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- Les articles originaux ne doivent pas dépasser 15 pages, références, figures et tableaux non compris. Ils doivent comporter systématiquement une introduction, un chapitre matériel et méthodes, suivi des résultats et une discussion
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ANNALES 1er SEMESTRE 2018/ ANNALS 1st SEMESTER 2018

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

ACQUIRED CARDIOVASCULAR DISEASES IN BRAZZAVILLE, CONGO

R. ATIPO-GALLOYE[1], BJ. MAKANI[3], I. KAFATA ONDZE[3], BF. ELLENGA-MBOLLA[3] MS. IKAMA[3], S. NGAMAMI MONGO[3], KUALA LANDA[3], RP. BAKEKOLO[3], SG. KIMBALLY-KAKY [3].

1: General Surgery Department, University Teaching Hospital Brazzaville, Congo
2: MARIEN NGOUABI University, Faculty of Medical Sciences, Brazzaville, Congo
3: Department of Cardiology, University Teaching Hospital Brazzaville, Congo

Correspondence: Dr R. Atipo-galloye
General, surgery Department, University Teaching Hospital Brazzaville, Congo

Abstract

Aim: Justification for creation of a cardiovascular surgical department. **Patients and Methods:** It was a retrospective study from January 2015 to December 2017 in Brazzaville Teaching Hospital, which concern 198 patients with acquired cardiovascular diseases waiting for surgical treatment abroad. **Results:** Among one hundred ninety-eight patients, average age was 35+/- years 4, 2, with a sex ratio of 0,75. Rheumatic valvular diseases represent the principal acquired cardiovascular diseases with 53%, followed by infectious endocarditis 22, 7%. Mitral insufficiency was the first valvular disease, followed by mitral disease. Among 198 patients, 98 (76, 5%) had complications before surgery. Six patients died before they get chance to be operate. Only 5 patients (2, 5%) underwent cardiac surgery abroad with good results. **Conclusion:** To improve cardiovascular care and life expectancy of our patients, we need to have functional surgical cardiovascular department.
Key words: Epidemiologic, clinic, therapeutic, acquired heart diseases.

Résumé

Objectif : Justification d'un département de chirurgie cardiovasculaire à Brazzaville, Congo. **Patients et Méthodes :** Il s'est agi d'une étude rétrospective, réalisée entre Janvier 2015 et Décembre 2017 au Centre Hospitalier Universitaire de Brazzaville (CHU-B). Cent quatre-vingt-dix- huit patients ayant une indication chirurgicale pour une pathologie cardiovasculaire ont été inclus. **Résultats :** Parmi les 198 patients inclus, l'âge moyen était de 35+/- 4,2 ans, avec un sexe ratio à 0,75. Les valvulopathies rhumatismales étaient les plus représentées avec 53 %, suivi de l'endocardite infectieuse 22,7%. L'insuffisance mitrale a été la première valvulopathie rhumatismale suivie de la maladie mitrale. Sur les 198 patients, 98 (76,5%) avaient des complications avant la chirurgie, dominées par l'insuffisance cardiaque. Six patients sont décédés en

attente de la chirurgie. Seuls 5 (2,5%) ont bénéficié d'une chirurgie à l'extérieur avec des bons résultats Conclusion : Au vu des données épidémiologiques, cliniques, et surtout pronostiques, il s'avère vitale la création d'un service de chirurgie cardio-vasculaire au CHU-B.

Mots clés : Épidémiologie, clinique, thérapeutique, cardiopathies acquises.

Introduction

Prognosis of patients with acquired cardiovascular diseases in developed countries has been ameliorated with participation of several parameters: Eradication of acute rheumatic fever, earlier diagnosis and adapted therapeutic management according to current cardiovascular guidelines[1].In developed countries, with eradication of acute rheumatic fever, acquired cardiovascular diseases are dominated by coronary arteries disease, degenerative mitral regurgitation, Monckenberg disease, and aneurysms of thoracic aorta. By opposition, in developing countries, acute rheumatic fever is the most valvular disease, followed by infectious endocarditis[2-4]. Most of facilities in Africa, especially in sub-Saharan except certain countries, do not have functional surgical cardiovascular department, which can correctly treat population who suffers from cardiovascular diseases. Optimal treatment of cardiovascular disease in our context, it's a challenge. Nearly, prognosis of all patients with surgical indication worse. The aim of our study is to describe epidemiologic, clinical and therapeutic aspects of acquired cardiovascular diseases at Brazzaville teaching hospital.

Patients/methods

Our study was retrospective from January 2015 to December 2017. It involved data from patients with acquired cardiovascular diseases seen in Cardiology department of Brazzaville teaching hospital during the study period. Our Teaching Hospital has not a functional surgical cardiovascular department. All patients with cardiovascular disease and surgical indication, waiting for medical transfer to abroad. Actually, we have three cardiovascular surgeons, whom work in surgical polyvalent department of our teaching hospital. There are two perfusionists in training. The surgical polyvalent department is composed into three units; cardiovascular, thoracic and neurosurgery. For cardio-vascular unit, actually we only performed emergency surgical cases as cardiac tamponade, closed pediatric cardiac surgery, and peripheral vascular surgery. Patients with cardiovascular diseases and indication for open cardiac surgery, most of often are hospitalized in cardiology department. This department has echocardiographic machine from type TOSHIBA, which serves for all echocardiography requests. This machine has two probes from 5 and 10 MHz There are not catheterization and intensive care units. All patients with complete medical records and surgical indication for

cardiovascular diseases were included. Systematic review of all trans thoracic echocardiography was performed. Patients with cardiovascular disease, with no medical records and no echocardiography data, have not been included. Socio-demographic, clinical, Radiological, EKG, echocardiographic and therapeutic data were recorded. The data were collected with Excel, windows version 7.

Results

Socio-demographics data are represented in table I.

Variables		Number	Percentage (%)
Sex	Male	85	43
	Female	113	57
Age groups (years)	< 20	15	7,6
	20-29	35	17,7
	30-39	78	39,3
	40-49	40	20,2
	≥ 50	30	15,1
Profession	Official	55	27,8
	Student	33	16,7
	Housewives	75	37,8
	None	25	12,6
	Others	10	5,1
Family income class	Low	65	32,9
	Middle	105	53
	High	28	14
Residence	Brazzaville	125	63,1
	Pointe-noire	45	22,7
	Others	28	14,1

Table I: Socio-demographics data of patients.

The sex-ratio was 0, 75. The Average age was 35+/-2 years 4, (extremes 15-65 years). 63, 1% of patients came from Brazzaville. Dyspnea was the most frequent functional symptoms, which leads patients to hospital.

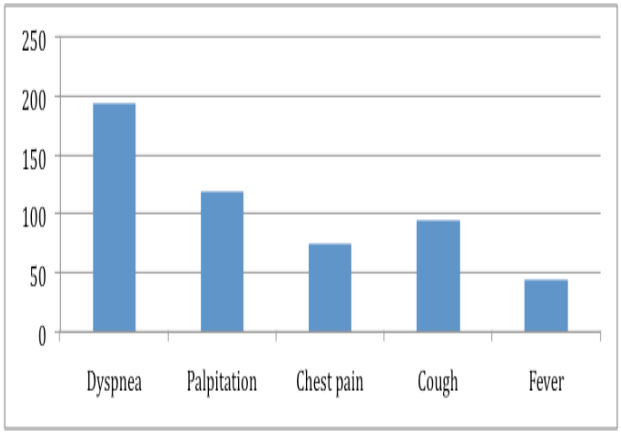

Figure 1: Functional symptoms

In our study, 49, 9% of patients had cardiac enlargement (cardiomegaly) at Chest-X Ray. In EKG, one hundred (50, 5%) patients had irregular cardiac rhythm. with cardiac cavities dilatation, left atrial hypertrophy with left ventricular hypertrophy which represented the most common electrical abnormalities (37, 8%), followed by right ventricular hypertrophy (12, 6%). Among selected acquired cardiovascular diseases, rheumatic valvopathies were the most representative with 53%, followed by infectious endocarditis 45%. (Table II)

Cardiopathies	Number	Percentage (%)
Rheumatic	105	53
Infectious endocarditis	45	22,7
Degenerative	20	10,1
Coronary artery diseases	12	6
Chronic constrictive pericarditis	6	3
Others*	10	5
Total	**198**	**100**

Table II: Distribution of type of cardiopathies

Others: endomyocardial fibrosis, aorta diseases: aortic aneurysm, aortic dissection.

Rheumatic valvopathies, were dominated by mitral regurgitation (MR) or insufficiency with 52, 3% followed by mitral disease (MD) 19%, mitral stenosis (MS) with 14, 2%).

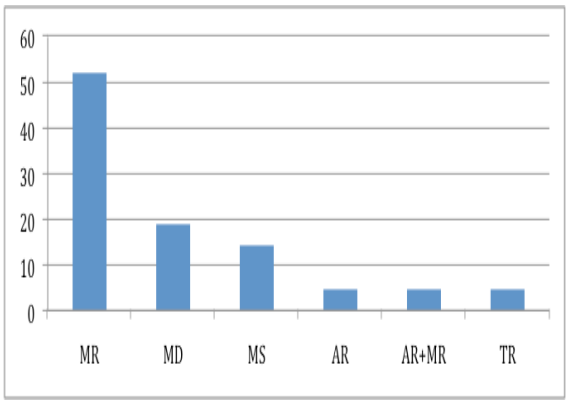

Figure 2: Type of valvopathies

MR= Mitral regurgitation; MD=Mitral disease/ MS=Mitral stenosis AR=Aortic regurgitation; TR=Tricuspid regurgitation

Complications noted in 98 patients preoperatively were dominated by heart failure (66, 3%). Six patients died before they get chance to be operated on. From a total of 198 patients who have surgical indication 5 patients (2, 5%) underwent surgery. Among operated patients, two were for chronic constrictive pericarditis. Going abroad for cardiac surgery is too much expensive for family. The table III illustrates the complications met before cardiac surgery.

Type of complication	Number	Percentage (%)
Heart failure (HF)	55	56,1
HF+Pulmonary hypertension	15	15,3
HF+Arrythmia	10	10,2
HF+ Thrombo embolic event	4	4,1
HF+Infectious endocarditis	4	4,1
Infectious endocarditis	4	4,1
Death	6	6,1
Total	**98**	**100**

Table III: complications before cardiac surgery.

Discussion

Our study is one of the first made in our teaching hospital showing that acquired cardiovascular diseases remains a challenge. Many authors in developing countries not have noted that, rheumatic valvular diseases are the most representative etiology of acquired heart valvular disease [5,6]. In most African countries, rheumatic heart diseases are considered 1 an endemic cardiac disease; In 63, 1%, of our study came from Brazzaville, the capital city. We had found that more than eighty percent of patients in our study came from low- and middle-income families. This may explain difficulties of these families to pay for treatment of their relatives, and our country has no public health care coverage, which can fatly allow to operate this population. Curry and al[8], reported in their publication, the high prevalence of rheumatic heart disease and of, mycobacterium tuberculosis in cardiac patients with co-HIV infection, in patients from low and middle income countries[8]. Oumar and al[7], in Mali, made the same observation between poverty and incapacity to pay for cardiac surgery [7]. Mitral diseases, especially mitral insufficiency was the first rheumatic valvular disease, followed by mitral stenosis. Oumar and colleagues[7] described the same observation, in their publication in Mali, as other authors[9-12]. Oftenly, rhumatic valvular diseases, may create conditions for complication infectious endocarditis, Global cardio-vascular are increasing in our context because of high prevalence of hypertension and diabetes mellitus, increased life expectancy. Mycobacterium tuberculosis is also another endemic

pathology in developing countries, pericardium can be evolved and lead to chronic constrictive pericarditis[13,14]. On, this regard, the number of patients who need cardiac surgery is growing up; up to date two hundred twenty patients are waiting for surgery in our hospital. There for, in conclusion, based on our registry data, we need a functional cardio-vascular surgical department to improve cardio-vascular healthcare in our country and prevent cardiac surgery abroad.

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CHIRURGIE VASCULAIRE / VASCULAR SURGERY

CADAVERIC TRAINING IN OPEN VASCULAR SURGERY

GC. MENEAS, S. ABRO, KH. YANGNI-ANGATE.

Department of CardioVascular and Thoracic Diseases, Anatomy Unit
Bouake Teaching Hospital, Cote d'Ivoire

Correspondence: Koffi Herve Yangni-Angate
Chairman Department of Cardio-Vascular and Thoracic Diseases and Anatomy Unit,
Bouake Teaching Hospital, Cote d'Ivoire.
Email: Cardiovascthodiseasesdept@gmail.com

Objective: A future vascular surgeon should have a good basic knowledge before performing any surgical procedure on a patient. However, surgical trainees now have less dedicated operating time than their predecessors so that changes in trainee formation is need. Cadaveric training has been considered the best substitute for actual live surgery. We expose our experience in training for vascular surgical procedures using human cadavers. **Material and Methods:** From June 2013 to November 2016, we performed 83 vascular surgical procedures on 45 human cadavers, 30 males and 15 women, including 28 children and 17 adults obtained according to the Ivorian laws in force. Cadavers were preserved in formaldehyde 10% and cryopreservation. The death mode was unknown.
Results: After 3 abdominal aortic expositions, we performed 3 surgical aortic repairs via 3 midline laparotomies. After 19 peripheral arterial exposures, and 5 samplings of the internal saphenous vein, we practiced 37 carotid, subclavian, iliac and femoral arterial' revascularizations via 4 cervicectomies, one supralaminar incision and 8 incisions in Scarpa or inguinal area.
Conclusion: Cadaver Training is an important tool to improve technical skills in vascular surgical procedures, for trainees to practise their surgical skills prior to entering operating theatre.
Keywords: Training, Simulation, Vascular, surgery

Introduction

Nowadays, postgraduate surgical training is facing significant challenges[1]. Working time constraints due to limitations on working hours in developed countries [2-4] and the lack of financial resources to access surgery in developing countries [5] creates fewer operations available for trainees. There is an imperative for more efficient and time-effective methods of surgical training. Several models were proposed for the surgical training of surgeons. There are synthetic models, cadavers, animals' models and virtual reality simulators [1]. The most realistic model, from an anatomical point of view, is the human body itself: cadavers' models[6]. Thus, several centers organize cadaveric workshops to train surgery residents[7-9]. Cadaveric training has been an essential part of surgical training for decades and has been considered the best substitute for actual live surgery[1, 10]. To hone our vascular surgical skills, we performed main cardiac surgical procedures using human cadavers.

Material and Methods:

From June 2013 to November 2016, we performed 83 vascular surgical procedures on 15 adults' human cadavers including 10 males and 5 women obtained according to the Ivorian laws in force. Cadavers were preserved in formaldehyde 10% and cryopreservation. The death mode was unknown.

Results:

A total of 83 vascular surgical procedures were performed: 16 regional approaches, 27 vascular exposures and controls and vein samplings and 40 vascular surgical revascularization techniques **(Table1).**

Regional approaches n= 16	Vessel's exposure, control and sampling n= 27	Surgical revascularization techniques n=40
- Cervico-sternotomy (n=4) - Supraclavian incision (n=1) - Laparotomy (n=3) - Inguinal Incision (n=2) - Scarpa area Incision (n=6)	- Carotid, supra aortic trunks,sub clavier, (n=7) - Abdominal aorta exposition (n=3) - External iliac and femoral arteries (n=12) - Internal saphenous vein sampling (n=5)	- Arterials' direct suture (n=25) - end-to-end anastomosis (n=4) - bypass procedure (n=5) - vein graft interposition (n=3) - Abdominal aorta flattening transplant (. n=3)

Table 1: List of vascular surgical procedures (n=83)

In head and neck region, we performed 7 Carotid revascularizations by suture (n=5), end-to-end anastomosis[1], and bypass procedure (n=1) via 4 cervico-sternotomy incisions **(Figure 1).** Three sub clavicular revascularizations by suture (n=2) or by end-to-end anastomosis (n=1) were performed. In thoracic region, we achieved thoracic aortic suture (n=1). In abdominal region, we performed 4 abdominal aortic revascularizations by suture (n=1) and flattening–transplant of abdominal aorta with re-implantation of the inferior mesenteric artery (n=3) via 3 median laparotomy incisions **(Figure 2).** In extremity, we achieved 25 femoral artery revascularizations **(Figure 4, 5)** by direct suture (n=16), end-to-end anastomosis (n=2), bypass procedure (n=4), vein graft interposition (n=3) via 6 Scarpa area incisions **(Figure 3).**

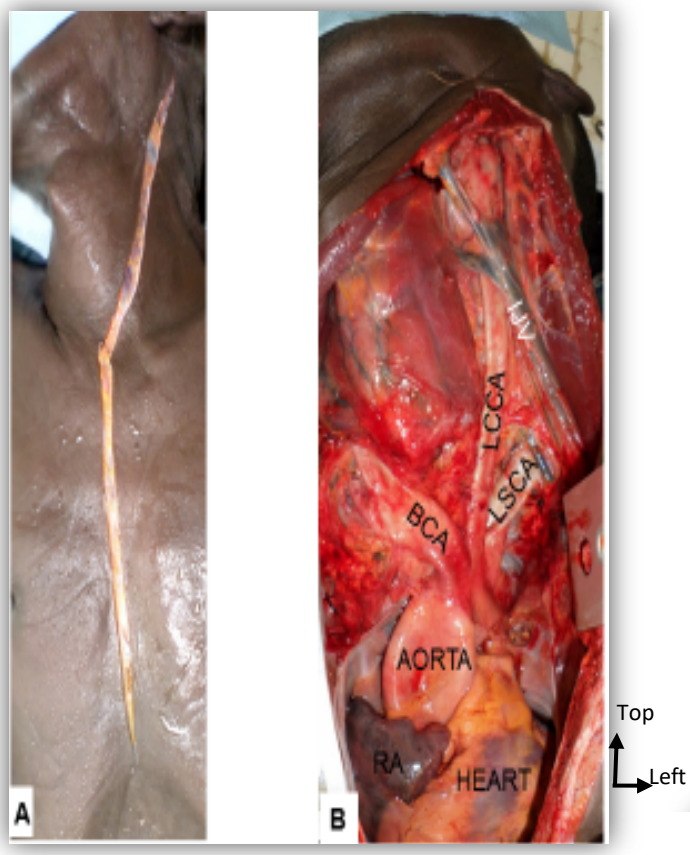

Figure 1 : Illustration of approaches techniques of head, neck and thoracic vessels.The left cervico-sternotomy **(A)** allows to exposure anterior view of supra-aortic trunks **(B). BCA :** Brachiocephalic artery. **LCCA :** Left common carotid artery. **LSCA :** Left subclavian artery. **RA :** Right auricle. IJV : Internal jugular vein.

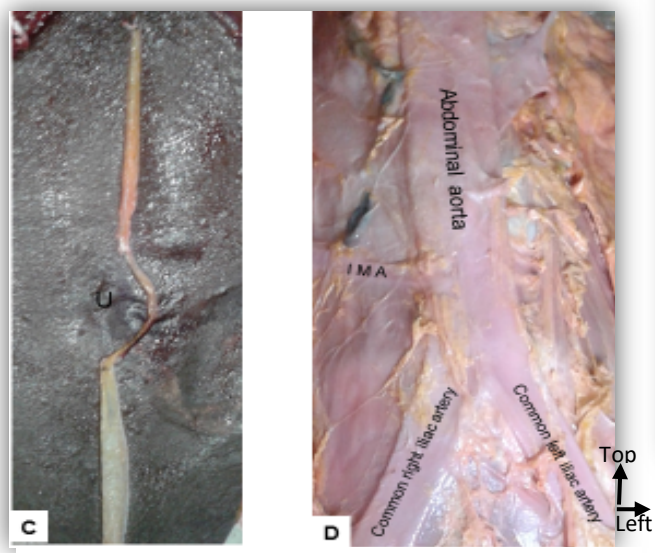

Figure 2 : Illustration of approaches techniques of abdominal vessels. The median laparotomy **(A)** allows to exposure anterior view of abdominal aorta **(B). U :** Umbilicus. **IMA :** Inferior mesenteric artery.

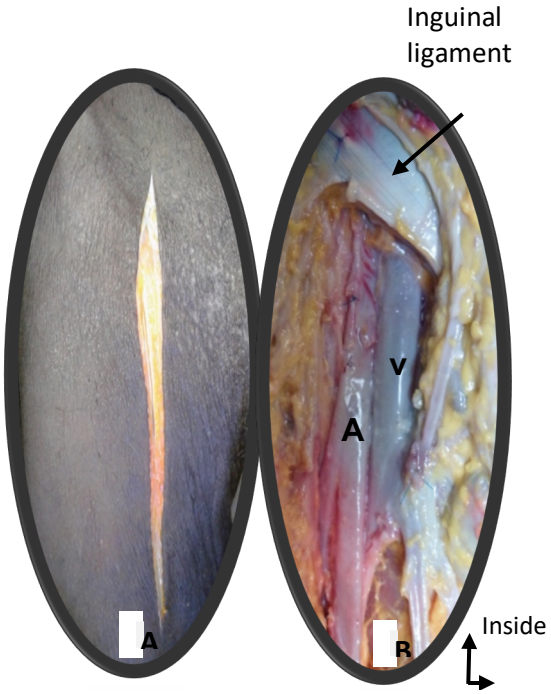

Figure 3 : Illustration of approaches techniques of femoral vessels. The vertical scarpa area incision **(A)** allows to exposure anterior view of femoral artery and vein **(B).**

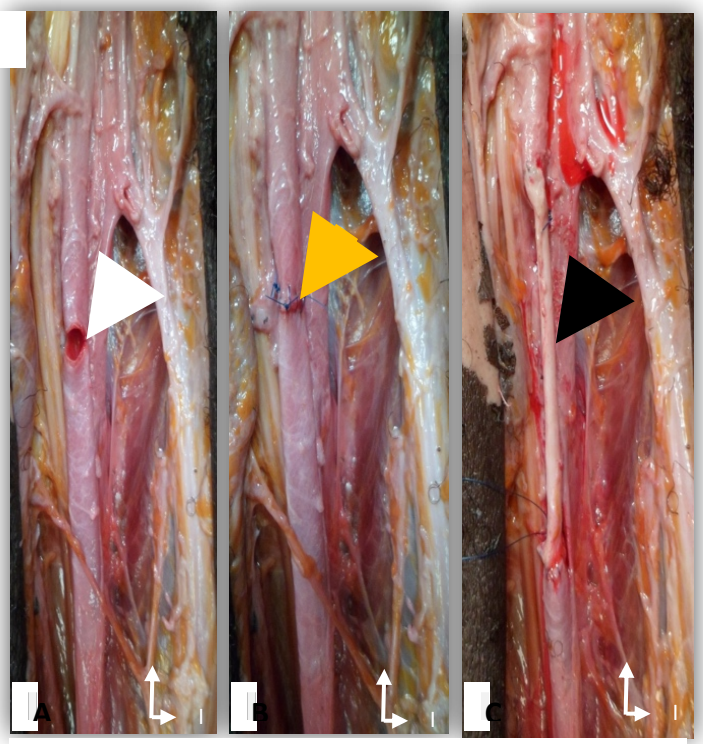

Figure 4: Open femoral artery revascularization techniques by direct suture **(B)** of the lateral wound of the superficial femoral artery **(A)**, or by vein graft interposition **(C).** Arrows present the different lesion and vascular surgical techniques in each case.

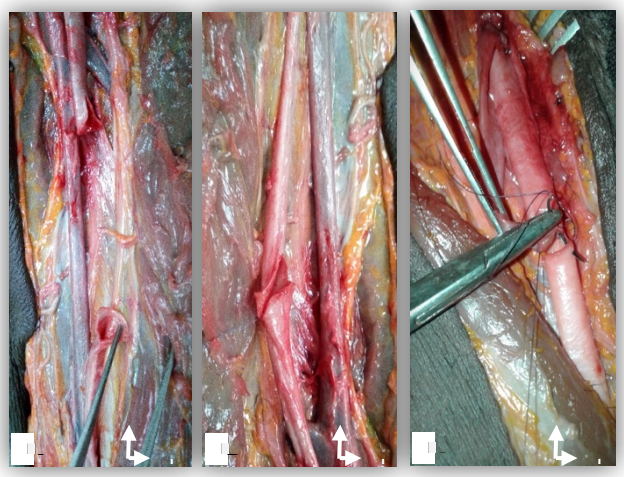

Figure 5: Open femoral artery revascularization techniques by end-to-end anastomosis **(A, B)**, or by bypass procedure **(C).** Blue arrow shows the suture technique of the distal arteriovenous anastomosis and yellow arrow indicates the inverted saphenous vein graft.

The idea of simulation in medical education has been well described in the literature. Indeed, according to Widmer and colleagues[2], simulation originates from research in other professions (e.g. training of pilots in aviation). Furthermore, Krampe [11] affirm that research in music showed that professional pianists were separated from amateur musicians by their amount of training, which exceeded 10,000 hours of practice. According to Ericsson[12], the same principle applies to surgical procedures where complex parts should be trained repeatedly, without the need to perform the whole operation, to reach and maintain expert performance. Deliberate practice includes the motivation to improve performance through regularly repeated similar tasks, build on existing knowledge and followed by immediate informative feedback[12]. This form of practice helps juniors to become experts and experts benefit from the possibility to train rare conditions such as intraoperative complications and emergency procedures. Most surgical training models are available including synthetic models, virtual reality, live animals, and human cadavers[14]. Synthetic models use synthetic material[15], live animals models required living animals [16]. In virtual reality models, surgical procedures training are performed using virtual reality surgical simulator[17]. In human cadavers' models, surgical procedures training are performed using human cadavers[18]. Each training model has its advantages and disadvantages. According to Gambhir RP[19], the best training tool is cadaveric training, and it is heartening to see more and more centers adopting this modality. In our practice, the performing of vascular surgical procedures allowed us to improve our knowledge of anatomy, to perfect our surgical basic procedures, to increase our surgical volume exposure. As in the United Kingdom, it is imperative to opt for the development of clinical skills centers in Africa and elsewhere in the world; and it is understandable that every institution engaged in postgraduate surgical training has a skills laboratory[20]. This will be one of challenges of Bouake Cardiology Institute construction in Cote d'Ivoire, which aims to be a reference center for the training of future cardiovascular and thoracic surgeons and even for trainees in general surgery in the West African Region. In this field, the practical guide on the development of a clinical skills center published by Dacre[21] will be a very useful support. Those types of surgical skills center would not only be reserved for trainees' surgeons, but, it would also offer an opportunity for senior surgeons because cadaveric

surgery is a safe way to practise new procedures for junior surgeons as well as difficult or challenging procedures for their seniors[22]. Regarding to the training in open vascular surgery, cadavers provide an excellent opportunity to teach basic principles[9]. In this cadaver training, there is no risk of bleeding associated with every vascular surgery procedure in the operating room. However, the repetition of the procedures and the dexterity that it provides, allow to minimize per and post- operative bleeding risk. Vascular societies in Africa and elsewhere in the world have to follow the lead shown by the European Society for Vascular Surgery and have dedicated training for the vascular surgery residents during the annual meetings[20,22]. These training could take place on all models as synthetic models, virtual reality, live animals, and human cadavers. However, the cadaveric model should be favored as far as possible because unlike the anastomosis, dissection is more difficult to simulate and use the cadaver's model more realistic[20].

Conclusion:

Cadaver Training is a important tool to improve technical skills in vascular surgical procedures, for trainees to practise their surgical skills prior to entering the operating theatre

Perspective Statement

In the future, cadaveric training in surgery residency should be integrated and building and equipping cadaveric surgery training laboratory should be implemented.

Limitations of the study

Further studies are to be carried out in the future, regarding the effectiveness of skills transfer from laboratory to operative room.

Conflict of Interest:

The authors declare no conflict of interest

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CHIRURGIE THORACIQUE / THORACIC SURGERY

TRAINING IN OPEN GENERAL THORACIC SURGERY: CADAVERIC MODEL

GC. MENEAS, S. ABRO, KH. YANGNI-ANGATE.

Department of Cardiovascular and Thoracic Diseases, Anatomy Unit, Bouake Teaching Hospital, Cote d'Ivoire

Correspondence: Koffi Herve Yangni-Angate.
Chairman Department of Cardio-Vascular and Thoracic Diseases and Anatomy Unit,
Bouake Teaching Hospital, Cote d'Ivoire.
Email: Cardiovascthodiseasesdept@gmail.com

Objective: Surgical training using simulators has been shown to be highly effective in the future surgeons training. Simulation using cadaver is advocated as a means of transferring learned skills to operating room and recreate surgical situations for trainees to practice and hone their skills. We expose our experience in training for open general thoracic surgical procedures using human cadavers. **Material and Methods:** From June 2013 to November 2016, we performed 30 general thoracic surgical procedures on 10 adults' human cadavers including 7 males and 3 women obtained according to the Ivorian laws in force. Cadavers were preserved in formaldehyde 10% and cryopreservation. The death mode was unknown. **Results:** Via 4 postero-lateral thoracotomies after 8 pulmonary vessels expositions, 4 diaphragmatic and trachea expositions and 1 sampling of fascia lata, we performed 8 lung resections, 2 tracheotomies, and 3 diaphragmatic repairs. **Conclusion:** The training for open general thoracic surgical procedures using human cadavers can be an important means of learning, training and strengthening the skills of young surgeons.

Keywords: Training, Cardio-vascular, Thorax, Surgery.

Introduction

Post-graduate surgical training is facing significant challenges following the advent of limitations on working hours in developed countries. In the United States, the Accreditation Council for Graduate Médical Education (ACGME) initially adopted the "80-hour working week" in 2003 and subsequently imposed further restrictions commencing in 2011[1,2]. Medical training in Europe has also seen major reductions in the number of hours worked by surgical trainees as a result of the European Working Time Directive (EWTD) incrementally reducing the maximum amount of hours worked down to an average of 48 h a week since 2009[3]. More and more reforms result in less and less time for training with no time to train surgeons[4]. In developing countries, the context is quite different. Many patients do not have financial resources to access surgery[5]. This fact causes a reduction in the operative activity volume in these

countries. Thus, in developed or developing countries, there is a decreasing surgical exposure of surgical trainees. Therefore, it is essential to develop more efficient and time-effective methods of surgical training. Several models were proposed for the surgical training of surgeons. There are synthetic models, cadavers, animals' models and virtual reality simulators[6]. The most realistic model, from an anatomical point of view, is the human body itself: cadavers' models[7]. Thus, several centers organize cadaveric workshops to train surgery residents[8-10]. We performed main thoracic surgical procedures using human cadavers.

Material and Methods:

From June 2013 to November 2016, we performed 30 general thoracic surgical procedures on 10 adults human cadavers including 7 males and 3 women obtained according to the Ivorian laws in force. Cadavers were preserved in formaldehyde 10% and cryopreservation. The death mode was unknown.

Results:

After 8 pulmonary vessels expositions, 4 diaphragmatic and trachea expositions and 1 sampling of fascia lata, we performed 8 lung resections, 2 tracheotomies, and 3 diaphra-gmatic repairs via 4 postero-lateral thoraco-tomies. Some pictures illustrate the approaches and expositions techniques **(Fig. 1)** and surgical techniques **(Fig. 2)** we achieved.

Regional approaches (number) n= 4	Dissection, Exposure, Exploration, Control of viscera and Vessels n= 13	Surgical techniques n=13
Posterolateral thoracotomy (4)	Pulmonary vessel (n=8)	Lung Resection (n=8)
	Diaphragm (n=2)	Diaphragmatic Repair (n=3)
	Trachea (n=2)	Tracheotomy (n=2)
	Fascia lata sampling for diaphragmatic repair (n=1)	

Table 1: List of general thoracic surgical procedures (n=30)

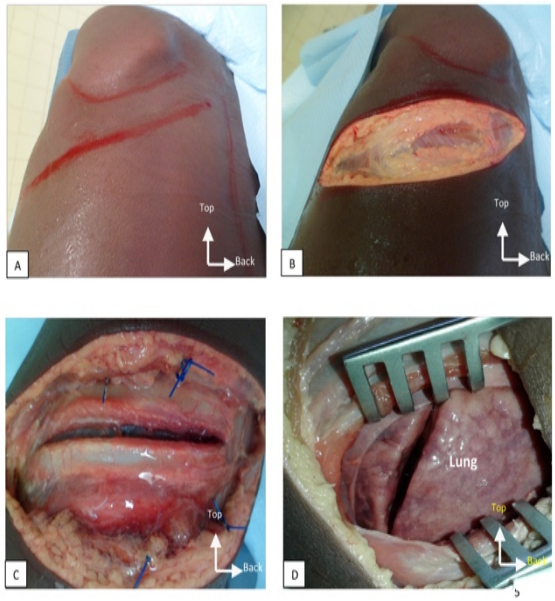

Fig. 1 : Postero-lateral thoracotomy. **A :** Drawing The Incision, **B :** Skin Incision, **C :** Opening the chest in the Left 5th intercostal space, **D :** Out of the Left fissure

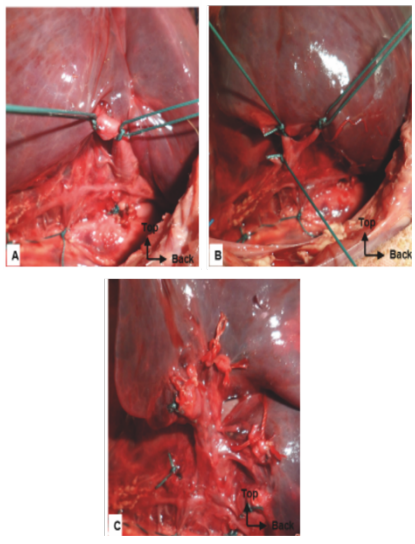

Figure 2: Illustration of lower left lung lobectomy. **A**: Venous time, **B**: Arterial time,C: Bronchial time

Discussion:

Knowledge, judgment, professionalism, and surgical skills[11] are needed to achieve surgical procedures. Halstedian model was the old technique for surgical training[12,13]. Although this model of surgical education succeeded in providing a skilled surgical workforce in the past, a multitude of factors have influenced the need to reconsider pedagogical strategies in surgical education[14.] Most surgical training models were proposed with their advantages and disadvantages: synthetic models, virtual reality, live animals, and human cadavers. All these models are applicable to the general thoracic surgery training and represent a real opportunity not only for trainees surgeons, but it would also offer a chance for senior surgeons to practice challenging procedures. For about two decades, thoracic surgical approach has taken a decisive turn with videos copy introduction in general thoracic surgery. This thriving technique becomes gradually a reference technique in thoracic surgical approach. Therefore, it is legitimate that stimulation in general thoracic surgery gives a privileged place to the surgical simulators include the simple bench model (SBM), virtual reality simulator (VRS), and human performance simulator (HPS), better adapted to the video-assisted thoracoscopic surgery (VATS) training[15.] Feedback evaluation regarding the realism and utility of those simulators is a need[16.] Furthermore, according to Fonseca[17,] with the increase in minimally invasive approaches to surgical disease and nonoperative management for solid organ injury, the open operative experience has been significantly reduced. Simulation technology, with the potential to foster the development of technical skills in a safe, nonclinical environment, could be used to remedy this problem. According to the same author, despite the increasing use of simulation in the technical training of surgical residents, few studies have focused on the use of simulation in the training of open surgical skills. There is therefore a need for simulation-based studies regarding open thoracic surgery training. This current study responds to this need. This is a report on open thoracic surgery training conducted on human cadavers. It allowed to demonstrate the relevance, the feasibility and the effectiveness of open thoracic surgical skills training on human cadavers. The human cadaveric model was used because it presents a high fidelity, provide only “true” anatomy simulator currently and allow the practice of entire operations. In our country, this model allowed us to improve our knowledge of anatomy, to perfect our surgical basic procedures, to increase our surgical volume exposure.

Conclusion: The training for open general thoracic surgical procedures using human cadavers can be an important means of learning, training and strengthening the skills of young surgeons.

Perspective Statement

In the future, we’ll need to build and equip cadaveric surgery training laboratory.

Limitations of the study

Further studies are to be carried out in the future to study the opinion of trainees and to analyze the effectiveness transfer of skills acquired from the laboratory to the operating theater.

Conflict of Interest:
The authors declare no conflict of interest.

Acknowledgements
I'm very grateful to my Teacher, Prof Koffi Herve Yangni-Angate who initiated and directed me in this training.

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