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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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They must be extracted from the list of the key words of the Medicus Index

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- For a chapter of a book : HUANG GJ. WU YK Operative for carcinoma of the esophagus and gastric cardia. In HUANG GJ. WU YK, editors. Carcinoma of the esophagus and gastric cardia. Berlin. Springer, 1984 ; 313-348
- For a book : MAGER RF. How to define teaching objectives. Paris Dunod, 2001 : 71-87.

Tables, figures and illustrations

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CHIRURGIE CARDIAQUE / CARDIAC SURGERY

NEGLECTED TRICUSPID REGURGITATION DURING MITRAL VALVE OR MITRAL-AORTIC VALVE SURGERY

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Abstract

Neglected Tricuspid Regurgitation or Neglected Tricuspid Insufficiency (TI) during mitral valve and mitral-aortic valve surgery. **Objective:** This study reported on clinical outcomes of neglected TI during mitral valve and/or mitral-aortic valve surgery. **Material and methods:** we realized a retrospective study between 1985 and 2002 including 30 patients who presented a small or moderate TI neglected during surgery for mitral and/or mitral-aortic valves diseases. **Results:** Twenty-four patients were female and six males. Median age was 18 years (ranged: 8 to 56 years). We noted rheumatic etiology in 81.5% of cardiac valves diseases. Patients 'mean episodes of global heart failure was1.67±1.5. Median duration of disease was 5 years (2 months - 12years). 60% of patients were at NYHA functional class III. Left cardiac valve diseases associated with neglected TI were mitral valve insufficiency (n=4), mitral valve stenosis(n=4), mitral valve disease (n=16), mitral-aortic valve insufficiency (n=3) and mitral-aortic valve disease (n=3). Mean cardio-thoracic index was 0.68±0.16. On Electrocardiogram, 53.3% of patients had a sinus rhythm. Diagnosis has been confirmed by Echocardiography-Doppler and cardiac catheterization-angiocardiography. Surgical procedures were isolated mitral valve replacement(n=24), aortic valve replacement with mitral valve annuloplasty (n=3) and double mitral-aortic valve replacement (n=3). Hospital mortality was 3.3% (n=1) due to cardiac failure. 22 and 12 patients were completely followed-up at 2 and 5years. At 2years, we noted premature bioprosthesis deterioration (n=1), mitral para-prosthetic leak (n=2) and increasing of neglected TI (n=1). At 5 years follow-up, 9 patients presented worsening of their neglected TI. Significant risks factors statistically associated with worsening neglected TI were: episodes of preoperative heart failure (p = 0.0227), mitral valve surgery associated with (p = 0.0048) and moderate TI (p = 0.046)).

Keywords: neglected tricuspid regurgitation/insufficiency, outcomes, cardiac valve surgery.

Introduction

Tricuspid insufficiency (TI) is the result of a lack of coaptation of the tricuspid valve leaflets, associate with a blood regurgitation the right ventricle to the right atrium during ventricular systole[1,2]. Two types of anatomo-pathological patterns can be identified: functional TI and organic TI characterized by valvular and/or sub valvular tricuspid apparatus lesions. For a long time, functional TI (FTI) has been a neglected and underestimated entity[3]. It is often due to idiopathic annular dilatation, dilated cardiomyopathy, pulmonary arterial hypertension, atrial fibrillation, right ventricular dysplasia and sometimes to congenital heart septal defects. FTIs can be small or minimal, moderate and large or major. In sub-Saharan Africa1, FTIs are frequently associated with mitral or mitral-aortic insufficiency. Surgical options regarding FTI remain controversial[4,5]. Those would be either a tricuspid annuloplasty with or without a prosthetic ring[5,6] or a tricuspid valve replacement, or a surgical abstention. The aim of this study is to contribute to a better codification of surgical indications for neglected FTIs during mitral-aortic or mitral valve surgery in Sub-Saharan Africa.

Material and Methods

We carried out a retrospective study including 30 patients with minimal or moderate TI coexisting with surgical mitral and mitral-aortic valvopathies between 1985 and 2002.Clinical data collection concerned:

- Demographic parameters, etiology, associated lesions and severity;
-Functional status according to NYHA classification;
- Radiological cardio-thoracic index (CTI);
- electrocardiographic parameters;
-Doppler echocardiography measurements: systolic and diastolic diameters of the right ventricle (RV), RV ejection fraction and the degree of TI;
- Cardiac catheterization coupled with angiography outcomes: RV end-diastolic pressure, cardiac index, RV ejection fraction and grade of TI;
- Surgical informations: all the patients underwent open heart surgery through a vertical median sternotomy, cardio-pulmonary bypass, aortic cross clamping, myocardial protection by a cold hyperkalemic, a sanguineous, antegrade cardioplegic solution. Types of surgery performed on the left cardiac valve(s), hospital morbidity and mortality, and post-operative evolution in the medium term (1- 2 years) and long-term (> 2 years) were studied.

Risk factors for FTI aggravation were assessed. All incomplete files were excluded from the study. Continuous variables were expressed as mean ± standard error (MSE) or percentage (%) depending on considered factors. Comparisons were made using the Mantel-Haenszel test, Yates test and Fisher test for values below 5. For all values, the significance threshold is set to 0.05.

Results

There were 25 women and 5 men (a sex ratio equal to 0.2). Median age was 18 years (extremes: 8 -56 years). Acute rheumatic fever was valve diseases' dominant etiology (n = 25; 81.5%). In history, there were 1.67 ± 1.5 episodes of right heart failure (n = 12). Tricuspid insufficiency was associated with a mitral insufficiency (n = 4), mitral stenosis (n=4), a mitral valve disease (n = 16), and mitro-aortic insufficiency (n= 6). Mean time between symptoms onset and presentation to hospital was 5 years (extremes: 2 months - 12 years). 60% and 40% of patients were at NYHA class III (n = 18) and class II (n = 12) respectively. On auscultation, stenosis (n = 3), or mitral disease (n = 10) or

mitral insufficiency (n = 10) or mitral-aortic insufficiency (n = 3).
Echocardiography, hemodynamic and angiocardiography results are shown on tables I and II.

Right aterial enlargement	24;80%
Right ventricular enlargement	21;70 %
Mean pulmonary arterial pressure (mmHg)	51.16±13.3
Ejection Fraction	50.15±13.12
TR grade I	14;46.7%
TR grade II	16,53.3%

Table I: Echocardiography Results
TR : Tricuspid Regurgitation

Mean right arterial pressure(mmHg)	5.75±4.2
Right ventricular end-diastolic pressure(mmHg)	35.14±16.8
Mean pulmonary arterial pressure (mmHg)	37.15±14.5
Pulmonary artery wedge pressure (mmHg)	19.75±10.12
Cardiac Index (l/min/m²)	2±0.52
TR grade I	n=18
TR grade IIa	n=8
TR grade IIb	n=4

Table II: Hemodynamic and Angiocardiography Results

During cardiac valvular surgery, TI was neglected in a double mitral-aortic valve replacement (n =3), isolated mitral valve replacement (n = 24), and a combined aortic valve replacement and mitral valve pasty (n = 3). Types of prosthetic valves used are listed in Table III.

Prosthesis			Number (n)	Percentage (%)
Bioprosthesis (n = 16; 53.3%)		Carpentier-Edwards	16	53.3
		Duromedics	2	6.7
Mechanical Prosthesis	(n = 14;46.7 %)	Starr 3M	8	26.6
		St Jude	4	13.4
TOTAL			30	100

Table III: Types of Prosthesis

Surgical follow-up was uneventful in 29 patients. Hospital mortality was 3.3% (n = 1) related to a low cardiac output. Mean follow-up was10.93 ± 3.9 years (extremes: 0-13 years) with a total follow-up of 152 patients per year. Morbidity included lung infection (n = 3), right heart failure (n = 2), hepatocellular insufficiency (n = 1) and atrial fibrillation (n = 1). All alive patients were in NYHA I / II functional class. At short term, disappearance of the TI murmur was noted in all survivors. At midterm, improvement rate of functional status was 56.4 % (Figure1).

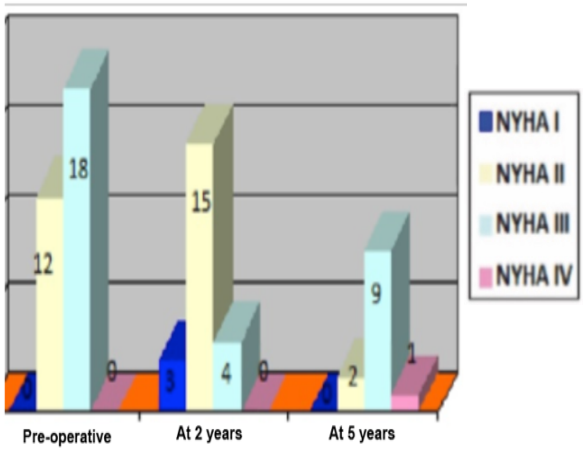

Figure 1: Clinical evolution at mid and long term

Risk factors	Neglected FTI aggravation (n=15)	Relative Risk (RR)	CI 95% [-]	P
Age (< 25ans)	10	0.8333	0.3233-2.14	00335
Sex (Female)	12	0.750	0.2815-1.9983	0.255
Preoperative heart failure Phase (> 1)	11	0.9167	0.2995 – 2.8057	0.0227
Moderate FTI	12	1.143	0.444 – 2.938	0.046
Mitral surgery	12	2.051	0.9561-6.62	0.0048

Table IV: Risk factors for aggravation of neglected functional tricuspid insufficiency

At long term, aggravation of neglected FTI (n=9; 75%) was the dominant post-operative complication. Average time for worsening FTI was 3.1 ± 2 years. Risk factors for aggravation of neglected FTI (n = 15) shown in Table IV were as follows: episodes of preoperative cardiac failure (p =0.0227), mitral valve surgery (p = 0.0048) and moderate TI (p = 0.046).

Discussion

Such as in our tropical context[1], combined minimal or moderate functional TI and left valvular heart diseases is frequent, in the range of 74-86%7; in post-operative period, it has been noted that FTIN at mitral valve surgery may have variable evolution; therefore, evaluating late postoperatively FTIN during mitral or mitral-aortic surgery becomes relevant. Worsening FTIN after mitral or mitral-aortic surgery occurs in 7.7 to 67% of cases[7,8,9] independently of valvular heart diseases etiology[1,9,10]. For Kwak et al[9], aggravation of FTI could be moderate (7.5%) or severe (19.5%) several years after mitral and / or mitral-aortic surgery. According to Dreyfus and al[11], based on perioperative measurement of tricuspid ring diameter, aggravation rates of FTI from minimal to moderate or to severe were 41% and 34% respectively after mitral surgery. Causes of worsening FTIN were residual mitral insufficiency and persistent pulmonary arterial hypertension[11]. From Dreyfus et al[11] viewpoint FTI can be neglected per-operatively when tricuspid ring diameter is less than 70 mm as recommended by Bonow RO et al[12]. On this basis, right ventricular failure preoperative symptoms have regressed in our NYHA class III patients similarly to Dreyfus GD and al[13] experience. He mentioned that clinical improvement was related to left cardiac valvular dysfunction correction by either mitral and / or aortic replacement or mitral plasty[13]. Clinical improvement often contrasted with echocardiographic and Doppler results of FTIN after mitral valve surgery[2,5,14]. In our study, in[15] patients, as expressed by some authors[11,14,15], onset of right ventricular failure symptoms, persistent preoperative pulmonary arterial hypertension post-operatively generated worsening neglected FTI at middle and long term and subsequently right ventricular dysfunction[16,17]. Izumi et al[18] reported between 4 and 24 years of post-operative period, 14% of severe aggravation of neglected FTI during rheumatic valve mitral surgery. Conversely, at seven years, Kirali K et al.[5] observed a significant regression of tricuspid regurgitation, of systolic pulmonary arterial pressure, and of left atrium diameter when comparing moderate FTIN and organic TI after rheumatic mitral valve surgery without pulmonary arterial hypertension. At 10 years of age, Kim H et al[19] showed 10% of minimal neglected TIs after mitral

valve replacement shifted faster after mitral-aortic valve surgery than after isolated mitral or aortic surgery. Majority of authors[4,16,20,21] assert that, in the long term, FTI continues to worsen after mitral and/or mitral-aortic valve surgery. From those authors predictive factors for late aggravation of FTI were: moderate FTI, TI grade II at echocardiography[22], atrial fibrillation[9,22], mitral surgery[9], left atrium dilatation22 and right ventricle failure [8,16,22,23]. According to Kim JB et al.[22], advanced age and neglected moderate FTI were predictive independent factors for moderate FTI aggravation after rheumatic mitral valve replacement. In our study, besides moderate FTI and mitral valve surgery, age less than 25 years, pre-operative cardiac failure episodes before surgery were in the long term, risk factors for worsening FTIN. For Kirali et al[5], predictive factors for late mortality were: age, severe post-operative TI (> grade 3) and pulmonary arterial hypertension. Mortality proportionally goes up with preoperative tricuspid regurgitation degree in patients with aortic valve surgery due to a severe aortic valve regurgitation[24]. For several authors[19,24,25,26,27]pulmonary arterial hypertension higher than 50 mmHg combined with moderate FTI would be the only condition for performing tricuspid annuloplasty which could improve neglected moderate FTI survival rates.

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CHIRURGIE CARDIAQUE / CARDIAC SURGERY

DE VEGA TRICUSPID ANNULOPLASTY DURING MITRAL VALVE REPLACEMENT: SURGICAL EXPERIENCE IN AN AFRICAN CONTEXT

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Summary

The aim of this study is to evaluate the De Vega's tricuspid annuloplasty and its long-term results after mitral valve surgery. **Material and methods:** De Vega tricuspid annuloplasty (TA) technique has been performed in 42 patients with functional tricuspid regurgitation (FTR) associated with a mitral valve disease. Etiology of valve diseases was rheumatic fever in half of our cases. In order to evaluate surgical results of this technique at mid and long term, tricuspid regurgitation (TR) was quantitatively estimated by echocardiography doppler and cardiac catheterization before and after surgery. Clinical symptoms in particular right ventricular dysfunction symptoms, cardiac function and surgical results were estimated. **Results:** Hospital mortality was 4.76 % (n= 2). Causes of death were acute heart failure (n = 1) and severe right cardiac insufficiency (n= 1). The rate of residual TR was 7.14 %. Hospital mean stay was 8.8 ± 4 days (range: 6 to 22 days). Early outcome was uneventful in 90.47 % of patients. At early post-operative period, right cardiac insufficiency signs decreased in 22 patients (52.38 %) and NYHA functional class decreased without escalation of patients ($p < 0.05$) pre-operative symptoms. Atrial fibrillation disappeared in 11.2 % cases. Regression of the tricuspid leak was 2 ± 0.47 degree. At one-year follow-up, there were no difference between survival without FTR improvement and survival with secondary regression of right cardiac insufficiency signs ($p = 0.83$). However, at echocardiography, there was a significant late regression of the right cardiac insufficiency signs for the patients with left-ventricle systolic ejection fraction (LVSEF) > 45 % versus patients with LVSEF < 45% ($p = 0.046$). At 5 years follow-up cardiac catheterization tricuspid leak was absent or mild (n= 22; 57.9 %), moderate (n = 14; 36.8 %) and severe (n = 2; 5.3 %). After 10 years and 15 years, freedom from late post-operative complications after tricuspid repair with De Vega annuloplasty was100% vs 63±5% and 58±2.4% vs 18% for the patients with LVSEF> 45 % and patients with LVSEF < 45% respectively ($p <0.05$). Conclusion: De Vega technique seems to be outstandingly effective in the patients whose myocardial function was well preserved, because no immediate second recurrence of TR has been detected. However, such a long-term efficiency of De Vega's technique cannot be expected in patient's whose myocardial function would deteriorate over the time.

Keywords: Tricuspid insufficiency; mitral valve; De Vega Annuloplasty.

Introduction

Tricuspid regurgitation (TR) results from failure of coaptation of the tricuspid valve leaflets, associated with a flowing back of blood from the right ventricle to the right atrium during right ventricular systole. TR can be functional or organic. In Africa, functional TR (FTR) is most often encountered; it frequently co-exists with rheumatic mitral valve diseases. There is no parallelism between the degree of functional tricuspid regurgitation and the intensity of preoperative clinical symptoms. Indication for surgery of functional TR depends on clinical and hemodynamic severity. FTR treatment is mostly conservative. According to the authors, tricuspid annuloplasty is performed by a simple antero-posterior annular plicature according to De Vega technique[4] or tricuspid-valved bicuspidation according to Kay technique[5], or reinforced double annular suture or an autologous pericardial ring technique or the Carpentier-Edwards annuloplasty ring technique[6]. Our choice has always been DE VEGA tricuspid annuloplasty (TA) technique whose evaluation and results are the purpose of this present study.

Material and methods

Between December 1983 and November 2000, 42 patients with mitral valve disease associated with functional TR underwent surgery. All organic TR were excluded from our study. There were 22 females and 20 males. Median age was 18 years (extremes: 8 and 55 years). Etiology of mitral valve disease associated with FTR was rheumatic fever in all our patients. Clinical, echocardiographic, hemodynamic and angiocardiography data are shown in Tables Ia, Ib and Ic.

VARIABLES (n = 42)		Number (n)	%	Mean	Extremes
				-	-
Classification NYHA	II	16	38,1		
(Functional Stage)	III	18	42,9	-	-
	IV	8	19	-	-
Preexisting	Right	18	47,4	-	-
Heart failure	Left	0	0	-	-
	Left and right	20	52,6	-	-
Age of illness (ans)				6,45 ± 2,1	3-19
DIAGNOSTIC (n = 42)					
	Mitral valve disease	24	57,1	-	-
Mitral valve diseases	Mitral stenosis	6	14,3	-	-
	Mitral insufficiency	12	28,6	-	-
	Moderate	30	71,4	-	-
Tricuspid insufficiency	Severe	12	28,6	-	-
Pre-operative radiographic parameters					
	Cardio-Thoracic Index (CTI)	-	-	0.77± 0.15	0.48-067
Electrocardiographic parameters	Atrial fibrillation	26	61,9	-	-
	Sinus rhythm	16	38,1	-	-

Table Ia: Clinical, radiological and electrical pre-operative characteristics of patients

VARIABLES (n = 42)		Number (n)	%	Mean	Extremes
Echocardiographic Parameters	Pulmonary Blood pressure (mmHg)	38	90,5	128.3± 10.3	60-180
	Ejection fraction (FE %)	-	-	60.60 ± 12	33 -79
	Other rheumatic lesions	30	71,4	-	-
	Infectious endocarditis lesions	6	14,3	-	-
	Degenerative lesions	4	9,5	-	-
	Valve thrombosis	0	0	-	-
	Others	2	4,8	-	-

Table Ib: Echocardiographic pre-operative characteristics of patients.

VARIABLES (n = 42)		Number (n)	%	Mean	Extremes
Hemodynamic Parameters	RAP (mmHg)	-	-	11.67± 8.7	3 - 65
	PAP (mmHg)	-	-	41.2± 9.72	23 - 61
	RVEDP (mmHg)	-	-	37.81± 16.7	17 - 60
	SAP (mHg)	-	-	78 ± 10.15	50 - 98
	LVEDP (mmHg)	-	-	38,18 ± 13	0 - 100
	Cardiac index (l/min/m²)	-	-	1.78± 0.42	1.2 - 2.61

Table Ic: Hemodynamic preoperative characteristics of patients

RAP: Right Arterial Pressure; **PAP:** Pulmonary Arterial Pressure **RVEDP:** Right Ventricular End Diastolic Pressure; **LVEDP:** Left Ventricular End Diastolic Pressure

Patients were divided into 2 groups: group 1 (n = 22 patients) with a left ventricular ejection fraction (LVEF) higher than or equal to 45% and group 2 (n = 20 patients) with LVEF less than 45%. For all patients, clinical diagnosis was based on holosystolic xiphoid murmur existence (n = 42) associated

with mitral valvular pathology. Pick's pseudo-cirrhosis syndrome was present in 62% of patients. In all patients, echocardiography and cardiac catheterization coupled with angiography confirmed functional TR diagnosis (n = 42). Surgery was carried out under cardio-pumonary bypass. Surgical procedures were tricuspid annuloplasty (TA) according to De Vega technique associated with mitral valve replacement (n = 42) by mechanical(n=30) and biological (n=12) prostheses. De Vega TA (n = 42) consisted in a double semi-circular plicature of tricuspid anulus using a doule –armed N0 2-0 braided polyester suture with two teflon corners at the antero-septal commissure and the antero-posterior commissure. Post-operative evaluation was made at midterm (1 - 2 years) and at long term (> 2 years). It consisted of assessment of clinical, electrocardiographic, radiological and hemodynamic right-sided heart parameters. These data were obtained during outpatient clinic care. Statistical analysis of continuous variables was expressed as mean ± Standard Derivations (SD). Comparisons were made using Chi-squared and Fisher tests for continuous variables. Kaplan Meier survival curves were compared by Log-Rank test. Threshold of significance was retained for a value of (p) less than 0.05.

Results

Immediate post-operative period was uneventful in 40 patients (95%). Residual rate of TR was 7.14%. At early post-operative term, patients were at NYHA functional class I or II (n = 32; 76.2%) [p<0.05]. Hospital mortality was 4.76% (n = 2). Acute heart failure was main cause of death (n = 2). Early postoperative complications (n = 6, 14.29%) were noted. Average hospital stay was 8.8 ± 4 days (extremes: 6 and 22 days). At day 5 after surgery, echocardiography assessment of De Vega TA was satisfactory. Mean follow-up was 11.33 ± 4. 26 years (extremes:3 years - 13 years). Total number of patients followed was 258 per year. Rate of patients at follow-up was 13.9%. At 1-month follow-up, there was a clinical regression of the right ventricle insufficiency symptoms in all patients. Atrial fibrillation disappeared in 11.2% of cases. Post-operatively, echocardiography and cardiac catheterization coupled with angiography showed a reduction of TR degree and of systolic pulmonary arterial hypertension, as reported in Table II.

EVOLUTION At 1 YEAR

Variables		Pre-operative	Number (n)	A 1 year	Number (n)	P
X-Ray	CTI (mean.)	0.77 ± 0.15	42	0,62 ± 0,5	40	NS
Echocardiography	RAD (mean.) mm	128.3 ± 10.3	42	110 ± 9,5	40	NS
	EF (mean.) %	60.60 ± 12	42	62,2 ± 11,2	41	NS
	VTDVD (mean.) ml	13,3 ±3,0	38	12,5 ± 5,14	25	NS
Cardiac catheterization + Angiocardiography	POD (mean .)	11.67 ± 8.7	42	10,71 ± 8,43	25	NS
	PAP (mean .)	41.2 ± 9.72	42	36,26 ± 11,18	25	S
	BPCP (mean .)	-	-	22 ± 5,31	20	-
	PTDVG (mean .)	38,18 ± 13	42	27,48 ±9,67	20	NS
	PAO (mean .)	78 ±10.15	42	80,16 ± 8,43	25	NS
	TI grade 1	0	0	23,8 %	10	S
	TI grade 2	0	0	11,9 %	5	S
	TI grade 3	71,43 %	30	0	0	S
	TI grade 4	28,57 %	12	0	0	S

Table II: Post-operative parameters of patients.

RAD: Right Atrium Diameter; **VTDVD** : Telediastolic Volume of the Right Ventricle ; **POD** : Right Atrial Pressure; **PAP** : Pulmonary Blood Pressure; **BPCP** : Blocked Pulmonary Capillary Pressure; **PTDVG** : Left Ventricle Telediastolic Pressure;**PAO**: Systemic Aortic Pressure; **CTI** :Cardiothoracic Index; **EF** : Ejection fraction; **TI :** Tricuspid insufficiency ; **S** : Significant ; **NS** : Not significant

At midterm, mortality was nil. Postoperative complications were myocardial dysfunction (n = 1), bio prosthetic valve endocarditis (n= 2) and atrial fibrillation (n = 3). At 1-year follow-up, regression of tricuspid regurgitation at echocardiography was 2 ± 0.47 grade. In the long term, post-operative complications were lung abscess due to an infective endocarditis (n = 1) and ischemic stroke (n = 1). Over 4.5 years post-operative, patients with a severe preoperative impairment of the myocardial performance with left ventricular systolic ejection fraction

(LVSEF) less than 45% presented more post-operative complications related to worsening symptoms of right heart ailure than patients with LVSEF equal or above 45%(p= 0.04) (Figure 1).

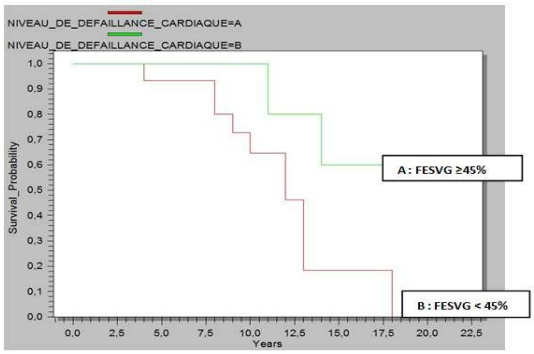

Figure 1 : *Actuarial freedom from complications after De Vega annuloplasty according to Kaplan-Meier method. (Hospital mortality excluded)*

During the first three years, symptoms of right heart failure declined and then stabilized between 3 and 4 years and then between 8 and 9 years before regressing again in patients with left ventricular systolic ejection fraction at 45% (Figure 2).

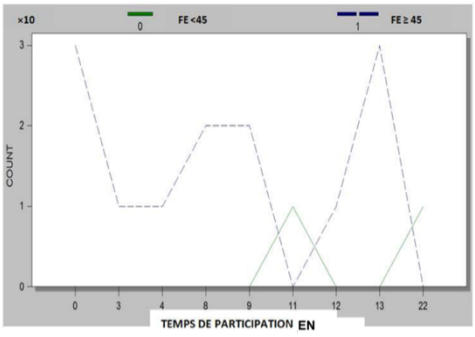

Figure 2: *Regression of right heart failure symptoms after surgery*

At 5 years, cardiac catheterization coupled with angiography showed lack or minimal tricuspid regurgitation (grade 1) (n = 22; 57.9%), moderate TR (grade 2) (n = 14, 36.8%) and significant TR (grade 3 or 4) (n = 2; 5.3%). In our study, after De Vega TA during mitral valve replacement, probability of overall survival without secondary worsening signs of right heart failure was 98%, 95% and 80 respectively at 5 years, 10 years and 15 years.

Discussion

De Vega technique has revolutionized tricuspid surgery since 1972[4]. Initially, De Vega TA was mainly reserved to moderate functional TR due to tricuspid annular dilatation[4]. This technique has the advantages of being simple and less expensive. DE Vega TA prevents mid-term right ventricular dysfunction when FTR coexists with surgical mitral valve disease[7]. Because of its advantages, and efficiency, its indication has been extended to severe FTR in our experience. Indeed, FTRs were due to mitral valve diseases, such as rheumatic mitral insufficiency and / or mitral stenosis or rheumatic mitral-aortic insufficiency[1,8,9,10]. De Vega TA was obviously suitable for tricuspid ring dilatation. Apart from technical and financial De Vega technique's advantages, exit from the heart and lung machine was easy in most cases (92.86%) according to our experience. This observation matched well with echocardiography results after tricuspid annuloplasty ring technique[11]. Our excellent results were confirmed later by the brief post-operative hospital stay of our patients as mentioned by others in literature [2,4,12.13]. From Rabago G. et al. study[14], rhythm disorders reduction was significant after De Vega TA due to its consequence such as depletion of right atrial dilatation. Significant myocardial function alteration has a positive impact on post-operative outcomes[15,16,17,18]. like we noted: similar findings have been reported in children with TR in congenital heart disease[14,19]. Furthermore, LVSEF <50%, systolic pulmonary arterial pressure (SPAP)> 60 mmHg were risk factors for De Vega TA dysfunction at mid-term when TR was severe or more before surgery[17]. According to our study, echocardiographic impact of functional tricuspid regurgitation repair

through De Vega TA at the time of mitral valve replacement was not statistically significant; it was also mentioned by CHAN[20].After surgery, at short and mid-term, clinical findings were similar to echocardiographic data when preoperative functional TR was in stage II and III: as reported by us and other authors[16,21,22,23].In a like manner, classic De Vega TA ,modified De Vega TA and tricuspid valve annuloplasty ring technique TA improved essentially immediate post-operative NYHA functional status, immediate postoperative survival and prevented from right ventricular dysfunction[11,15]. In our study, immediate complications rate after De Vega TA was not different from Kay TA (11.9%)[5] and Carpenter-Edwards tricuspid valve annuloplasty ring technique (8.7%)[25]. Along the same line, overall survival without complication after De Vega annuloplasty was 100% vs 63± 5% at 10 years and 58±2.4% vs 18% at 15 years respectively in patients with LVSEF> 45% and with LVSEF <45%. At 10 years, survival without re-intervention was 87.9± 3% in patients with normal LVSEF according to Guenther T. et al.[26]. Despite a high rate of pre-existing heart failure episodes, late mortality is zero in our series; it was probably due to our experience of De Vega TA technique.

Conclusion

DeVega tricuspid annuloplasty remains an excellent technique with excellent results at short and long term postoperatively.

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CHIRURGIE THORACIQUE / THORACIQUE SURGERY

PATTERN OF VASCULAR MALFORMATIONS IN A SUBSAHARAN AFRICA SETTING

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Summary

Congenital vascular malformations (VM) encompass a wide spectrum of lesions with varying degrees of severity. The confusing terminology in the literature has led to the development of many classifications systems. The International Society for the Study of Vascular Anomalies (ISSVA) classification is the mostly accepted and has been recently updated. In Africa in general and sub-Saharan Africa in particular, very few reports have written using those confusing terminologies thereby leading to poor description of the lesions. The aim of our study is to describe the patient's characteristic and pattern of VM in Tropical Africa in General and Yaoundé in particular outlining the importance of accurate description of the lesions in light of the current concepts, classifications and terminology. All the patients diagnosed of VM during a 10 years period (January 2007 to October 2016) are included. For each patient clinical examination, duplex ultrasound and if necessary X rays, Computer tomography, MRI. were performed. The following data were retrieved: epidemiological data, description of the malformation (the symptoms, the type, the location, the extend, the sizes), the presence of an associated non-vascular malformation. During the study period, 51 VM were diagnosed in 47 patients. The age was 2 weeks to 29 years. Thirty-six (76.59%) were male and 15 (23.40%) female. As far as the type of VM is concerned, the venous malformations were the most common followed by capillary and combined. 2 trinocular aortic malformation were seen. It was noticed that 8 of the 9 combined VM-Klippel Trenaunay syndrome (n=8) and Parkes- Weber syndrome (n=1) were found in male patients. The sizes of the VM ranged from spot like lesion to extensive lesion and huge mass. With regards to the location of the VM, the limbs were found to be most affected (58,82 %) with the lower limbs being more affected than the upper limbs.

Key words: Vascular, malformations, Africa

Introduction

Congenital vascular malformations (VM) arise due to an error in vessel development in the embryo They encompass a wide spectrum of lesions with varying degrees of severity, ranging from isolated and innocuous lesions, to those that are disfiguring and disabling, to those that signal the presence of a more complex syndrome[1] the confusing terminology in the literature has led to the development of many classifications systems. The International Society for the Study of Vascular Anomalies (ISSVA) classification is the mostly accepted and has been recently updated[1]. The ISSVA classification divides vascular anomalies into vascular tumours or Hemangiomas and VM; based on their endothelial cell characteristics, clinical presentation, natural history, and histopathological characteristics. VM are further classified according to the type of vessel involved into arterial, venous, lymphatic and arteriovenous malformations[1,2,3]. The VM are also divided into defects of the main vessel, also called truncular defect or defect of the major named vessels and area of displastic vessel in tissue which are called extraarticular. In some patients a more complex disease can be the result of a combination of malformations[1,2,3]. Though considered rare, VM are frequently encountered in vascular practice and are a source of morbidity and esthetic disturbances and in complex cases the management can be frustrating both for the patient and the management team. In Africa in general and sub-Saharan Africa in particular, very few reports have been written[4,5,6,7]. The limits of those previously published studies are the limited number of VM, the use of confusing terminology the-refore leading to poor description of the lesions and the mixing together of the Hemangiomas (vascular tumors) and VM which are different pathologies with different management approches, prognosis and evolution. The aim of our study is to describe the patient's characteristic and pattern of VM in Tropical Africa in General and Yaoundé in particular outlining the importance of accurate description of the lesions in light of the current concepts, classifications and terminologies.

Patients and Methods

All the patients admitted in our clinic and diagnosed of VM during a 10 years period (January 2007 to 2016) have been considered. The Yaoundé General Hospital is the main referral Hospital in Cameroon and the only Vascular Center where most vascular patients of the country and neighboring countries are managed. Most modern vascular diagnostic tools (US, CTA…) and expert (Vascular surgeons, radiologist…) are available in this center. The diagnosis of VM is based on step by step procedure as follow: the clinical examination (the cornerstone of the diagnosis), duplex ultrasound and where necessary depending on the case; X rays, Computer tomography, MRI. For each patient, the following data were retrieved using a standardized case report form; 1-Epidemiological data (Age, sexes, age at onset, family history of VM, specific exposition of the mother during pregnancy (if known). 2-For the VM the symptoms, the location, the extend, the sizes, the type (venous arterial, lymphatic, combined, truncular or extratruncular) 3-the presence of an associated none vascular malformation. Hemangioma/vascular tumors as well as some specific malformations classified by the last ISSVA under complex malformations (as Proteus syndrome) are not part of this study .4 Data were entered into epi-info and analyzed as counts, frequency and percentages continuous data were

expressed as mean/standard deviation while categorical data were analyzed using Chi-square test with a Pvalue ≤0.05 regarded as statistically significant.

Results

During the study period, 51 VM were diagnosed in 47 patients. The age range was 2 weeks to 29 years. Thirty-six (76.59%) were males and 15 (23.40) females the lesions were present at birth in 44 (85 %) of the cases though not considered serious whereas it developed during the early years of life for the rest of the patients. For all the patients, no specific exposition of the mothers during pregnancy which may be considered as risk factor was declared. With regards to the type of VM, the venous malformations were the most common followed by capillary and combined (Table I).

Type of VM	N	%
Venous	25	49
Lymphatic	6	11.7
Capillary	9	17.64
Combined (Klippel Trenaunay)	8	15.68
Combined with arteriove nous fistula (Parkes Weber)	1	1.9
Arterial (aorta coarctation)	2	3.92
Extra vascular associated lesion (Overgrowth syndrome)	6	11.76

Table I: Distribution of the VM

Location of the malformation	N	%
Limbs	30	
Upper limbs	6	58.82
Lower limbs	24	
Trunk	13	25.49
Head and neck	6	11.76
Aorta	2	3.91
Genitalia	1	1.96

Table II: Location of the VM

The lesions encountered in VM were mostly unifocal (20 patients) and multifocal in 5 patients the limbs were the most involved location (Figure 1).

Figure 1: Venous malformation of the leg in a 15 years old boy

It was noticed that 8 of the 9 combined VM-[8 Klippel -Trenaunay Syndrom (KTS) and one Parkes- weber syndrom (PWS)] were found on male patients. The KTS which is a combination of Capillary, Venous (Varices) lymphatic malformations and associated limb overgrowth invarious proportion or discrepency were located on the lower limb for 7 patients and upper limb for one patient (Figure 2)

Figure 2: Klippel Trenaunay syndrome 21 years old male (right limb hypertrophy and non-systematic varicoces are

The patient with PWS had the classical presentation with its arteriovenous fistula in the mid-thigh region. The lymphatic malformations (Cystic hygroma/lymphangioma) were localized mainly around the neck region (Figure 3).

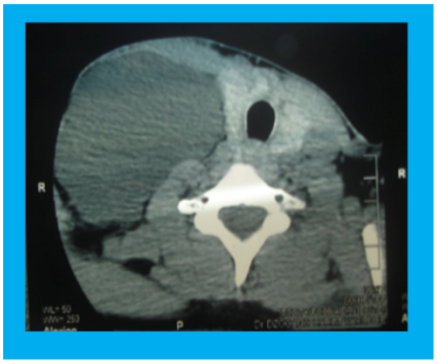

Figure 3: Cervical Cystic hygrom

Of the 2 aortic coarctations one was mid-aortic (Abdominal) and discovered during an US which depicted a left atrophic kidney. The other was a thoracic arch classical coarctation suspected by a blood pressure difference between the two arms. The sizes of the VM ranged from.

Discussion

VM remain a difficult diagnostic and therapeutic challenge due to the wide range of clinical presentations, unpredictable clinical course, erratic response to the treatment with high recurrence/ persistence rates, high morbidity following nonspecific conventional treatment, and confusing terminology. For the purpose of clarity and easy understanding, we have chosen the simplest form and terminology of the most recent ISSVA Consensus[1]. The aim of our study was specifically to describe the pattern of VM in tropical Africa and not the therapeutic approach or outcome. This is not the case with other reports from sub-Saharan Africa in which all the anomalies (hemangioma and VM) were considered together[4,5,6,7]. Those reports were emphasizing on surgical management and outcome without a clear description of the lesions[4,5,6]. The number of patients though small compared to what is seen in specialized vascular centers in Western countries[8] is probably the highest from a country of Sub-Saharan Africa and probably most parts of the developing world. This may be due the lack of vascular specialists. Actually, the field of vascular surgery is evolving in Sub-Saharan Africa but the practice is bedeviled by lack of skilled vascular surgeons and infrastructural challenges. The consequences are a low volume of operations and a dearth of data. Available data are not representative of the wider picture. In Senegal, among the 28 vascular anomalies presented by Diarra et al[20] were VM. In Tanzania only 33 among 134 cases of vascular anomalies were VM5 In Benin City (Nigeria), Oarsmen's and Evbuomwan published a report of 63 hemangiomas using this confusing terminology for every type of vascular anomalies6. In North Nigeria Dagbani et al[7] reported just 4 VM in their practice in 4 years in in a tertiary Hospital. Therefore, we strongly believed that our experience can be of help in contributing to the world data bank. As far as our patients are concerned, the long delay to seek vascular attention for most of the patients is probably due to the lack of vascular specialist. Therefore, some patients were correctly diagnosed only at adult age. The male to female ratio is not different from what is seen in most publications [4,5,6,8]. The isolated presentation and the sporadic pattern of VM is also commonly reported in the medico-surgical literature. Venous malformations are the most prevalent type of VM in our study; this is also the most reported type by the other authors[1,2]. It represents 59% in one of the renowned vascular mal-formation centers in Italy[8]. We can mention that simple cutaneous VM

(capillary) like « Port wine » may be difficult to see in some black patients and therefore they may not seek medical attention. Most of our capillary VM were seen in mucosa or in fair skin people. Combined VM are not rare in our patients (18%). In the literature, it represents about 5% of VM (8). Diarra et al[4] reported 7 combined VM among their 20 VM in Senegal. We think that our higher proportion as was the case in Senegal[4] can be explained by the fact that they are the most serious and complicated cases and therefore people are more aware to seek a specialized attention. But it may also be a specific trend for our setting. We need more studies to clarify this issue. The lesions are very huge in many patients. In fact, as mentioned, most of our patients were diagnosed lately due the lack of vascular expertise. It is probably the case in most parts of the world. The commonest location is the extremities as is also the case in most reports[1,2,4,5,6,] though the lower extremity was mostly involved in our study unlike other reports[6]. This is probably because we have considered here purely VM and not all the vascular anomalies. It is well known that hemangiomas are more common at the cephalic extremity[1].

Conclusion

Vascular anomalies are the most common tumors, in infancy and childhood and pose major diagnostic and therapeutic challenges in our environment. Making an accurate clinical diagnosis is of critical importance. In particular it is important to correctly and precisely identify each type of lesion to reduce confusion. This is possible in our setting.

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CHIRURGIE THORACIQUE/THORACIC SURGERY

TERATOME KYSTIQUE DU MEDIASTIN CHEZ PATIENTE DE 33 ANS

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Résumé.
Les tératomes médiastinaux sont des tumeurs germinales rares. Nous rapportons ici le cas d'une patiente de 33 ans qui a consulté pour toux depuis 6 mois et chez qui une radiographie du thorax a montré une masse médiatisnale dont le caractère kystique a été confirmé par le scanner. Une thoracotomie antérolatérale a été effectuée mettant en évidence une masse de 7 cm adhérent au péricarde et au poumon. L'exérèse totale a été faite. L'anatomopathologie a permis de décrire un tératome kystique mature. L'évolution post-opératoire a été simple.

Mots -clés : médiastin, tératome, chirurgie

Summary
Anterior mediastinal teratomas are rare germ cell tumors. We report a case of such rare tumor in a 33 years old woman who presented with persistent cough of 6-month duration. Chest X R-ay suspected and then Computed tomography of the chest confirmed the diagnosis as anterior mediastinal cystic mass. Patient underwent a left antero-lateral thoracotomy. Intra-operatively there was a 7cm large mass in the anterior mediastinum. A Complete excision of the mass has been done. Pathologic examination confirmed a teratoma. The patient underwent uneventful recovery.

Key -words: mediastinum, teratoma, surgery

Introduction

On appelle masse médiastinale kystique, tout processus liquidien occupant l'espace médiastinal développé aux dépens des éléments du médiastin ou empruntant le médiastin pour se développer. Elles sont rares et le plus souvent bénignes et d'origine malformative. Leur découverte est fortuite dans 1/3 des cas. Le tératome kystique ou kyste dermoide est une Tumeur germinale dont la localisation médiatisnale très rare représente 15 % des masses du médiastin[1,2,3]. Son diagnostic positif repose sur la confrontation de la clinique, mais surtout l'imagerie qui donnera la localisation précise de la lésion et une orientation diagnostique adéquate. Le diagnostic étiologique ou de nature restant l'histologie soit par prélèvement

orientée par imagerie ou de la pièce opératoire. Nous rapportons ici un cas de tératome kystique du médiastin antérieur étage moyen chez une patiente de 33 ans.

Cas clinique

Une patiente de 33 ans infirmière sans antécédents médical ni chirurgical remarquable a consulté pour toux isolée sèche avec un épisode hemoptoique, évoluant depuis 6 mois pour laquelle à la biologie la recherche de la tuberculose était négative. Plusieurs traitements antibiotiques n'ont pas apporté d'amélioration. L'examen clinique était pauvre avec un très bon état général. La radiographie du thorax complétée par la tomodensitométrie (TDM) ont permis de mettre en évidence une masse enkystée du médiastin antérieur étage moyen gauche mesurant 7 cm de diamètre à contours nets, à contenu inhomogène, non vascularisée faisant évoquer en premier un kyste dermoide ou un thymome enkysté (Figure 1).

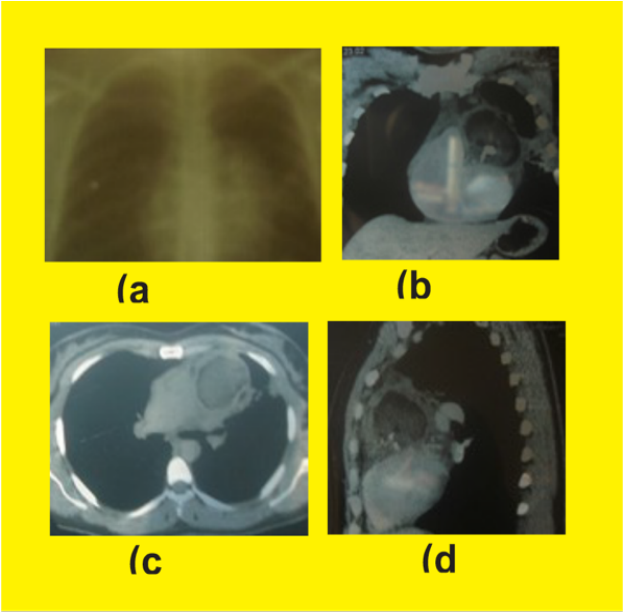

Figure 1 : Images de la masse kystique à la radiographie simple (a) et aux différentes coupes tomodensitométriques (a,b,c,d)

Après un bilan préopératoire normal, une thoracotomie antéro-latérale passant dans le 5e espace intercostal a été réalisée. En per-opératoire, il s'agissait d'une masse médiatisnale gauche adhérenteau péricarde à sa face médiale et au poumon en arrière et latéralement. L'ablation de la masse bien que laborieuse du fait des adhérences a été totale mais obligeant à emporter le péricarde y adhérent.
Un double drainage a été mis en place et l'expansion pulmonaire quasi-totale. Les suites opératoires ont été simples. L'étude anatomo-pathologique a permis de révéler à la macroscopie : une formation kystique à paroi épaisse uniloculaire de 7 cm de diamètre, renfermant un contenu d'allure graisseuse et des cheveux. (Figure 2) et à la microscopie: un tératome mature.

Figure 2 : Aspect macroscopique du tératome après ouverture transversale : des cheveux sont visible

Discussion

Les tératomes sont des tumeurs germinales des cellules embryonnaires pluripotentes. Ils se développement typiquement dans les gonades mais la localisation extr1a-gonadiques la plus fréquente chez l'adulte est le médiastin [1,2,] Les kystes dermoïdes extrêmement rare représentent environ 15% des tumeurs du médiastin et siègent

presque exclusivement dans le médiastin antérieur étage moyen[3] comme chez la patiente ici présentée. L'âge moyen des patients au moment du diagnostic est entre 25-30 mais variant entre la 1ere et la 4eme décade de vie[3].Très souvent asymptomatiques, la découverte est la plus souvent fortuite sur une radiographie ou une TDM. Les plus volumineux peuvent être responsables de syndrome médiastinaux divers (syndrome respiratoire, vasculaire, digestif, neurologique) qui ne font pas penser en premier à une lésion du médiastin[3]. Chez notre patiente, c'est un syndrome respiratoire (toux chronique) qui, sans être évocateur, a permis d'arriver au diagnostic. Ce cas permet de préciser l'importance jamais assez démontrée de la radiographie du thorax devant une toux persistante. La radiographie du thorax qui reste le moyen d'exploration de base de toute masse médiatisnale. Distinguer une opacité médiastinale d'une opacité pleuro-pulmonaire sur un cliché de thorax représente l'étape initiale dans l'approche diagnostique. Dans le cas des kystes dermoides, une fois sur trois, on peut déceler des calcifications avec des ossifications organoïdes pathognomoniques de ces lésions[3]. Ces éléments n'étaient pas présents chez notre patiente. L'examen tomodensitométrique (TDM) constitue la meilleure technique d'exploration du médiastin. Elle peut être la seule technique d'imagerie dont on aura besoin immédiatement après l'individualisation d'une lésion médiastinale sur les radiographies standard. La TDM fournie une analyse topographique plus précise ; elle renseigne sur la topographie précise de la masse, son extension et ses rapports avec les structures adjacentes. Elle donne ses caractéristiques densitométriques et donc préciser son caractère liquidien, homogène ou hétérogène. L'histoire naturelle du kyste dermoide est variable. Longtemps asymptomatique, elle peut le rester toute la vie du malade. Elle peut aussi se révéler par des complications2 liées à la compression des organes voisins ou à l'érosion de l'arbre trachéo-bronchique qui peut entrainer une toux productive avec émission de cheveux appelée trichophytie ou enfin à la rupture qui est exceptionnelle. La rupture peut être médiastinale ou alors vers les voies aériennes. La rupture du kyste qui est décrite par certains auteurs comme mode de révélation dans 36 % des kystes dermoides du médiastin peut être à l'origine d'une douleur thoracique hémoptysie fièvre et même une détresse respiratoire. La rupture peut être secondaire à l'augmentation rapide du volume du kyste, à l'inflammation y compris l'infection, l'ischémie autolyse en rapport avec les secrétions intra kystiques enzymatiques (enzymes protéolytiques des tissus pancréatiques ou salivaires)[4,5] ; cependant, des ruptures traumatiques ont été rapportées5. La malignité fait partie des formes de cette pathologie. L'exérèse chirurgicale est nécessaire pour affirmer le diagnostic et constitue le traitement idéal pour le tératome kystique. Notre patiente a pu bénéficier de cette approche avec de bonnes suites opératoires. Le tératome kystique est la tumeur du médiastin ayant un très bon pronostic après exérèse chirurgicale[3].

Conclusion

Bien que très rare, le tératome kystique du médiastin peut être suspectée sur une radiographie simple du thorax qui est l'élément clé d'orientation. Heureusement la chirurgie permet un diagnostic et un traitement définitifs.

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CHIRURGIE THORACIQUE / THORACIC SURGERY

MANAGEMENT OF IMPACTED DENTURE IN THE OESOPHAGUS: WHEN IS OESOPHAGOTOMY RECOMMENDED?

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Abstract:
Background: The use of artificial dentures has increased among Nigerian populace over the last 3 decades. There is also an increased incidence of complications from impaction of artificial dentures (IAD) in the oesophagus while literature about these complications are scant from Nigeria.
Aim: To present the challenges of management and indications for surgical intervention in patients managed for IAD in University of Ilorin Teaching Hospital, Nigeria **Method:** The records of patients who presented with foreign body in esophagus between March 2007-June 2016 were reviewed. Demographic data of all patients and summary of management of patients who required surgical intervention for IAD were extracted from their case files. The results were presented in descriptive statistics. **Results:** Thirty-nine records of foreign body in the oesophagus were found (11 females, 28 males), 10(25.6%) were IAD (1 female). The age range of all patients was 3 to 74 (mean 29.9± 23), age range of the 10 who had IAD was 29 to 74 years (mean 47.7± 16.4. Nine of the 10 with IAD had rigid esophagoscopy, while one had thoracotomy and esophagostomy without prior attempt of oesophagoscopic retrieval because of late presentation. Oesophagoscopic retrieval was successful in 7 patients, 6 of whom had IAD <20cm from upper incisor. Two patients had failed attempt at retrieval necessitating neck exploration.

Conclusion: Our series showed a high incidence of IAD in esophagus. This calls for better education of prospective users of artificial dentures. We have identified that oesophagoscopic intervention should be used with caution when IAD is deeper than 20cm from incisor.

Introduction

The teeth constitute important part in facial appearance, nutrition and social art of communication[1]. Missing teeth may result in impaired chewing ability necessitating diet selection, impaired communication and loss of normal facial contour requiring replacement with artificial dentures. Over the last three decades, the use of dentures has increased among Nigerian populace with an attendant increased incidence of complications from impaction of artificial dentures (IAD) in the esophagus[3].Yet, literature about these complications are scanty from Nigeria. In 2004, Nwaorgu et al3 in south-western Nigeria reported 22 cases over a 16-year period, citing only a report of three cases before theirs. Alabi et al4 in Ilorin reported 6 cases of dentures in upper third of oesophagus over a 10-year period. In 2014, Adedeji et al also in south-western Nigeria reported 19 cases over a period of shorter than half of the duration of the report by Nwaorgu et al[3]. The complications of IAD depend on the size and geometry of the denture, site of arrest along the alimentary tract and duration of stay at the site of arrest [2,3]. Common complications include oesophageal necrosis and perforation[1].Recovery of IAD will be by either of two means, including spontaneous expulsion following regurgitation/vomiting or expulsion through the anus[2] or by a form of active intervention. The best form of intervention for removal of a denture impacted in the oesophagus is controversial[5]. This article presents the challenges encountered in the active intervention for management of IAD in University of Ilorin Teaching Hospital.

The cases requiring surgical intervention were summarized giving reasons for surgical interventions. In addition, we propose criteria for retrieval by esophagostomy. It also adds a review of the literature on the management of IAD emanating from Nigeria.

Materials and Methods

The available unit records of patients who presented to Otorhinolaryngology Department or Thoracic & Cardiovascular Division of the University of Ilorin Teaching Hospital, Ilorin, North Central Nigeria, with foreign bodies in esophagus between March 2007-June 2016 were reviewed. The case files of patients who had IAD were retrieved, from where the patients' demo- graph, type of denture and outcome of intervention was extracted. The management of patients who required surgical intervention were summarized. Descriptive statistics are presented using SPSS V16 and R statistical software V3.2.2.

Results

Thirty-nine patients presented with foreign body in the esophagus during the study period, ten (27.8%) were IAD. The age range of all patients was 3 to 74 (mean 29.9± 23), the age range of the 10 who presented with IAD was 29 to 74 years (mean 47.7 (± 16.4). The whole study population included 11 females; however, only one of the 10 with IAD was a female. The records of ingested objects available in the unit records are as shown in table 1. Nine of

the patients had rigid esophagoscopy under general anesthesia with endotracheal intubation and muscle relaxation while 1 had thoracotomy and esophagostomy without prior attempt of oesophagoscopic retrieval. Oesophagoscopic retrieval was successful in 7 of the 9 patients. Distribution of success rate depending on depth of impaction is shown in figure1. Two others had failed attempt at retrieval of the denture with associated esophageal laceration necessitating neck exploration. They both had prolonged hospital stay with one of them needing a right thoracotomy and a feeding gastrostomy. The patient in whom oesophagoscopic retrieval was not attempted presented 4 months after the denture ingestion. He required a right thoracotomy be- cause of expectation of fibrosis around the IAD.

Case summaries

Case 1: A 29-year old male artisan who had dysphagia, odynophagia to saliva and dull aching re- trosternal pain, 16 hours after accidental ingestion of his upper incisor denture while feeding. He had worn the same denture uneventfully for 4years.Examination revealed tender suprasternal region and inflamed posterior pharynx. No other loco-regional or systemic examination findings. Neck and chest radiographs appeared normal. Rigid oesophagoscopy revealed IAD 20cm from the incisor. Attempt at endoscopic extraction was aborted for oesophageal exploration when the denture arrested in the hypopharynx. Oesophageal exploration via left oblique neck incision anterior to the sternocleidomastoid re- vealed 8cm longitudinal tear in the left oesophageal wall. The tear was repaired over 18Fr nasogastric tube (NGT) using single layer interrupted silk 2/0 after the denture was extracted. An open neck drain was placed. NGT feeding and oral feeding were commenced 2nd and 14th post-operative day (POD) respectively. The oral feeding was preceded by a methylene blue test demonstrating no leakage. He was discharged on 20th POD and referred to the Prosthodontist for review of denture. He remained dysphagia free 8months later.

Case 2: Fifty-two-year-old female hypertensive who had neck pain, dysphagia, odynophagia, drooling of saliva and hematemesis about1½ hours after accidental ingestion of upper central incisor denture which she had worn uneventfully for 10 years. She attempted to induce expulsion by stimulating vomiting severally but to no avail before coming to hospital. Examination revealed hyperemic posterior pharynx. She had no nuchal tenderness or crepitation; chest and abdominal examination findings were normal. Chest and neck radiographs were also normal. Rigid esophagoscopy revealed the denture in midoesophagus. Attempt at endoscopic retrieval was aborted for immediate neck exploration when esophageal laceration and partial. expulsion of denture into mediastinum occurred. Exploration revealed midoesophageal lacerations; one 7cm laceration on the right posterolateral wall and a second 0.5cm laceration of the left postero-lateral wall. The lacerations were repaired in 2 layers with 2/0 Vicryl and a prophylactic right chest tube was inserted. She developed nuchal subcutaneous emphysema and spikes of fever on 5thPOD. Suspicion of repair leakage causing mediastinitis was confirmed by gastrografin swallow. Re-exploration via a right serratus-sparring posterolateral thoracotomy revealed dehiscence of previous repaired right posterolateral laceration.

The dehiscence was repaired using 2/0 silk interrupted stitches reinforced by mediastinal pleura flap. Mediastinal and right pleural drains were placed. Appropriate antibiotics were administered for mediastinitis. Feeding gastrostomy (by a third surgical intervention) was placed after methylene blue dye test on 9thPOD revealed leakage of the repair. Oral feeding commenced after barium swallow showed no leakage or stenosis 8 weeks later. Gastrostomy and chest tubes were removed 3 months after stabilization on oral intake.

Case 3: A 73-year old hypertensive and diabetic who had open prostatectomy a year earlier complicated by stroke and atrial fibrillation from which he recovered neurologically and regained sinus rhythm after chemical cardioversion. He presented 4 months after numerous failed attempts at inducing expulsion of accidentally ingested denture by stimulating emesis. At presentation there was dysphagia to semisolids, odynophagia and right-sided dull chest pain. Barium swallow with bread and cotton wool pledgets showed contrast hold up in the mid-thoracic oesophagus and precise localization confirmed by flexible oesophagoscopy (Fig. 2) and computerized tomography scan of the chest. He consented 2 months after presentation to oesophagotomy plus possible oesophagectomy and oesophageal replacement with full comprehension of the risks of surgery and anaesthesia. The impacted denture was successfully extracted by oesophagotomy through a right posterolateral thoracotomy.Oeso-phagus was repaired using interrupted figure-of-8 PDS suturing. Oral feeding was commenced on 12th POD after barium swallow showed no leak. Chest tube was removed 2 days thereafter. He remained symptom free 7 months after.

Ingested Object	Frequency	Percent
Denture	10	25.64
Coin	8	20.51
Fish bone	7	17.95
Metal clip	4	10.26
Small container	4	10.26
Kola nut	2	05.13
Not specified	4	10.26
TOTAL	39	100.0

Table 1: Records of ingested objects

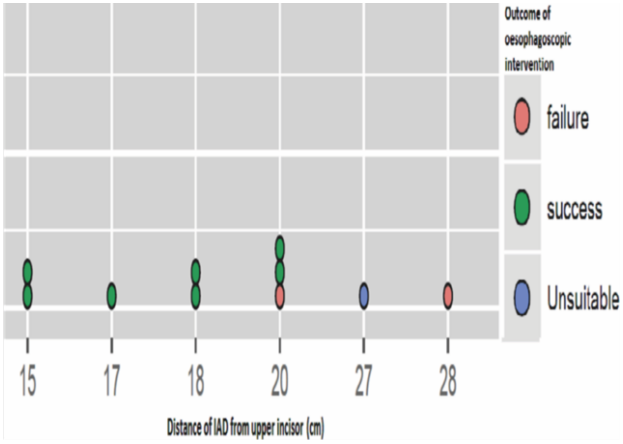

Figure1: Outcome of attempt at oesophagoscopic extraction versus distance of impaction from upper incisor

Figure 2: Video endoscopy of case 3 showing obliquely lying denture with thickened esophageal wall due to inflammation and

Discussion

Incidence of foreign body ingestion is notably higher in children[1]. They may swallow coins, parts of toys and other small materials [4,6–8]. Among adults, the more common causes are edible

substances such as meat, fish bone or co- la-nut [1,7]. Dentures are unique types of ingested foreign bodies because they bear hooks or anchors and have sharp edges which increase the associated morbidity/mortality Recent reports suggest increasing incidence of IAD. Adedeji et al in Nigeria2 reported prevalence of impacted acrylic denture in the oesophagus in the range of 1.3% - 38.6%2. A comparable value of 25% was found in this study. All the cases in this review were in adults, the sex distribution conforms to previous studies showing higher incidence in males. Although more females are likely to use dentures for cosmetic reasons, they tend to pay attention to the care of their dentures thereby reducing the incidence of complications in them[2].

Common sites of denture impaction are at anatomical narrowing along the gastrointestinal tract, at acute angulations or stenotic regions[1,9,10]. Seventy percent of IAD of gastrointestinal tract are in the oesophagus[1], the most common is the cricopharyngeal sphincter which is the narrowest portion of the esophagus [1,10,11]. In this review, 66.7% were located at the cricopharyngeal sphincter; these were successfully extracted by rigid oesophagoscope while 33.3% which were located in the mid esophagus, posed greater challenges. All 6 cases which accounted for 11.5% of impacted foreign bodies in review by Alabi et al4 were located in the upper third of the oesophagus, however modality of retrieval was not stated. In majority of cases, order than plain neck and chest radiographs, extensive radiologic investigations may not be required because the diagnosis is usually apparent from the extracted history. Only the patient who presented very late required extensive radiologic investigations in this study. Endoscopy is the gold standard for confirming the diagnosis and is commonly the first line of intervention[1]. Oesophagoscopic retrieval has a high success rate [4,12]. In this study 20% had difficult and complicated attempt at endoscopic retrieval necessitating surgical intervention; one patient was considered unsuitable for trial of endoscopic removal. The further down the site of impaction in the oesophagus, the more difficult it is to extricate the denture without perforating or lacerating the oesophagus. The ragged and sharp edges of removable, partial dentures make successful removal a daunting task. Oesophagectomy with oesophageal substitution have been performed in long standing cases with extensive fibrosis[11]. Though not encouraged, expectant management may be adopted in cases when the denture is small or in cases when it has passed into the gut especially beyond the ligament of Treitz1.Common to most cases of impacted denture is a history of loose denture [1,3]. This stem from poor dental follow up or patronizing inappropriate personnel for denture fabrication. Prosthodontists have a role in increasing public awareness on dental follow up and prompt presentation when loosening of denture is noticed. In the event that accidental ingestion occurs, immediate presentation to the ORL surgeon or thoracic surgeon with intervention less than 24 hours increases the probability of successful non-operative retrieval.

Conclusion

Our series has showed a significant proportion of foreign body impaction in the esophagus occurring as a result of dentures. We have also identified that the deeper the level and chronicity of impaction may pose greater challenges in management. Safe removal of dentures impacted further down is less probable.This calls for better education of prospective users of artificial dentures. There is need for regular follow-up with the

Prosthodontist, particularly to identify when the denture is getting loose early. We also advocate caution in the use of oesophagoscopic intervention when IAD is judged to be more than 20cm from incisors.

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