.8%) had serous and haemorrhagic effusions respectively. Breast cancer patients were 24 (37.5%). The rest were bronchogenic carcinoma 13 (20.3%), mediastinal lymphoma 7 (10.9%) and osteosarcoma 6 (9.4%). Endometrial and ovarian carcinomas were 4 (6.3%) each and other malignancies were 6 (9.4%). Thirty five (54.7%) patients underwent tetracycline pleurodesis. Pleurodesis was not performed in 29 (45.3%) due to trapped lung. The recurrence rate of tetracycline pleurodesis was 23.5%. Twenty (31.3%) had pleural fluid cytology with a sensitivity of 40%. Out of 57 patients discharged, 50 (87.7%) were lost to follow up. Twenty three (35.9%) were admitted for 3-4 weeks. Twenty (31.3%) were on admission for one week and the rest 20 (31.3%), for 8-13days. One (1.6%) patient was admitted for six weeks. Prophylaxis against chest infection and deep vein thrombosis (DVT) was administered in 60 (63.8%) and 46 (71.9%) patients respectively. Two (3.1%) and 14 (21.9) were treated for DVT and malaria respectively. Three (4.7%) patients became oxygen dependent due to metastatic lung disease. In-hospital mortality was 7 (10.9%).
Conclusion: The morbidity of patients with MPE was further compounded by prolonged hospital stay, predisposing them to DVT and malaria. Trapped lung made a significant number unsuitable for pleurodesis.

11. DEVELOPING PAEDIATRIC CARDIAC SURGERY IN AFRICA

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Background: The public health impact of congenital heart defects (CHD) in Africa is unknown. We sought ways in which the current services could be improved by investigating access to tertiary care for CHD.
Patients and method: Consecutive patients referred for evaluation and treatment of CHD at Ghana's National Cardiothoracic Centre between August 2011 and July 2012 were enlisted with retrospective analysis of their records. Extrapolation was used to estimate the birth prevalence of CHD in Ghana. Access was evaluated in terms of utilization of diagnostic and surgical services.
Results: We estimated an annual birth prevalence of 5,840 CHDs. Eight hundred-and-eighteen hospital patients (53.4% females) were enlisted; median age 2 years (2 days – 59 years). There were 329 infants diagnosed with CHD. Ventricular septal defects, atrial septal defects, and tetralogy of Fallot accounted for 617 (75.4%) cases. Surgical intervention was performed for 128 patients (including 6 infants) during the study period with an overall hospital mortality of 7%. The cost of open heart correction was at least 3.4 times that of closed heart correction but the affordability(5% vs. 39%; *OR* = 7.4, 95% CI 4.6 – 12.0; $p < 0.0001$)disproportionately favored closed heart correction because of lower cost.
Conclusion: Although surgical intervention for CHD has a good outcome, restricted access to diagnosis and treatment portends a poor outcome for the majority of individuals born with CHD. Our local experience is probably a reflection of the outlook for children born with CHD on the African continent. There is the need to demonstrate the public health impact of CHD through population studies to facilitate a change in public policy. Urgent steps are required to develop a technical consensus about the appropriate public health approach to enhance geographical and financial access to CHD services on the continent.

12. EXCISION OF A GIANT ANTERIOR CHEST WALL PLEXIFORM NEUROFIBROMA AND CHEST WALL RECONSTRUCTION WITH METHLYMETHACRYLATE AND VERTICAL RECTUS ABDOMINIS MUSCULOCUTANEOUS FLAP: CASE REPORT

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Plexiform neurofibromas (PNFs) are benign nerve tumours resulting from aberrant growth of cells of nerve sheath. PNFs are generally painless, slow growing neoplasms. Although most neoplasms are asymptomatic, they can be particularly debilitating due to their potential to grow to very large sizes. They have potential for transformation into highly malignant peripheral nerve sheath tumours which occur in approximately 5% of patients. They can affect most parts of the body. When they occur in the chest wall, they are amenable to excision. Following excision, a surgeon is faced with a large skeletal and soft tissue defect which poses functional and cosmetic challenges. We present a 24-year old farmer that presented with a giant anterior chest wall plexiform neurofibroma that was noticed since childhood. He had excision of the mass and skeletal reconstruction with methylmethacrylate sandwiched in prolene mesh and soft tissue coverage with vertical rectus abdominis musculocutaneous flap. We conclude that the use of methylmethacrylate and myocutaneous flaps give both good functional and cosmetic outcome following excision of large chest wall tumours.

13. EXPERIENCE IN THE CREATION OF LONG TERM VASCULAR ACCESS FOR DIALYSIS IN A NIGERIAN CITY

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Background: Reliable long term vascular access for the purpose of dialysis can be especially challenging in the third world. With the establishment of more dialysis centers and the general improvement in economic conditions in Nigeria, patients with chronic renal disease are surviving longer. Obtaining reliable long term vascular access is therefore very important to our patients. We report our institutional experience in creating long term vascular access.
Patients and methods: This study is an analysis of a prospectively maintained database of arterio-venous fistulae created as vascular access for haemodialysis. The study period was March 2008 to May 2013. The procedures were performed by 2 cardiothoracic surgeons in various hospitals in the Lagos Metropolis. The data analyzed included demographic characteristics, types of fistulae or grafts created, the challenges encountered and complications.
Results: There were a total of 69 fistulae created in 60 patients. The distribution of procedures was 41 radiocephalic fistulae (59.4%), 17 brachiocephalic fistulae (24.6%), 9 basilic /brachial vein transpositions (13.1%) and 2 brachioaxillary vein AV grafts (2.9%). Male to female distribution was 1.6:1. Ages ranged from 12 years to 80 years with an average age of 48.7 $\pm$ 16.7 years. 75% of the fistulae went on to maturity and were used for dialysis. Complications seen were wound infections in 2 patients (2.9%), post-operative seroma in 2 patients (2.9%), hematoma following cannulation in 1 patient (1.4%), pseudo aneurysm formation in 1 patient (1.4%) and severe postoperative bleeding in 3 patients (4.3%). Repeat procedures were required in 9 patients (13%). Tunneled dialysis catheters were inserted for temporary vascular access to allow fistulae to mature in 23 patients (38%).
Conclusions: Permanent vascular access for dialysis done by dedicated surgeons experienced in vascular anastomosis with the aid of adequate loupe magnification can enjoy favorable success rates even in developing countries. The patient should be sensitized to the possibility of more than one attempt at fistula creation and the surgeon should be aware of the different options available for Arterio -Venous fistula creation.

14. FACILITATED ANGIOPLASTY

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Background: Primary percutaneous coronary intervention (PCI) has become the optimal strategy for the treatment of ST-segment elevation myocardial infarction (STEMI). However, primary PCI is offered less, and many of those that do are unable to offer primary PCI as an around-the-clock service. Primary PCI also is less widely available in many developing countries. Thus, fibrinolytic therapy continues to be administered to many patients with STEMI. Given the relatively low rates of successful reperfusion with fibrinolysis, revascularization is often required afterward, the indications for and outcomes are evaluated in this study.
Methods: We performed a prospective and randomized study with combined strategy of immediate thrombolysis in the emergency room or in the ambulance followed by angioplasty within 12 hours after thrombolysis.
Results: The study recruitedpatients admitted with acute coronary syndrome who were thrombolysed with streptokinase and with TIMI III flow. A total of 96 patients were included in the study. They were randomized in two groups: group A (58) patients had thrombolysis plus medical treatment while group B (38) patients had thrombolysis and PCI within 12 hours. The most dominant risk factor was hypertension, occurring in 63 patients (65.6%); the predominant area of infarct was the inferior wall (57.3%). Most patients had single vessel disease; the commonest culprit vessel was the right coronary artery. When referred for PCI, group A patients had patency of culprit vessel in 65% of cases whilst in group B, 94% patency was demonstrated. Re-infarction and unstable angina were more common in group A patients.
Conclusions and Recommendations: Primary PCI is superior to thrombolysis and medical therapy in terms of restoration of coronary perfusion in 30 days following acute myocardial infarction. Re-infarction and unstable angina occur less commonly after primary PCI. Where the service is available, primary PCI should be offered instead of thrombolysis and medical therapy.

15. IMPACT DU VIH/SIDA SUR L'EVOLUTION POST-OPERATOIRE DES SEQUELLES DE TUBERCULOSE PULMONAIRE

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Contexte: Cette étude vise à analyser les particularités démographiques, cliniques, radiologiques et évolutives des séquelles pulmonaires tuberculeuses (SPT) opérées chez les séropositifs (VIH^+)*versus* séronégatifs (VIH^-).

Patients et méthodes: Il s'agit d'une étude cas-témoins réalisée entre 2005 et 2012. Le cas (groupe I) a été défini comme une personne VIH^+, ayant dans ses antécédents, une tuberculose pulmonaire (TP) traitée et déclarée guérie. Les témoins (groupe II) ont été appariés sur l'âge, le sexe, le statut sérologique VIH^-, le diagnostic pré-opératoire de la STP, la mortalité, les complications post-opératoires (CPOP),

le séjour hospitalier, le suivi à moyen terme des STP opérées. L'analyse statistique a comparé la proportion de sujets exposés aux différents facteurs dans les 2 groupes.

Résultats: Les VIH$^+$ dont l'âge était compris entre 40 et 50 ans (60%) présentaient plus de STP que les VIH$^-$ (21,3%) [p<0,05]. Les séropositifs étaient VIH1$^+$ (n = 12; 60%), VIH1&2$^+$ (n=4;20%) et VIH2$^+$ (n=4;20%). Les VIH$^+$ ne présentaient pas d'Aspergillome pulmonaire. Le séjour moyen hospitalier était de 13,1±10,2jours et 16±9jours respectivement chez VIH$^+$ et VIH$^-$ (p=NS). Le suivi moyen était de 4,035 ± 1,99ans. Le taux de mortalité à court et moyen terme était nul. Le taux de CPOP était de 0% *versus* 21,1% (n=8) pour les VIH$^+$*vs* VIH$^-$ (p<0,001). Les CPOP immédiates étaient les bullages persistants chez 75% des immunodéprimés *versus* 10% des immunocompétents (p<0,05). La survenue de CPOP immédiates des STP chez les VIH$^-$ était statistiquement non significative chez les femmes (P=0,38%) que chez les hommes (p=0,252%). Les CPOP tardives étaient un syndrome restrictif pulmonaire (n=3), un pyothorax persistant (n=2) et une déformation du thorax (n=3). Le pyothorax opéré chez le VIH$^+$*vs* VIH$^-$ entraînait des CPOP tardives (p=0,032). L'analyse uni-variée montrait 2 facteurs indépendants qui influençaient directement la morbidité à moyen terme: l'hémoptysie pré-opératoire et le bullage persistant.

15.IMPACT OF HIV/AIDS ON THE POSTOPERATIVE OUTCOME OF PULMONARY TUBERCULOSIS SEQUELLAE

Background: We analyzed the demographic, clinical, and radiological aspects and the outcome of the operated pulmonary tuberculosis sequellae (PTS) in seropositive (HIV$^+$) and sero-negative (HIV$^-$) patients.

Patients and Methods: Between 2005 and 2012, a case-controlled study was conducted. The study group (group I) consisted of seropositive (HIV$^+$) patients treated for pulmonary tuberculosis (PT) and declared cured. The control group (group II) was compared in terms of age, sex, serum status negative (HIV$^-$), preoperative diagnosis of PTS, the mortality, postoperative complications, hospital stay, and the medium-term follow-up of the operated PTS. The statistical analysis consisted in comparing the proportion of subjects exposed to the various factors in the 2 groups.

Results: The HIV$^+$ (group 1) age range from 40 to 50 years (60%) presented more PTS than HIV$^-$ (group 2) (21.3%) [p<0.05]. The HIV seropositive were VIH1$^+$ (n=12; 60%), VIH12$^+$ (n=4;20%) and VIH2$^+$ (n=4;20%). The HIV$^+$ did not present a pulmonary aspergilloma. The mean hospital stay was 13.1±10.2 days and 16±9 days respectively for the HIV$^+$ and HIV$^-$ (p=NS). The mean follow-up was 4.035±1.99 years old. The short and medium-term mortality rate was nil. The rate of postoperative complications was 0% *versus* 21.1% (n=8) for patients HIV$^+$*versus* HIV$^-$ (p=0.001). The early postoperative complications of the PTS occurring on the immunocompetent patient was not significant for women (P=0.38%) as well as men (p=0.252%). The early postoperative complications were persistent bullae in 75% of the immunosuppressed *versus* 10% of the immunocompetent (p=0.05). The pyothorax operated in the HIV$^+$*versus* HIV$^-$ led to complications (p=0.032). The late postoperative complications were a pulmonary restrictive syndrome (n=3), a persistent pyothorax (n=2) and a distortion of the thorax (n=3). The uni-variable analysis showed 2 independent factors which directly influenced the medium-term morbidity: the preoperative hemoptysis and the persistent bullae.

16. INSUFFISANCE TRICUSPIDIENNE NEGLIGEE AU COURS DE LA CHIRURGIE VALVULAIRE MITRALE ET/OU MITRO-AORTIQUE

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Contexte: Cette étude vise à rapporter l'évolution des insuffisances tricuspidiennes fonctionnelles négligées (ITFN) au cours de la chirurgie valvulaire mitrale et/ou mitro-aortique.

Patients et Méthodes : Entre 1985 et 2002, nous avons réalisé une étude rétrospective de 30 patients ayant présenté une insuffisance tricuspidienne (IT) minime ou modérée, négligée lors de la chirurgie des valvulopathies mitrales et/ou mitro-aortiques.

Résultats : Il s'agit de 24 femmes et de 6 hommes dont l'âge médian était de 18ans (extrêmes :8-56 ans). 81,5% des valvulopathies étaient d'étiologie rhumatismale. Les patients ont présenté en moyenne 1,67±1,5 épisodes de défaillance cardiaque globale dans les antécédents. La durée médiane de l'ancienneté de la maladie était de 5 ans. 60% des patients étaient au stade fonctionnel III de la NYHA. Les pathologies valvulaires associées étaient une insuffisance mitrale(IM)[n=4], un rétrécissement mitral (n=4), une maladie mitrale (n=16), une insuffisance mitro-aortique (n=3), une maladie mitro-aortique (n=3). L'index cardio-thoracique moyen était de 0,68±0,16. A l'Electrocardiogramme, 53,3% des patients étaient en rythme sinusal. La confirmation diagnostique a été apportée par l'échocardiographie- Döppler, le cathétérisme cardiaque couplé à l'angiocardiographie. La chirurgie a consisté à un remplacement valvulaire mitral isolé (n=24), un remplacement valvulaire aortique avec une annuloplastie mitrale (n=3) et un double remplacement valvulaire mitro-aortique (n=3). La mortalité hospitalière était de 3,3% (n=1) due à un bas débit cardiaque. Nous avons suivi régulièrement 22 et 12 patients respectivement à 2 et 5ans. A 2 ans, nous avons noté une détérioration précoce bioprothétique (n=1), une IM résiduelle (n=2) et une aggravation de l'IT (n=6) ;à 5 ans ,celle-ci a également été observée dans 9 cas. Les facteurs de risques statistiquement significatifs de l'aggravation de l'ITFN ont été : le nombre d'épisodes de défaillance

cardiaque pré-opératoire (p=0,045), la chirurgie valvulaire mitro-aortique associée (p=0,01) et l'ITF modérée négligée (p=0,03).

16.NEGLECTED TRICUSPID INSUFFICIENCY (NTI) DURING MITRAL AND/OR MITRO-AORTIC VALVE SURGERY

Background: The aim of this study was to report the outcome of neglected Tricuspid Insufficiency (NTI) during mitral and/or aortic valve surgery.
Patients and Methods: Between 1985 and 2002 in a retrospective study of 30 patients with mild or moderate tricuspid insufficiency neglected during mitral and/or aortic valve surgery were selected.
Results: Twenty-four patients were female and six were males. Mean age was 18 years (ranged: 8 to 56 years). 81.5% of cardiac valve diseases recorded were rheumatic in origin. The average episode of global heart failure was 1.67+/-1.5. Mean duration of the history of the disease was 5 years. Sixty percent of the patients were in NYHA functional class III. Left cardiac valvular diseases associated with NTI were mitral valve regurgitation (n=4), mitral valve stenosis (n=4), mixed mitral valve disease (n=16), mitro-aortic valve insufficiency (n=3), mitro-aortic valve disease (n=3). At Chest radiograph, mean cardio-thoracic ratio was 0.68±0.16. Of the ECGs, 53.3% were in sinus rhythm. The diagnosis was confirmed by echocardiography-Doppler and cardiac catheterization plus angiocardiography. The surgical procedures were isolated mitral valve replacement (n=24), aortic valve replacement with mitral valve annuloplasty (n=3) and double mitro-aortic valve replacement (n=3). Hospital mortality was 3.3% (n=1) due to cardiac failure. Twenty-two and 12 patients were followed-up respectively at 2 and 5 years. At 2 years, we noted premature bioprosthesis deterioration (n=1), mitral paraprosthetic leak (n=2) and increased NTI (n=6). At 5 year follow-up, 9 patients had increased NTI. The risk factors of increasing NTI were: episode of preoperative heart failure (p=0.045), combined mitro-aortic valve surgery (p=0.01) and moderate tricuspid regurgitation (p=0.03).

17. INTRACARDIAC REPAIR OF DOUBLE-OUTLET RIGHT VENTRICLE (DORV) IN WEST AFRICAN CHILDREN – UTILITY OF CT ANGIOGRAPHY (CTA) IN SURGICAL DECISION-MAKING

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Background: In double-outlet right ventricle (DORV), both great arteries arise entirely or predominantly from the morphologically right ventricle. Precise preoperative evaluation in DORV is fundamental to a good surgical outcome. The clinical utility of 64-slice cardiac CTA for children with DORV has not been investigated in West African children.
Methods: We investigated the utility of cardiac CTA in the anatomic diagnosis and surgical decision making in DORV patients presenting for repair. Consecutive patients referred for surgical repair of DORV between October 2011 and June 2013 were enlisted. Relevant features from reports of clinical presentation, echocardiography, cardiac CTA (when applicable), and intra-operative findings of the surgical candidates were documented. Parameters of surgical importance included VSD size, VSD location relative to the semilunar valves, presence of sub-pulmonary or sub-aortic obstruction, tricuspid-pulmonary valve distance (TPD), great artery relationship, branch pulmonary artery confluence, and coronary artery anatomy.
Results: There were 33 patients (24 males) of mean age 6.5 ± 5.1 years and weight 19.1 ± 9.8 kg. Cardiac CTA was performed in 26 patients. The phenotypic features of DORV encountered were the tetralogy-type (15), the VSD-type (7), remote VSD-type (10), and the Taussig-Bing or TGA-type (1). Utility of CTA was shown for the following indications: inconclusive anatomical diagnosis, uncertain origin of a great artery, evaluation of branch pulmonary artery confluence, and preoperative planning concerning the feasibility of intraventricular repair. Intra-ventricular tunnel repair was accomplished in 11 patients (primarily in 7) with 2 hospital deaths (18.2%). Twelve systemic-pulmonary artery shunts were performed in 10 patients with no mortality; 4 of these subsequently underwent intra-ventricular tunnel repair. Three patients were inoperable on account of hypertensive pulmonary vascular disease. The remainder (13) need conduit repair not currently available locally.
Conclusion: The clinical utility of 64-slice cardiac CTA as an adjunct to echocardiographic evaluation for surgical repair of DORV is confirmed for 4 major indications. The decision to undertake intraventricular tunnel repair is greatly facilitated by cardiac CTA. The importance of conduits in the surgical armamentarium for DORV patients in the sub-region is evident.

18. TÉRATOME INTRA PÉRICARDIQUE DU NOUVEAU NÉ RÉVÉLÉ PAR UNE TAMPONNADE

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Le tératome intra péricardique est une tumeur primitive rare diagnostiquée durant la période néonatale ou dans l'enfance. La tumeur contient du tissu endodermique, mésodermique, neuro ectodermique et des cellules germinales. Cette tumeur est bénigne mais son volume et l'épanchement liquide peuvent entrainer une compression cardiaque.Un nouveau né de 15 jours avait présenté des signes de tamponnade et de défaillance cardiaque droite. L'échocardiographie transthoracique montrait un épanchement péricardique de grande abondance avec une compression des cavités cardiaques, ainsi qu'une tumeur hétérogène intra péricardique de 47 mm x 36 mm. L'échographie suspecte le diagnostic devant l'hétérogénicité de la masse associée à un épanchement péricardique. Devant l'urgence du tableau clinique, un drainage avec biopsie péricardique par voie sous xyphoîdienne était

réalisé. Un scanner thoraco abdominal réalisé dans les suites post opératoires montrait les délimitations de la masse et ses rapports avec le péricarde, le myocarde et les gros vaisseaux. Une exérèse complète par sternotomie médiane était réalisée et l'examen anatomopathologique avait confirmé le diagnostic de tératome suspecté devant l'imagerie et la vue opératoire. L'échographie bidimensionnelle est considérée comme le meilleur examen pour le diagnostic des tumeurs cardiaques primitives, mais le scanner ou l'imagerie par résonnance magnétique (IRM) définit mieux les rapports de la tumeur avec les structures adjacentes.

18.INTRAPERICARDIAL TERATOMA IN A NEWBORN INFANT CAUSING CARDIAC TAMPONADE

Intrapericardial teratomas are rare primary cardiac tumors usually diagnosed in neonates and infants. They contain endodermic, mesodermic, and neuroectodermic germinals layers. Intrapericardial teratomas are usually benign tumors but may be life-threatening because of pericardial effusion and heart compression.A 15-day old boy presented with signs of heart failure and tamponade. Two- dimensional echocardiography revealed a complex intrapericardial mass (47 mm x 36 mm) with a large pericardial effusion compressing the heart. Echocardiography made diagnosis by showing an intra-pericardial heterogeneous mass compressing the heart. CT scan defined the relationship with great vessels, pericardium and myocardium. Complete surgical resection was performed without complication. Histology of the tumor confirmed the presumptive imaging diagnosis of teratoma. Twodimensionalechocardiography was a performed exam in primary cardiac tumors diagnosis, but tomodensitometry (CT scan) and magnetic resonance imaging (RMI) have advantages in large tumors assessing the relationship between the tumor and adjacent tissues

19. MALIGNANT TRANSFORMATION IN THE OESOPHAGUS 25 YEARS AFTER INITIAL TREATMENT FOR ACHALASIA: CASE REPORT

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Achalasia of the cardia is a pre-malignant condition. Though it is uncommon, it is known that malignant changes can occur several years after the treatment for achalasia. This is because the chronic food stasis in the oesophagus over the years affects mainly the distal and mid-oesophagus. This leads to irritation of the mucosa, which then leads to metaplasia, dysplasia and finally the carcinoma of the oesophagus. We present the case of a patient who was managed in this Centre, and developed a malignancy more than 2 decades after the initial treatment for achalasia. This 56 year old lady had modified Heller's operation 25 years ago (1 year after she developed symptoms of achalasia). Ten years later, she presented with recurrence of the achalasia, complicated by a sigmoid oesophagus. She then had oesophagectomy with oesophagogastrostomy (Ivor-Lewis). Fifteen years after the oesophagectomy, she presented with severe weight loss and difficulty in breathing. The CT scan showed a tumour in the remnant (intrathoracic) oesophagus infiltrating the trachea. There was no dysphagia. Oesophagoscopy confirmed the tumour, and the biopsy came out as squamous cell carcinoma of the oesophagus. She passed away within a few days before radiotherapy could be commenced. Since the food stasis does not usually affect the cervical oesophagus, it is often spared from the malignant change. Therefore when oesophagectomy is considered for recurrent achalasia or failed Heller's operation, we recommend that the whole of the thoracic oesophagus be removed, and the anastomosis done at the level of the cervical oesophagus (with the colon or the stomach). Long-term surveillance of achalasia patients is also strongly recommended.

20. LA PLASTIE MITRALE SUR VALVE RHUMATISMALE CHEZ L'ENFANT AU SENEGAL : A PROPOS DE 100 CAS

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Contexte: Evaluer les résultats à court et à moyen terme de la plastie mitrale chez l'enfant au Sénégal.
Patients et Méthodes: Il s'agit d'une étude rétrospective sur 8 ans (1999-2007), concernant 100 patients porteurs d'atteintes rhumatismales. L'âge moyen était de 12 +/- 5 ans (7-17 ans). La symptomatologie était dominée par la dyspnée. Les lésions valvulaires étaient complexes. La fonction myocardique des patients était conservée et le ventricule gauche dilaté. Des gestes (transfert et raccourcissement) étaient effectués sur les cordages (73) complétés par des commissurotomies (22) et des fermetures de fentes (17). Une annuloplastie était réalisée chez 84 malades.
Résultats: La morbidité était caractérisée par 4 plasties fuyantes. Le suivi moyen était de 5 ans, Il n'y avait pas de mortalité tardive. Les résultats étaient satisfaisants avec 84 patients présentant des fuites des fuites de grade I-II. La réduction du diamètre du ventricule gauche était statistiquement significative en systole (p< 0,05 29,5+/-6,2 mm vs 33,07+/- 5,3 mm) et en diastole (p< 0,05 47,1+/-8,6 mm vs 50,5+/-9,4 mm).
Conclusion: La plastie mitrale permet une stabilisation de la fonction myocardique et un remodelage significatif du ventricule gauche. Une analyse lésionnelle précise est déterminante. Les résultats à moyen terme sont encourageants.

20.MITRAL RHEUMATIC VALVE REPAIR IN CHILDREN IN SENEGAL: A REVIEW OF 100 CASES

Background: To evaluate the medium-term results of mitral valve repair in children in Senegal.
Patients and Methods: It was a retrospective study over 8 years (1999-2007); concerning 100 patients with an average age of 12 ± 5 years with rheumatic mitral lesions which had benefitted from a mitral valve repair. Dyspnea (26 stage IV and 74 stage III) was prevalent. The lesions were complex: anterior leaflet prolapse (62), posterior leaflet restriction (35), commissural fusion (30) and fusion of chordae (54). Transfers and shortenings were performed on the chordae (73) supplemented by commissurotomies (22), cleft closure (17) and an annulus repair.
Results: Morbidity was characterized by four cases of residual mitral regurgitation. Three patients had a residual BAV which spontaneously resolved at one year. The 2 others required reoperation. After an average follow-up of 5 years, one patient had a rheumatic fever recurrence. The results were satisfactory with residual mitral regurgitation graded I-II (84). Left ventricle reduction diameter was statistically significant in systole ($p< 0.05$; 29.5 ± 6.2 mm vs 33.07 ± 5.3 mm) and in diastole ($p< 0.05$; 47.1 ± 8.6 mm vs 50.5 ± 9.4 mm). Cardiac function improvement was not significant ($p = 0.99$; 63.3 ± 4.8 % vs 62 ± 6.4 %).
Conclusion: Mitral valve repair allows stabilization of function and a significant remodeling of the left ventricle. Obtaining good results is dependent on rigorous selection of patients and precise analysis. The medium-term results are encouraging.

21. MYXOME DE LA VALVE MITRALE POSTÉRIEURE : DEUX CAS OBSERVÉS À DAKAR

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Les auteurs présentent 2 cas de localisation atypique de myxome de l'oreillette gauche. Dans un cas la localisation de la tumeur sur la valve mitrale postérieure a entrainé un tableau d'insuffisance mitrale chez un homme âgé de 64 ans. Dans l'autre cas, c'est l'obstruction de l'orifice atrio-ventriculaire par la tumeur qui expliquait la symptomatologie de rétrécissement mitral observée chez une femme de 45 ans. La chirurgie sous circulation extracorporelle avec des voies d'abord différentes a permis l'exérèse complète de la tumeur. Dans un cas la continence de l'appareil valvulaire a été renforcée par une annuloplastie mitrale.

21. ATRIAL MYXOMA OF THE POSTERIOR MITRAL VALVE LEAFLET: TWO CASES OBSERVED IN DAKAR

The authors present 2 cases of atypical location of left atrial myxoma. In one case the location of the tumor on the posterior mitral valve led to mitral insufficiency in a 64 year-old man. In the other case the obstruction of the atrioventricular orifice by the tumor was the cause of symptoms of mitral stenosis observed in a 45 year-old woman. Surgery under cardiopulmonary bypass with different surgical approaches allowed complete removal of the tumor. In one case the competence of the mitral valve apparatus was reinforced by mitral annuloplasty.

22. NŒUD SINUSAL: ETUDE DESCRIPTIVE ET VASCULARISATION ARTERIELLE ET VEINEUSE CHEZ LE NOIR AFRICAIN

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Le but de cette étude était de décrire, sur 45 cœurs normaux d'adultes noirs africains, la topographie et la morphologie du nœud sinusal aux plans macroscopique et histologique, puis, d'en préciser sa vascularisation artérielle et veineuse. La méthode utilisée a été la technique d'injection-coloration des ostia et sinus coronaires suivie de l'étude histologique de la région du nœud sinusal au microscope optique binoculaire au faible grossissement (×2,5) puis au fort grossissement (×40). Cette étude a permis de conclure que le nœud sinusal était indiscernable à l'œil nu (97,7 % des cas), mais toujours identifié à l'histologie à la jonction auriculo-cave supérieure sous la forme d'un amas de cellules nodales. Sa vascularisation artérielle était assurée par l'artère du nœud sinusal qui provenait principalement de l'artère coronaire droite (60,6% des cas). Sa vascularisation veineuse n'était pas tributaire du sinus coronaire dans tous les cas.

22.SINO-ATRIAL NODE: DESCRIPTION, ARTERIAL STUDY AND VENOUS DRAINAGE OF HEART IN BLACK AFRICAINS

The purpose of this study was to describe, in 45 normal hearts of black African adults, firstly, the location and morphology of the sinoatrial node and secondly, its arterial supply and venous drainage. The injection-coloration of coronary arteries and coronary sinus was the method used. This injection-coloration method has been followed by a histological study of the sinoatrial node area. This study concluded that the sinus node is indistinguishable to the naked eye (97.7% of cases), but still identified histologically at the atrio-caval junction in the form of a cluster of nodal cells. Its arterial supply was ensured by the sinus node artery that comes mainly from the right coronary artery (60.6% of cases). Its venous drainage is not dependent on the coronary sinus in all cases.

23. PALLIATIVE PROCEDURES FOR CYANOTIC CONGENITAL HEART DISEASE IN ACCRA: A 20 – YEAR SINGLE CENTRE EXPERIENCE

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Background: Since the performance of the first Blalock-Taussig (BT) shunt by Alfred Blalock in 1944, many other palliative procedures have been described and performed for cyanotic congenital heart disease. These procedures offer good palliation for most of the children while they await their definitive procedures. The aim of this study was to analyze the types of palliative procedures, the diagnoses and the outcome over a 20-year period.
Patients and Methods: A retrospective study was done for all patients who had palliative procedures for cyanotic congenital heart disease from January 1992 to December 2011.
Results: Two hundred and sixty-four palliative procedures were performed, with 59% of them being in males. The modal age group was 0 – 4 years (49.2%), with a mean age of 6.9 ± 6.1. Tetralogy of Fallot comprised 97.0%, tricuspid atresia 1.5%, DORV 1.1% and pentalogy of Fallot 0.4%.BT shunts comprised 92.2%, with the Waterston shunt forming the remaining 0.8%.All the BT shunts were modified, with 91.6% of them being done on the right. Morbidity was 11.8% (7.6% blocked shunts, bleeding requiring re-exploration 4.2%) andhospital mortality of 3.8%.
Conclusion and Recommendation: The modified BT shunt provided good palliation for cyanotic congenital heart disease with acceptable mortality and morbidity. We consider it a preferable interim procedure for cyanotic congenital heart disease with reduced pulmonary blood flow when financial constraints delay primary repair.

24. PALLIATIVE SENNING OPERATION IN TRANSPOSITION OF GREAT ARTERIES OR TAUSSIG BING ANOMALY WITH VSD AND REVERSIBLE PULMONARY HYPERTENSION

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Background: Palliative Senning with VSD remaining open, is an innovative surgical alternative for late-presenting children with TGA and VSD. This subset of children with TGA who present very late for medical attention is very high in developing countries. Previous studies in the west have limited themselves to children within age of 5 years / or 20 kg. In such studies immediate operative mortality and RV failure was more in children whose VSDs were closed especially if they were large.
Patients and Methods: We studied 26 children from our series in the age range of 2 - 10 years. ECHO confirmed TGA in 24 patients, and 3 patients had Taussig Bing anomaly, with coarctation in 2. Of these children, 20 had moderate sized VSDs and 6 had large VSDs. Cardiac catheterization was done for all from the original series of 40 patient. Fourteen patients with irreversible pulmonary hypertension were ruled out of a palliative Senning surgery. In the other 26 patients, all had systemic pulmonary pressures with reversible pulmonary resistance and 2 patients had associated coarctation. All the patients underwent a Senning operation but the VSDs were left open. Average bypass time was 1 hour 10 minutes done on a temperature of 33 degrees centrigrade. Post-operative recovery was uncomplicated in 22 patients. 2 patients had RV dysfunction which needed inotropes and nitric oxide with IV levosimendan and prolonged ICU stay of 8 days,
Results: There was no early post-op mortality. After the end of one month, the mortality was 1 out of 26. At one year follow-up, all patients were doing well, except one.
Conclusion: Palliative Senning with VSD remaining open, is a safe surgical alternative for late presenting children with TGA and VSD.

25. PENETRATING CARDIAC INJURIES IN BELGIUM: 20 YEARS OF EXPERIENCE IN UNIVERSITY HOSPITALS IN BRUSSELS

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Contexte : Les plaies cardiaques représentent une affection mortelle dont le pronostic dépend de la qualité de la prise en charge par les services d'urgences. Analyser l'expérience de certains hôpitaux bruxellois et les comparer avec ceux de la littérature.

Patients et Méthodes : Nous avons revu rétrospectivement du 1er janvier 1990 au 31 décembre 2010 toutes les plaies cardiaques de 3 grands hôpitaux bruxellois. Les données récoltées concernaient des paramètres cliniques, diagnostiques, opératoires et de morbi-mortalité.
Résultats : Un total de 15 cas ont été répertoriés. Un patient a été exclu par manque de données. Quatorze patients (12 hommes/ 2 femmes) d'un âge moyen de 35 ans (16-69) ont été inclus. Le mécanisme était une arme blanche chez 13 patients (93%) et une arme à feu chez 1 patient (7%). L'état hémodynamique était instable chez 9 patients (64%), in-extremis chez 2 patients (14%) et stable chez 3 patients (26%). L'Abbreviate Injury Score (AIS) était de 5 chez 11 patients, 3 chez 2 patients (14%) et 2 chez 2 patients (14%). Le New Severity Injury Score (NISS) était de 30 chez 5 patients, 38 chez 3 patients (22%), les 6 patients restants ayant respectivement des scores de 54, 51, 35, 14, 10 et 5. Le bilan diagnostic a consisté en un électrocardiogramme chez 5 patients, une échographie cardiaque chez 5 patients et un scanner chez 5 patients. Cinq patients n'ont eu aucun examen

complémentaire et sont directement allés au bloc opératoire. Treize (93%) patients ont été opérés (11 d'une sternotomie dont 2 avec laparotomie, 2 d'une thoracotomie dont un avec transsection sternale). Les lésions concernaient le ventricule droit chez 10 (71%) patients, le péricarde chez 3 patients (22%) et le ventricule gauche chez 1 patient (7%). Trois patients (22%) présentaient des lésions associées (1 lacération diaphragmatique avec hémopéritoine, un hémopneumothorax, une plaie hépatique). Deux patients ont eu recours à une circulation extracorporelle. Le séjour moyen aux soins intensifs était de 4,8 jours. Trois patients ont présenté des complications consistant en une insuffisance tricuspidienne chez une malade et une dépression réactionnelle chez 2 d'entre-eux. Trois patients (22%) sont décédés.

Conclusion : Les plaies pénétrantes du cœur relativement rares en Belgique, sont surtout dues aux armes blanches avec une mortalité hospitalière non négligeable. L'amélioration de la morbi-mortalité passe par la mise en place de protocoles clairs adaptés à nos services d'urgences qui ne disposent pas toujours d'un plateau technique nécessaire pour gérer optimalement ces victimes.

25-PENETRATING CARDIAC INJURIES IN BELGIUM: 20 YEARS OF EXPERIENCE IN UNIVERSITY HOSPITALS IN BRUSSELS

Background: Cardiac wounds remains highly lethal lesions in which their prognosis depends on the emergency management. The aim of this study was to analyse the experience of different hospitals in Brussels and compare it with the findings in the literature.

Patients and Methods: From January 1st 1990 till 31st December 2010, all penetrating cardiac wounds in 3 hospitals in Brussels were retrospectively reviewed. The data recorded included clinical parameters, surgical consultation and outcome.

Results:A total of 14 (12 men / 2 female) sustained penetrating cardiac injuries. There were 13 patients (93%) with stabs wounds, 1 patient (7%) with gunshot wounds. The location of the wounds was as follows: 10 patients (71%) right ventricle, 3 patients (22%) the pericardium, 1 patient (7%) the left ventricle. The hemodynamic status was unstable in 9 patients (64%), in-extremis in 2 patients (14%) and stable in 3 patients (22%). The mean Abbreviate Injury Score was 4.6 and the mean New Injury Severity Score was 31. Thirteen patients (93%) were operated (11sternotomies, 2 thoracotomies). Two patients required cardiopulmonary bypass. Three patients (22%) died.

Conclusions: Penetrating cardiac wounds are relatively rare in Belgium, mainly due to stabs and with consequent mortality. The implementation of clear guideline is necessary to improve survival.

26. THE POSTOPERATIVE MANAGEMENT OF THE CARDIOVASCULAR AND THORACIC PATIENT IN THE INTENSIVE CARE UNIT (ICU) AND HIGH-DEPENDENCY UNIT (HDU)

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Background: Postoperative complications may occur and are not rare during thoracic and cardiovascular surgery. Early detection and treatment may reduce morbidity and mortality. It is therefore necessary that all postoperative cardiovascular and thoracic patients be observed in a HDU/ICU for a period depending on the type of surgery that was done. The ICU especially should be well resourced to allow for effective management of these cases. At the National Cardiothoracic Centre the commonest major postoperative cases are open heart surgery, closed heart surgery and thoracic surgery.

Patients and Methods: All post-op cardiovascular and thoracic patients admitted to the ICU/HDU from January 2010 to December 2012 were analyzed.

Results: Open heart surgery (OHS) for 2010, 2011 and 2012 [Number (Mortality Rate %)] were: 79 (11.4), 73 (12.1) and 81(10.0) respectively. Closed heart surgery (CHS) similarly was 55 (5.5), 68 (11.3) and 55 (3.6).Thoracic cases were 26(0), 43 (7.1) and 47 (0). Operations on the colon were 12(0), 15 (0) and 11(0). Abdominal aortic aneurysm (AAA) was 1 (0), 11 (0) and 5 (0). Femoral popliteal bypass (FEMPOP) was Nil, 1 (0) and 11 (0). Arterio-venous fistula (AVF)/ Tunnelled dialysis line (TDL) was 93/79, 126/18 and 150/33. Pacemaker (PM) was 52 (1.9), 59 and 42. For some cases basic monitoring of ECG, NIBP, SPO2, temperature, as well as the basic ventilator parameters if the patient is being ventilated. Monitoring is usually invasive for most thoracic, closed and all OHS namely arterial blood pressure, central venous pressure and occasionally pulmonary artery pressure catheters. Trans-esophageal or trans-thoracic ECHO should be available. Routine investigations, clotting, chest xray and arterial blood gas analysis should be routinely available. Complications commonly seen are bleeding especially postoperative open-heart surgery and thoracic surgery, low cardiac output states, arrhythmias and respiratory failure. Blood, blood components, antifibrinolytic agents and desmopressin should be available. Low cardiac output states should be treated with fluids, inotropic agents and if severe, mechanical support and extra-corporeal membrane oxygenator. Renal replacement therapy, total parenteral nutrition, deep vein thrombosis prophylaxis when indicated and enteral feeding should be available. Arrhythmias especially of ventricular origin should be aggressively treated with the correction of deranged electrolytes levels.

Conclusion: Postoperative care after cardiovascular and thoracic surgery should be in HDU/ICU, monitoring may have to be invasive and other resources should be available.

27. POSTOPERATIVE COMPARISON OF CHEST CLOSURE WITH OR WITHOUT A DRAIN FOLLOWING PATENT DUCTUS ARTERIOSUS LIGATION. A NON-BLINDED RANDOMISED CONTROLLED CLINICAL TRIAL

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Background: This study compared the post-operative outcomes of thoracotomy closure in patients with a chest drain and those without a drain following patent ductus arteriosus (PDA) ligation. Due to the controversy that exists concerning the safety and benefit of chest tubes when routinely used following PDA surgery, the information obtained from this pilot study can be used to inform theory, create policy and improve practice.
Patients and Methods: A non- blinded randomized controlled clinical trial. We randomized 22 patients to no chest tube and 22 patients to receive a chest tube.
Results: In the no drain arm, 21 participants (95.5%) did well without a chest tube at 48 hours; one patient developed a post-operative pleural effusion that needed draining with no further complications. In the no drain arm, none of the patients (0%) had post-operative wound infection while in the drain arm, five patients (22.7%) developed infection. More participants in the no-drain arm (86.4%) did well on less than 1 L/min of oxygen compared to those in the drain arm. (OR: 0.19, 95% CI: 0.04 – 0.83, p=0.027). For the combined primary outcome, participants in the no-drain arm had significantly favorable outcomes (less adverse events) compared to the drain arm, (OR: 0.15, 95% CI: 0.04 – 0.61, p=0.008). After adjusting for potential confounders, this protective effect remained statistically significant and increased (OR: 0.13, 955 CI: 0.02 – 0.77, p=0.024). There was no statistically significant difference in stay in the Intensive Care Unit (95% CI: 0.07 – 2.76, p=0.388).
Conclusion: Avoiding routine use of a chest drain after uncomplicated PDA surgery can be employed with minimal complications to the patients.

28.POUMONS DÉTRUITS DE L'ENFANT SUR CORPS ÉTRANGERS: INDICATIONS ET RÉSULTATS

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Contexte: présenter notre expérience des poumons détruits de l'enfant sur corps étrangers

Patients et Méthodes: Etude rétrospective de 1990 à 2011 qui a concerné 8 enfants opérés (7 garçons et une fille) pour un poumon détruit sur corps étranger intra bronchique ancien de nature métallique. Les manifestations respiratoires marquées par des infections pulmonaires à répétition évoluaient de 5 mois à 3ans. Les territoires détruits étaient localisées à droite dans 7 cas.
Résultats: Huit résections pulmonaires réglées ont été réalisées (une pneumonectomie droite, 6 lobectomies droites et une lobectomie gauche) en raison des destructions parenchymateuses adjacentes à l'obstruction. Le séjour post opératoire a été de 12 jours Les suites opératoires ont été simples avec à un an avait noté une bonne récupération clinique et radiologique et une reprise de la scolarité.
Conclusion: Les exérèses pulmonaires pour poumons détruits sur corps étrangers intra-bronchiques malgré les bons résultats doivent être le recours ultime au profit de L'extraction par endoscopie et les mesures préventives surtout chez l'enfant.

28.DESTROYED LUNG IN CHILDREN DUE TO INTRA-BRONCHIAL METALLIC FOREIGN BODIES

Background: Topresent our experience of destroyed lung in children due to intra-bronchi metallic foreign bodies.
Patients and Methods: It was a retrospective study between 1990 and 2011 involving 8 children (7 males and 1 female) presenting with destroyed lungs due to intra-bronchial metallic foreign bodies.
Results: Recurrent pulmonary infections were the most frequent complaints. The destroyed lungs were right-sided in 7 cases. Eight pulmonary resections (one pneumonectomy and 7 lobectomies) were necessary because of pulmonary parenchymal destruction. There were no post-operative complications and no mortality.
Conclusion: Pulmonary resection for destroyed lung due to intra-bronchial foreign bodies in children despite the good results must be used after unsuccessful endoscopic extraction and preventive measures.

29. PRESENTATION OF RHEUMATIC HEART VALVE DISEASE IN EASTERN ARGENTINA (PAMPA REGION)

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Background: Although rheumatic fever is a treatable and curable disease in the 21st century, in the third world countries it continues to be a common presentation of heart valve disease. We investigated the incidence, presentation and outcome of surgery for rheumatic heart valve disease in Eastern Argentina, the richest and most developed area of the country.
Patients and Methods: Between January 2008 and June 2013, 49 (4%) patients out of 1206 were operated with the diagnosis of rheumatic valve pathology.The data of the patients was prospectively collected and analyzed.
Results: The mean age was 58.6 years (43-81), 73.3% (33) being females. The mitral valve was involved in all but one case (98 %); the aortic valve was involved in 6 patients (13%). The most common presentation was mitral stenosis or mixed mitral valve disease in 80% of the cases and insufficiency in the 17, 7% and aortic insufficiency in only one case. A third of the patients had severe pulmonary hypertension, but only four (%) had coronary artery

disease. The most common surgery was mitral valve replacement (83.6 %), either alone or combined with aortic and tricuspid repair, followed by mitral repair 15.5 % and isolated aortic replacement in one case. Atrial fibrillation surgery was performed in 28.5 %. Hospital mortality was 12.25 %.
Conclusions: Mitral stenosis is the most common presentation of rheumatic heart disease. Although it represents less than 5% of all the open heart cases it continues to be the most common cause of mitral valve replacement. Complex surgeries including double, triple valve, atrial fibrillation surgery and mitral repair account for half of the cases.

30. RÉSULTATS DE LA PRISE EN CHARGE DES COMPLICATIONS THORACIQUES DES CORPS ÉTRANGERS INGÉRÉS.

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Objectifs : présenter les résultats de la prise en charge des complications thoraciques des corps étrangers ingérés.
Matériels et méthodes : De 1994 à 2009, nous avons pris en charge 6 patients pour des complications thoraciques d'un corps étrangers ingéré , un os de poulet(n=2) , une arête de poisson(n=3) , un dentier(n=1). Il y avait 2 hommes et 4 femmes dont l'âge était compris entre 21 ans et 69 ans. Le diagnostic a été porté dans un délai de 2 heures à 90 jours devant un pyothorax (n=4), un pneumothorax avec un emphysème sous cutané massif (n=1), et une dysphagie persistante (n=1). Un drainage pleural été réalisé chez 5 patients et une thoracotomie pour une décortication associée à une fistulorraphie (n=4) et une oesophagotomie pour extraction du corps étranger (n=1) a été également réalisée. Une jejunostomie d'alimentation a été associée dans tous les cas pour une durée de 21 jours en moyenne.
Résultats: Les suites opératoires ont été favorables malgré une dénutrition importante, il n'y a pas eu de décès. La durée d'hospitalisation a varié de 21 jours à 133 jours.
Conclusion: les résultats ont été bons malgré le retard diagnostic et la longue hospitalisation

30.RESULTS OF TREATMENT OF THORACIC COMPLICATIONS OF OESOPHAGEAL FOREIGN BODIES

Background: To present the results of treatment of thoracic complications of oesophageal foreign bodies.
Patientsand Methods: Between 1994 and 2009, we treated 6 patients with thoracic complications of oesophageal foreign bodies.
Results: There were 2 males and 4 females with ages between 21 and 69 years; foreign bodies were chicken bones (n=2), fish bones (n=3) and unidentified (n=1). The delay in diagnosis ranged from 2 hours to 90 days and was manifested by pyothorax (n=4), pneumothorax with emphysema (n=1), and persistent dysphagia (n=1). Pleural drainage was necessary in 5 patients, thoracotomy in 5 patients (decortication in 4 and oesophagotomy for extraction of foreign body in 1). Feeding jejunostomy for 21 days was necessary in all the cases. Malnutrition was the most prevalent post-operative complication. There was no mortality. The hospital stay was 21 to 133 days.
Conclusion: Despite late diagnosis and the long hospital stay the results are good.

31. REUSE OF PACEMAKERS IN THE THIRD WORLD: MEDICAL, LEGAL, CULTURAL AND ETHICAL PERSPECTIVES

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According to the World Health Organization (WHO) cardiovascular disease (CVD) is the leading cause of death globally. Over 80% of CVD deaths take place in low- and middle-income countries (LMIC). Specifically, it is estimated that 1 million to 2 million people worldwide die each year due to lack of access to an implantable cardiac defibrillator (ICD) or a pacemaker. Despite the controversies surrounding pacemaker reutilization, studies done so far on the reuse of postmortem pacemakers show it to be safe and effective with an infection rate of 1.97% and device malfunction rate of 0.68%. Pacemaker reutilization can be effectively and safely done and does not pose significant additional risks to the recipient. Heart patients with reused pacemakers have an improved quality of life compared to those without pacemakers. The thesis of this paper is that pacemaker reutilization is a life-saving initiative. It is cost effective; consistent with the principles of beneficence, nonmaleficence, and justice with a commitment to stewardship of resources and the Common Good. Used pacemakers with adequate battery life can be properly sterilized for use by patients in LMICs who cannot afford the cost of a new pacemaker.

32. SAFETY OF HYPOTHERMIC CARDIOPULMONARY BYPASS WITHOUT PERI-OPERATIVE EXCHANGE TRANSFUSION IN SICKLE CELL DISEASE PATIENTS

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Background: We conducted a case control study evaluating our institutional protocol of hypothermic cardiopulmonary bypass (CPB) without perioperative

exchange transfusion in sickle cell disease (SCD) patients.

Patients and Methods: SixSCD patients (group 1) undergoing CPB for intracardiac procedures were matched to six non-sicklers (group 2). The two groups were matched according to age, body surface area, duration of CPB, and intracardiac repair type. The data was analyzed according to hospital mortality, perioperative transfusion requirements, surrogates for intravascular hemolysis (IVH), and intensive care unit length of stay (ICUS).

Results: All patients underwent hypothermic CPB (28℃ – 32℃) with aortic cross-clamping and cold crystalloid antegrade cardioplegia. There was no mortality. Two SCD patients experienced important nasopharyngeal bleeding from traumatic nasotracheal intubation; their nasal turbinates were found to be enlarged. There were no episodes of significant hypoxemia, hypercarbia, acidosis, or IVH. None of the patients had sickling crisis during the perioperative period. In addition to 450 ml of blood used for priming the heart-lung machine, blood transfusion requirements were significantly higher (17.8 ± 11.4 ml/kg) for SCD patients. The triggers for blood transfusion during cardiopulmonary bypass and the postoperative period were a fall in haemoglobin of more than 2g/dl below the preoperative steady state haemoglobin, or a hematocrit of less than 20% for SCD patients. The ICUS tended to be a day longer in SCD patients.

Conclusion: Hypothermic cardiopulmonary bypass can be used safely in SCD patients without exchange transfusion if hypoxia, acidosis, and low cardiac output are avoided.

Perioperative transfusion is often triggered by hemodilutional anemia and blood loss rather than intravascular hemolysis from sickling crisis; transfusion requirements are nearly 20ml/kg higher than non-sicklers of similar size undergoing the same intracardiac procedure. A hematocrit of 20% may be considered a safe transfusion trigger during cardiopulmonary bypass in SCD patients.

In SCD patients, nasotracheal intubation is best avoided as it carries an important risk of traumatic nasopharyngeal bleeding from enlarged nasal turbinates.

33. SEPARATION OF CONJOINED HEARTS IN THORACOPAGUS TWINS – YES WE CAN BUT SHOULD WE?

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Conjoined twins have been the subject of academic and public interest for ages. Until recently, such twins only aroused the curiosities of the medical profession but no real treatment options were offered. Recent advances in pediatric cardiology and cardiac surgery have increased the possibilities of surgical separation for twins with conjoined hearts in well-resourced centers. The spectrum of abnormalities found in such conjoined hearts is protean; the attempts at successful separation are almost universally futile. Some have questioned the moral justification for attempting such high risk procedures with attendant high financial costs to society. We have recently encountered three pairs of such twins with unfavorable outcome: the first pair was stillborn and we had to define the morphology of their conjoined hearts as a post-mortem procedure; we performed emergency separation of the conjoined hearts at 24 hours of life in the second pair when the imminent demise of one twin threatened the survival of the other who survived the separation but succumbed to respiratory failure after 7 days; operation was denied to the third, a pair of dicephalic dibrachius parapagus twins who survived for only a month. Our experience with the management of conjoined hearts in thoracopagus twins is consistent with what is evident in the scientific literature: In the current era, successful surgical separation of conjoined hearts in thoracopagus twins remains largely elusive. When cardiac separation is possible, respiratory failure from hypoplastic lungs and flail chest remain important confounders of survival. The ethical justification for performing such high-risk complex procedures especially in resource-poor settings remains debatable.

34. SURGERY FOR VALVULAR HEART DISEASE ASSOCIATED WITH SHORT TERM USE OF FENFLURAMINE-PHENTERMINE: A CASE REPORT

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We report a case of multi-valvular heart disease in a 37 year old female following short term (1 month) use of fenfluramine-phentermine (Fen-Phen) prior to sleeve gastrectomy for morbid obesity. Echocardiography showed unusual valvular morphology and regurgitation in both mitral and tricuspid valves, thickened valve leaflets tethered by thickened and shortened chordae and severe pulmonary hypertension. At surgery, the affected valves had a glistening white appearance without the usual yellowish discoloration or calcification associated with rheumatic heart disease. She had surgical repair of both valves and intra-operative echocardiography showed competent mitral and tricuspid valves with trivial leaks. Histology of excised part of the leaflet showed focal surface proliferation and fibrosis. The use of Fenfluramine alone or in combination with Phentermine has been associated with unusual cardiac morphology and resultant regurgitation of the left- and right-sided heart valves and the prevalence of significant valvular disease associated with the use of these anorectic drugs is reported to be as high as 23%. The first report linking anorectics used in

treatment of obesity with valvular heart disease was in 1997.Most cases of valvular heart disease associated with Fen-Phen use have been attributed to long term exposure and surgical repair has not been a common mode of treatment. This case highlights the occurrence of severe multi-valvular regurgitation following short term exposure and a successful surgical repair.

35. THE PRACTICE OF ANAESTHESIA FOR THORACIC SURGERY

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Historically, thoracic surgeries created a lot of problems for the anaesthetist: Inadequate ventilation, hypoxia and hypotension from pendelluft and mediastinal flaps. This brought about the development of lung isolation techniques and the use of one lung ventilation (OLV). The other problem was that of control of secretions and other fluids like blood and pus from the pathologic lung soiling the healthy lung. The other challenge that still persists is adequate pain control in the post-operative period. The above problems require of the thoracic anaesthetist a good knowledge of certain aspects of the thoracic anatomical arrangements as well as an in-depth understanding of respiratory physiology and pharmacology. Common chest pathologies that need the input of the anaesthetist include the following;

1. Bronchoscopies for the removal of foreign bodies as well as diagnostic procedures. 2. Thoracotomy for lung abscess/empyema, lung resections, foreign bodies, bronchial repair, pleural surgery, chest wall surgery, oesophageal surgery, great vessels surgery (aneurysms) and spine fixation. 3. Sternotomy for the excision of the thymus, retrosternal thyroids and other mediastinal tumours. 4. Video assisted thoracotomies for achalasia, removal of foreign bodies, catamenialhaemo- and pneumothorax and pleurodesis.

Pre-operative assessment of the patient is very important. This includes taking a good history and examination of the patient. The laboratory investigation and appropriate imaging are reviewed thoroughly. Appropriate explanation is given to the patient about what to expect in the peri-operative period as well as what to do and what not to do. Some medications are also prescribed at this stage and chest physiotherapy initiated.Our intra-operative armamentarium includes the normal endotracheal tube, double lumen tube, bronchial blockers, fibre optic bronchoscope and the ability to manage one-lung ventilation. The post-operative period is equally challenging with respect to pain management as well as having to ventilate some patients after lung surgery and the challenges it brings with it.

36. THE SCOPE OF THORACIC SURGERY IN WEST AFRICA – THE GHANAIAN EXPERIENCE

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The practice of thoracic surgery in Ghana involves the diagnosis and management of lung pathology, mediastinal disease, foregut and the chest wall anomalies. General thoracic surgery is undertaken by the cardiothoracic surgeons at the National Cardiothoracic Center (NCTC), the only cardiothoracic center in the country. Patients seen are mostly referred from teaching hospitals, regional hospitals and district hospitals. History, clinical examination and when appropriate a repeat or new investigations are carried out to confirm diagnosis before treatment is commenced for any patient.
The scope of general thoracic surgery in Ghana includes the following:

- Lung cancer diagnosis, staging and surgical treatment
- Pulmonary resections
- Pneumothorax – primary and secondary
- Empyema thoracis
- Suppurative lung diseases – lung abscess, bronchiectasis
- Pleural effusions
- Bullous lung diseases
- Chest wall tumours
- Mediastinal tumours
- Surgery for myasthenia gravis
- Gastroesophageal reflux disease
- Esophageal motility disorders
- Chest trauma

In a ten year review from 2002 – 2012, 539 cases of general thoracic procedures were carried out at the NCTC. Esophageal procedures accounted for 49% followed by pulmonary procedures (19.1%). Surgery for corrosive esophageal stricture was the highest (42.2%) for esophageal procedures and surgery for esophageal carcinoma was performed in 21.3% of patients. For pulmonary procedures, surgery for bronchogenic carcinoma accounted for the highest number of cases that benefited from lung resections. Majority of patients (70%) who had pneumonectomy were diagnosed with destroyed lung from tuberculosis. Advances in general thoracic surgery was in the field of minimally invasive surgery using video assisted thoracoscopy (VAT). Innovations at the NCTC include tracheal stabilization with autologous costal cartilage in acquired tracheomalacia, sternocleidomastoid myocutaneous esophagoplasty for cervical esophageal lesions, colo-pharyngo-esophagoplasty and colon flap pharyngo-esophagoplasty for very severe pharyngo-esophageal strictures. Early diagnosis and management of thoracic cancers especially esophageal and bronchogenic cancinoma remain the greatest challenge in the practice of general thoracic surgery.

37. THE UNMET NEED FOR PAEDIATRIC AND CONGENITAL HEART SERVICES IN ACCRA

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Background: Approximately 90% of more than 1,000,000 children who are born with congenital heart disease around the world receive suboptimal care or have no access to care. The figure in Ghana has yet to be reported.
Methods: A retrospective search of the echocardiogram database was made from January 2005 to December 2010. All patients less than 15 years diagnosed with a congenital heart disease (CHD) for the first time were selected and entered into the study. In like manner, all children in the age group who had surgery were also entered into the study.
Results: A total of4,396 new echocardiograms were performed for CHD over the study period; 2175, (49.5%) were male whilst 2221 (50.5%) were female, in a male to female ratio of 1:1. 589 (22.2%) were cyanotic lesions whilst 2067 (77.8%), were acyanotic. The commonest CHD studied was ventricular septal defect (VSD) 40.3% of all the acyanotic lesions, or 18.9% of the entire series. Tetralogy of Fallot (TOF) was the commonest cyanotic CHD lesion encountered, 71.6% of all the cyanotic lesions studied or 9.6% of the series. The five commonest CHDs studied were, VSD, TOF, ASD, PVS and PDA. Only 20.2%, (17.6 - 28.5%) of all CHDs evaluated and who had surgical indications had access to surgery.
Conclusion: In the study period,79.8% of children with CHDs could not have access to surgery. With this great need for paediatric and congenital heart services, there is the need for a concerted effort to save the lives of these children.

38. TRANSCATHETER CLOSURE OF PATENT DUCTUS ARTERIOSUS AND ATRIAL SEPTAL DEFECT; EXPERIENCE IN AN AFRICAN COMMUNITY.

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Background: Congenital heart disease contributes significantly to the health burden of children in Nigeria. Catheter interventions for congenital heart disease has been available in the developed world since the first report on device closure of PDA in 1967 by Porstmann. However this did not commence in Nigeria until October 2010. The objective was to document the profiles of the patients who have undergone interventions for congenital heart diseases since the availability of the facility, the challenges encountered and the prospects associated with the interventions at the study site.
Patients and Methods: All the patients referred for interventions for congenital heart disease at the study centre between October 2010 and October 2012 were studied. Profile of the patient including diagnosis at referral, indications interventions done were documented. The study was done at the Department of Paediatrics and Child Health, Lagos State University Teaching Hospital, Ikeja. Lagos, Nigeria.
Results: Age range was 3 years to 62 years, (13.54 ± 17.7 years) with male to female ratio of 1: 3. Diagnosis at referral include Patent Ductus Arteriosus (PDA) in 10 out of the 12 patients (83%) and secundum atrial septal defects (ASD) in two patients (17%). They all had transcatheter closure of the defects.
Conclusion: Interventional procedures for congenital heart diseases although now available locally, high degree of manpower training, cost and local availability of consumables are major limiting factors to its use. Regional and International collaboration could be mutually beneficial.

39.TWO SYNCHRONOUS INTUSSUSCEPTIONS OCCURING AFTER THE REPAIR OF CHRONIC TRAUMATIC DIAPHRAGMATIC HERNIA

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Post-operative intussusception is rare. It may occur after operations for a wide variety of conditions as a result of ileus and adhesion bands. A high index of suspicion with good ultrasonography are necessary for proper diagnosis because of the protean mode of presentation.We report a case of two synchronous post-operative jejuno-jejunal intussusception in a 13-year-old girl following repair of a chronic left traumatic diaphragmatic hernia via thoracotomy. She had features of partial intestinal obstructionafter a bout of diarrhoeal stools in the second post-operative week. The diagnosis was made 3 days later. The intussusceptions were discovered intra-operatively with the second and smaller one found on routine bowel exploration after discovery of the obvious and larger one. Both were manually reduced without the need for bowel resection. Double post-operative intussusceptions are rare. We recommend meticulous bowel inspection at laparotomy whenever post-operative intussusception is managed operatively.