CHALLENGES IN OPEN HEART SURGERY (OHS) IN AFRICA:
CÔTE D'IVOIRE EXPERIENCE

Distinguished Lecture of the United States Chapter of The International Society of Surgery (ISS) delivered on Wednesday October 7TH, 2015 during the Clinical Congress 2015 of the American College of Surgeons (ACS) in Chicago (USA)

By
Koffi Herve Yangni-Angate, MD (Thesis in Anatomy), Professor, FWACS, FICS, FISS
- Head, Cardio-Vascular and Thoracic Surgery Bouake University Teaching Hospital
- President, African Association of Thoracic and Cardio-Vascular Surgeons
- President, Pan-African Association of Surgeons
- Immediate Past President, West African College of Surgeons

INTRODUCTION (Slide 1,2)

I would like to thank the United States Chapter of the ISS (slide 3) for inviting me at the ACS clinical congress 2015 (slide 4) and give me an opportunity to speak on "Challenges in Open Heart Surgery in Africa: Cote d'Ivoire Experience" (slide 5).

I am an active member of the ISS since June 1998 (slide 6); ISS is a well-known society of surgeons chaired by prestigious surgeons such as the Swiss Theodor Kocher (1840-1917) who was the first surgeon to receive the Nobel Prize in 1909 (slide 7).

Cote d'Ivoire is located in Western Africa (slides 8-9); its physical features are shown on slide 10. His Excellency Late Dr Felix Houphouet-Boigny, former President of Cote d'Ivoire (1960-1993) (slide 11) facilitated the creation of the first "Heart Institute of Cardiology" (slide 12) where the first open heart surgery in Côte d’Ivoire was performed on March 16th, 1978 in Abidjan (slide 13) by 3 surgeons: Pr D. Metras, Pr A. Ouezzin-Coulibaly and Late Dr K. Ouattara (slide 14).

CARDIAC LESIONS AND SURGERY

Acquired valvular Heart Diseases and Congenital Heart Diseases were the two main categories described in our experience (slides 15).

Regarding Acquired valvular diseases three etiologies were concerned: Rheumatic Fever, the most frequent; Native Valve Endocarditis and Endomyocardial Fibrosis (slide 16-17)

Most often, rheumatic fever attacked the Mitral valve with massive destruction (slides 18, 19, 20, 21, 22); usually, the severity of rheumatic valve lesions made surgical repair uneasy and replacement by bioprosthesis or mechanical devices more adequate to perform (slides 23, 24, 25, 26). Bioprosthesis degeneration as main complication or disadvantage of biological prosthesis, occurred between 4.24 and 6.5 years post-operative follow-up (slides 27, 28).
A tropical valvular heart disease called "Endomyocardial Fibrosis (EMF)" (slide 29) has also been diagnosed (slides 30,31); its clinical, imaging features; surgical procedures and results are shown on slides (32,33,34,35,36). Different types of Congenital Heart Diseases (CHD) were noted with an overall surgical hospital mortality at 10% (slides 37-45).

**CHALLENGES** (slide 46)

- Rheumatic Heart Disease (RHD) is the most common form of Cardio-vascular diseases in the developing world and it will remain as it is for the next 20-40 years to come in sub-Saharan Africa (slides 47,48,49) where exists the highest prevalence of RHD worldwide.

- RHD is the leading cause of death during the first 5 decades of life with a mortality of 20% at 6 years follow-up in Nigeria (slide 50).

- RHD causes extensive and severe heart valve lesions (slide 51) making quasi-impossible valve repair in our context; such situation should be avoided by earlier diagnosis and surgical treatment for it has been demonstrated best long term results after conservative surgical procedure rather than valve replacement (slides 52,53).

- EMF is a mysterious pathology with a remaining unknown etiology (slide 54); we have one of the most largest clinical and surgical experience in the world.

- Lack of detecting CHD in Cote d’Ivoire as in sub-Saharan Africa (slides 55,56); of cardiac centres (slides 57,58,59); of specialized personnel in Cardiology and Cardiac Surgery including cardiac surgeons (slides 60,61,62,63). Therefore, we need more structured training programmes for cardiologists and cardiac surgeons in our developing countries (slides 64, 65,66,67).

- Sustainability of training programme, of cardiac centres and Cost constraints for cardiac surgery are crucial (slides 68,69,70); patients have no enough financial resources to afford cardiac surgery (slides 71,73) and there is no health insurance scheme (slide 72).

- Insufficient number of OHS done, less than 400 operations per million of population per year (slides 73,74) because of lack of funding (slide 74) or other difficulty as limited laboratory support in some countries like Nigeria (slide 75).

**RECOMMANDATIONS** (slide 76)

Recommendations are as follows:

- Public Health insurance to be planned (slide 77).

- More Centres for Cardiac surgery to be effective (slide 78) for training and health care; a new cardiac centre in construction is going to commence activities soon (slides 79,80,81) in Côte d’Ivoire.

- Global expansion of OHS (slides 82-83) should include: Government, international and regional cooperation, non-governmental organizations, foundations, donors, industries; and should also include scientific exchanges at local, regional and international levels (slides 84-93); and promotion of clinical research (slide 94).

**CONCLUSION**

Before ending my lecture, may I give a tribute to all my predecessors since the beginning in 1992 of this distinguished lecture (slides 95-98); to the USA Chapter of the ISS; to two American College of Surgeons past-presidents I met some years ago for the first time in Washington DC (USA) (slide 99); Prof Patricia Numman was one of them. I share with Prof Patricia Numman a same idea: Bringing more African women to Surgery. We all know: Women are the cornerstones of our families in Africa; educating women means more than anywhere else; educating a Nation; moreless, empowering Women in Africa can be one of the solutions to end poverty in Africa (slide 100).

Ladies and Gentlemen, We should all remember the 5 phases of life: VITA (Life), LABOR (Work), STUDIUM (Study), CHARITAS (Charity), MORS (Death) mentioned by Gregorio Calvi di Bergolo (1904-1994) (slides 101,102); Indeed, we shall all die one day, whatever we are. Lifetime
is very short and we don’t have to wait too long for actions. Actions are your passion; actions are my passion; you and I can change the world with Joy, Enthousiasm, Optimism (slide 103); you and I can transform dream into reality (slide 104); we can make it happen (slide 105).

Dear Colleagues,

your humble servant, your Guest has spoken (slide 106)

God bless America,
God bless Africa,
God bless the World
Thank you for your attention
THE DISTINGUISHED LECTURE OF THE INTERNATIONAL SOCIETY OF SURGERY

was established by the Board of Regents of the American College of Surgeons in June 1990, and the first lecture was delivered at the 1992 Clinical Congress in New Orleans, Louisiana. This Lecture was proposed and endowed by the U. S. Chapter of the International Society of Surgery to recognize the Society’s worthwhile activities by honoring distinguished international surgeons at the annual Clinical Congress of the American College of Surgeons. The next Distinguished Lecture of the International Society of Surgery at the Clinical Congress of American College of Surgeons will be:

Lecturer: Koffi Herve Yangni-Angate
Title: Challenges in Open Heart Surgery in Africa: Côte – d’Ivoire Experience
Location: McCormick Place Convention Center – Room: W-179
Date: Wednesday, October 7, 2015
Time: 8:00 am – 9:00 am
Slide 3

Slide 4

CHALLENGES IN OPEN HEART SURGERY IN AFRICA
COTE D’IVOIRE EXPERIENCE

Professor Koffi Herve YANGNI-ANGATE, MD, FWACS, FICS, FISS
Cardio-Vascular and Thoracic Surgeon
President, Pan African Association of Surgeons
Immediate Past-President, WACS
A first international congress took place in Brussels three years later. In the chair was a citizen of another neutral country, the Swiss Theodor Kocher (1840-1917), who was well known in Europe and overseas through his widely translated scientific work and his intensive travels. His reputation increased even more when in 1909 he received the Nobel Prize as the first surgeon. By this time the Society had 600 members of whom 200 attended the first meeting. Thus in 1905 the SOCIÉTÉ was born with its full structure and it was decided to hold the next two meetings in 1908 and 1911, again in Brussels. Afterwards the SOCIÉTÉ bravely crossed the Atlantic to meet in New York in 1914.
Slide 8

COTE D'IVOIRE (WESTERN-AFRICA)

Slide 9

Population = 265.819 Millions
Medical Doctors (% Inhab.) = [0.03% - 0.49 %]
Population Growth = [1.36 % - 3.24 %]
GDP/Inhabitant ($) = [140 - 2130]
Infant Mortality (%) = [24.6 % - 132.5 %]
Life Expectancy (year) = [42.6 - 64.2]
Population = 25.5 Millions
Population Growth = 2.03 %
Mean Age (year) = 19.2 ♂
               = 18.9 ♀
Infant Mortality (‰) = 116.9
Life Expectancy (year) = 48.3
GDP/Inhabitant ($) = 1 699
Medical Doctors (‰ Inhab.) = 0.12 ‰
First Open Heart Surgery, Abidjan: Adult 26 years Atrial Septal Defect
Slide 15

CARDIAC LESIONS AND SURGERY IN IVORY COAST

- ACQUIRED VALVULAR HEART DISEASES
  (Rheumatic Fever ++++)

- CONGENITAL HEART DISEASES.

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ACQUIRED VALVULAR HEART DISEASES

<table>
<thead>
<tr>
<th></th>
<th>COTE D'IVOIRE (CI)</th>
<th>SENEGAL</th>
<th>GHANA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td>26 years (4 – 69 years)</td>
<td>23.2 years</td>
<td>30 years</td>
</tr>
<tr>
<td>Etiology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatic Fever</td>
<td>80 %</td>
<td>100 %</td>
<td>86.6 %</td>
</tr>
<tr>
<td>Native Valve Endocarditis</td>
<td>12 %</td>
<td>-</td>
<td>2.9 %</td>
</tr>
<tr>
<td>Endomyocardial Fibrosis</td>
<td>8 %</td>
<td>-</td>
<td>3.5 %</td>
</tr>
<tr>
<td>Functional Status IV NYHA</td>
<td>52 %</td>
<td>-</td>
<td>68.6 %</td>
</tr>
</tbody>
</table>

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ETIOLOGY OF MITRAL VALVE DISEASE

RHEUMATIC
- Developing countries
  - Ischemic
  - Dilatated cardiomyopathy
  - Congenital

DEGENERATIVE
- Industrialized countries

Slide 16

Slide 17
BACKGROUND (3)
ANATOMY OF THE HEART:

NORMAL MITRAL VALVE

Slide 18

Untreated streptococcal infections may cause rheumatic fever in which the body’s antibodies fight the infection but also attack heart valve leaflet tissue, most commonly the mitral valve.

Slide 19
Rheumatic Mitral Valve Lesions
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Slide 24

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**VALVE SURGERY PROCEDURES**

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Replacement CI</th>
<th>Replacement SENEGAL</th>
<th>Replacement GHANA</th>
<th>Repair CI</th>
<th>Repair SENEGAL</th>
<th>Repair GHANA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitral Valve</td>
<td>658</td>
<td>55</td>
<td>-</td>
<td>166</td>
<td>43</td>
<td>-</td>
</tr>
<tr>
<td>Aortic Valve</td>
<td>230</td>
<td>23</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Tricuspid Valve</td>
<td>48</td>
<td>-</td>
<td>5</td>
<td>100</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>936</strong></td>
<td><strong>78</strong></td>
<td><strong>201</strong></td>
<td><strong>280</strong></td>
<td><strong>52</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

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Slide 25
**VALVE REPLACEMENT DEVICES**

<table>
<thead>
<tr>
<th></th>
<th>CI</th>
<th>SENEGAL</th>
<th>GHANA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioprosthesis</td>
<td>470</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Mechanical Prosthesis</td>
<td>466</td>
<td>78</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>936</td>
<td>78</td>
<td>201</td>
</tr>
</tbody>
</table>

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**MORBIDITY : CI**

N = 994

- Bioprosthesis Degeneration 4.24 years - 6.5 years
- Low Cardiac Output
- Prosthetic Valve Endocarditis

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### Acquired Valvular Heart Diseases

<table>
<thead>
<tr>
<th></th>
<th>Côte d’Ivoire (CI)</th>
<th>Senegal</th>
<th>Ghana</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Age</strong></td>
<td>26 years (4 – 69 years)</td>
<td>23.2 years</td>
<td>30 years</td>
</tr>
<tr>
<td><strong>Etiology</strong></td>
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<td>12 %</td>
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<td>8 %</td>
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<tr>
<td><strong>Functional Status IV NYHA</strong></td>
<td>52 %</td>
<td>-</td>
<td>68.6 %</td>
</tr>
</tbody>
</table>

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DEFINITION

Restrictive cardiomyopathy characterized by dense fibrous plaques of the mural endocardium in either one or both of the ventricles of the heart

(RAMAN KUTTY V.)

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Slide 30

Left ventricle endomyocardial fibrosis

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Slide 31
ENDOMYOCARDIAL FIBROSIS

(1978 – 2013)
Mean Age 12+- 0.6 (2 - 15 years)

126 cases

Boys 82 (65%)
Girls 44 (35%)

Right - Sided form 39
Left – Sided form 40
Bilateral form 47

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Slide 32

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Slide 33
## Endomyocardial Fibrosis

### Surgical Procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocarlectomy</td>
<td>126</td>
</tr>
<tr>
<td>Mitral reconstruction</td>
<td>17</td>
</tr>
<tr>
<td>Tricuspid reconstruction</td>
<td>19</td>
</tr>
<tr>
<td>Mitral replacement</td>
<td>50</td>
</tr>
<tr>
<td>Tricuspid replacement</td>
<td>40</td>
</tr>
</tbody>
</table>

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ENDOMYOCARDIAL FIBROSIS

SURGICAL RESULTS
126 cases : 1978 - 2013

<table>
<thead>
<tr>
<th>Operative Death</th>
<th>Left sided form</th>
<th>6  (5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right sided form</td>
<td>3   (2%)</td>
<td></td>
</tr>
<tr>
<td>Bilateral form</td>
<td>11  (9%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20  (16%)</td>
<td></td>
</tr>
</tbody>
</table>

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Slide 36
# CONGENITAL HEART DISEASES

**OPEN-HEART SURGERY IN COTE D’IVOIRE**

**A THIRTY FIVE YEAR SURGICAL EXPERIENCE (1976-2014)**

Personal Communication

<table>
<thead>
<tr>
<th>CONGENITAL HEART DISEASES (CHD) IN COTE D’IVOIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
</tr>
<tr>
<td>VSD</td>
</tr>
<tr>
<td>T4 FALLOT</td>
</tr>
<tr>
<td>PARTIAL A-V CANAL</td>
</tr>
<tr>
<td>PULMONARY VALVULAR STENOSIS</td>
</tr>
<tr>
<td>COMPLETE A-V CANAL</td>
</tr>
<tr>
<td>COMPLEX CHD</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

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**ASD**

Echocardiography: ASD

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Slide 38
Slide 39

**PARTIAL AV CANAL**

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Slide 40
**TETRALOGY OF FALLOT**

**N = 100**

Mean Age : 5.7 years (6 months - 32 years)

Mean Weight : 16.4 kg (6.3 – 55 kg)

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**TETRALOGY OF FALLOT**

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Slide 42
TETRALOGY OF FALLOT

Regular Form 24%
Irregular Form 76%

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OPEN-HEART SURGERY IN COTE D’IVOIRE
A TWENTY YEAR SURGICAL EXPERIENCE

by

YANGNI-ANGATE H., and al.

Journal of Medical Sciences And Hopital Management
Vol 1 n°1, March 2007 : 18-23
Summary

Concerning congenital heart diseases (n = 408), the most frequent lesions were: Ventricular septal defect (VSD) 100, Atrial septal defect (ASD) 140, Tetralogy of Fallot 100, Partial atrio-ventricular Canal 16. Corrective repair has been done in all cases.

Overall mortality was 10 % (n = 43)

YANGNI-ANGATE H., and al.

Journal of Medical Sciences and Hopital Management
Vol 1 n°1, March 2007 : 18-23.
Control Of Cardiovascular Diseases In Developing Countries

Research, Development, and Institutional Strengthening

INSTITUTE OF MEDECINE

Christopher P. Howson, K. Srinath Reddy, Thomas J. Ryan, and Judith R. Balc, Editors

THE CURRENT BURDEN OF CARDIOVASCULAR DISEASE

NATIONAL ACADEMY PRESS

Washington, D.C. 1998

Slide 47

Rheumatic Heart Disease: The Unfinished Agenda

For countries in the early stages of development, rheumatic heart disease is the most common form of CVD. Indeed, it is thought to affect more than 4 million people worldwide, resulting in approximately 90,000 deaths each year (Michaud et al., 1993). A range of 20–35 percent of cardiac patients admitted to hospitals in Africa and Asia have rheumatic heart disease, often with heart failure or needing replacement of the heart valve. For the next 20–40 years, it is likely that developing countries will experience a double burden of CVD: rheumatic heart disease will continue, while atherosclerotic CVD becomes more common.

Slide 48
Epidemiology of Rheumatic Heart Disease - Data scarce in Africa

- Acute rheumatic fever/RHD
  - commonest form of heart disease in Africa
- 20 million affected in developing world
  - highest prevalence sub-Saharan Africa
- 2 million children worldwide/1 million sub-Saharan Africa
  - leading cause of death during 1st 5 decades of life
  - mortality 20% at 6 yr follow-up Nigeria; 12.5%/yr Ethiopia

Valve repair should always be the first choice.....
SURVIVAL

<table>
<thead>
<tr>
<th></th>
<th>5 Yrs</th>
<th>10 Yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>REP</td>
<td>96.5 ± 1.8%</td>
<td>88.2 ± 4.5%</td>
</tr>
<tr>
<td>BIO</td>
<td>83.5 ± 3.0%</td>
<td>70.2 ± 4.1%</td>
</tr>
<tr>
<td>MECH</td>
<td>87.8 ± 2.2%</td>
<td>73.4 ± 6.0%</td>
</tr>
</tbody>
</table>

Mechanical valves minimize reoperation but limit survival and increase thromboembolic complications. Patients undergoing valve repair had improved late cardiac survival independent of their preoperative characteristics. Rheumatic mitral valves should be repaired when technically feasible, accepting a risk of reoperation, to maximize survival and reduce morbidity. (J Thorac Cardiovasc Surg 2000;119:53-61)

Terence M.Yau et al.
Mitrail Valve Repair and Replacement in Rheumatic Disease
Rheumatic Mitral Valve Repair

![Graph showing survival rates for different mitral valve repair procedures over 5 years.]

Antunes M. Mitral Valvuloplasty. 1985

Slide 53

Endomyocardial Fibrosis: Still a Mystery after 60 Years

- Gene Bukhman, John Ziegler, and Eldryd Parry

<table>
<thead>
<tr>
<th>Cause</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td>[85]</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>[39,86]</td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td>[87,88]</td>
</tr>
<tr>
<td>Malaria</td>
<td>[89]</td>
</tr>
<tr>
<td>Myocarditis</td>
<td>[46,62]</td>
</tr>
<tr>
<td>Helminthic parasites</td>
<td>[90]</td>
</tr>
<tr>
<td>Allergy</td>
<td></td>
</tr>
<tr>
<td>Eosinophilia</td>
<td>[76,88]</td>
</tr>
<tr>
<td>Auto-immunity</td>
<td></td>
</tr>
<tr>
<td>Malnutrition</td>
<td></td>
</tr>
<tr>
<td>Protein deficiency</td>
<td>[79]</td>
</tr>
<tr>
<td>Magnesium deficiency</td>
<td>[23]</td>
</tr>
<tr>
<td>Toxic agents</td>
<td></td>
</tr>
<tr>
<td>Cerium</td>
<td>[23]</td>
</tr>
<tr>
<td>Cassava</td>
<td>[79,91]</td>
</tr>
<tr>
<td>Thorium</td>
<td>[23]</td>
</tr>
<tr>
<td>Serotonin</td>
<td>[50]</td>
</tr>
<tr>
<td>Plant toxin</td>
<td>[92]</td>
</tr>
</tbody>
</table>

Slide 54
CONGENITAL HEART DISEASES SCREENING
remains insufficient

PEDIATRIC AND CONGENITAL HEART DISEASES: HEACTH PRIORITY OF THE 21ST CENTURY

In Sub-Saharan Africa and in developing countries rheumatic cardiopathies represent 5 to 10% of deaths due to cardiovascular sickness; they affect 12 to 40% of the African population and will remain frequent within the next 20 to 40 years. Furthermore, in Africa congenital cardiopathies screening remains insufficient. For example in Cote d’Ivoire, on looking at the incidence of congenital cardiopathies between 5 and 8 for 1000 births and the number of 360,000 births per year, between 1800 and 2800 congenital anomalies per year should be discovered. We are still far from this incidence here as well as in other African regions. For these reasons, it is necessary to increase in Africa the human resources in cardiology and to establish many centers for screening cardiovascular diseases. So, in Cote d’Ivoire, as a supplement to the Institut de Cardiologie of Abidjan in the south of the country, the construction of a second center of cardiology started in Bouake, a town located in the center of our country (figure 3).
CHALLENGES

Cardiac Centre in Côte d’Ivoire:

Insufficient Number

BACKGROUND

COTE D’IVOIRE

Population = 25,5 Millions
1 full Cardiac Centre

Slide 57

Slide 58
BACKGROUND

Global Expansion of Cardiothoracic Surgery.
The African Challenge

A. Thomas PEZZELLA, M.D.


Briefly, there are over 1.5 million open-heart operations done each year worldwide by over 6,000 surgeons, in over 3,000 centers or units. Unfortunately only 2 billion of the world 6.5 billion population has access to these operations. There are 1222 open-heart operations per million population in North America, compared to 18 per million in Africa. This translates into 1 center or unit per 120,000 people in the USA to 1 center/unit per 33 million people in Africa.

Population = 25,5 Millions
Population Growth = 2,03 %
Mean Age (year) = 19,2 ♂

18,9 ♀

Infant Mortality (‰) = 116,9
Life Expectancy (year) = 48,3
GDP/Inhabitant ( $) = 1699
Medical Doctors (% Inhab.) = 0,12 %
Epidemiology of Infant Heart Disease in Sub-Saharan Africa

Dr WAWO YONTA Edvine
University Teaching Hospital, Yaounde - Cameroon
Faculty of Medicine and Biomedical Sciences, Yaounde - Cameroon

A: The Burden:
3/ Difficulties with medical management in Sub-Saharan Africa

- Insufficient specialized medical personnel

CARDIAC SURGEONS IN COTE D’IVOIRE

- 5 Cardiac Surgeons for a population of more than 22,000,000 people
### CARDIOTHORACIC SURGEONS AT POST AND PROJECTED IMMEDIATE NEEDS IN 7 COUNTRIES

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>CARDIOTHORACIC SURGEONS AT POST</th>
<th>PROJECTED IMMEDIATE NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHANA</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>NIGERIA</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>BENIN</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>MALI</td>
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<td>12</td>
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<tr>
<td>THE GAMBIA</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>SIERRA LEONE</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>LIBERIA</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

*The immediate National needs of Specialists based on a ratio of 1: 22,000 population.*

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### Countries with established Cardiac surgery programs

![Map of Africa highlighting countries with established Cardiac surgery programs](image)

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*Slide 64*
TRAINING OF CARDIOVASCULAR AND THORACIC SURGEONS: The Need For a Structured Programme

K. YANGNI-ANGATE Kari Nerva, MD, FWACS, FICS
PEDIATRIC CARDIAC SURGEON
PRESIDENT OF AFRICAN ASSOCIATION OF THORACIC AND CARDIOVASCULAR SURGEONS
BOUAKE UNIVERSITY TEACHING HOSPITAL
INSTITUT OF CARDIOLOGY ABIDJAN

CONAKRY 2009

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Slide 66
AATCVS INITIATIVES FOR
AN HARMONIZED AND STRUCTURED TRAINING PROGRAMME

CALABAR 2010

FINAL ADOPTION:
HARMONIZED CORE CURRICULUM AND
ESTABLISHMENT OF A COMMON LIST
OF SURGICAL PROCEDURES

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CVT TRAINING PROGRAMME:
IMPLEMENTATION- REQUIREMENTS-
SUSTAINABILITY

- Centres: - Modern Equipments
  - Good Management
  - Political and Financial support
- Harmonized Training Centre Policy in our Region
- Collaboration:
  - AATCVS
  - Government
  - Industries
  - NGO
  - Donors
  - International organizations
  - Foundations

Slide 68
Constraints
GDP/capita < cost of one OHS

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CHALLENGES

- Many of our Patients Cannot afford the Bill
- (GDP per capita = very low):

Cost of Cardiac Surgery:
Without Prosthesis = **4,800 USD**
With Prosthesis = **5,600 USD**

Slide 70
Epidemiology of Infant Heart Disease in Sub-Saharan Africa

Dr WAWO YONTA Edvine
University Teaching Hospital, Yaounde - Cameroon
Faculty of Medicine and Biomedical Sciences, Yaounde - Cameroon

A: The Burden:
① Difficulties with medical management in Sub-Saharan Africa

• Insufficient financial resources of the population

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CHALLENGES

No Health Insurance Scheme

Slide 72
Outcome of patients undergoing open heart surgery at the Uganda heart institute, Mulago hospital complex

- Lack of direct funding for open heart surgery programs is a major obstacle limiting the number of children that can be operated by local teams as only very few families can pay for the costs of the surgeries.

- Governments and local charities should direct funding to support treatment of more children with heart disease locally as opposed to referral abroad to increase access to the service.

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CHALLENGES

- In Africa, according to WHO Recommendations and to the International Standards, we should perform 400 operations per million of population per year, and should achieve the proportion of one surgeon for 150 cases per year.

Slide 74
Open heart surgery in Nigeria: a work in progress

- Bode Falase, et al.
- http://www.cardiothoracicsurgery.org/content/8/1/6

Challenges encountered included the low volume of cases done, an unstable working environment, limited number of trained staff, difficulty in obtaining laboratory support, limited financial support and difficulty in moving away from the Cardiac Mission Model.

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RECOMMANDATIONS

Slide 76
PUBLIC HEALTH INSURANCE

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RECOMMANDATIONS

- Regional Centres of Excellence to provide cost effective care of Patients needing Surgery

- More Centres for Cardiac Surgery In the Region.

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NEW CENTRE: BOUAKE (IVORY-COAST)

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NEW CENTRE: BOUAKE (IVORY-COAST)

Slide 80
OPEN HEART SURGERY
GLOBAL EXPANSION

- Government

Slide 82
Commencing open heart surgery in resource limited countries: lessons from the LASUTH experience

- Mobolaji Adewale Oludara et al.
- The Pan African Medical Journal

We propose that owing to the huge financial investment needed, government sponsorship as well as collaboration with overseas based and local non-governmental agencies may be required to jump start the process of open cardiac surgery. Local staff training opportunities are also provided by such missions and this can further be complemented by overseas exposure in areas of need for capacity building.
OPEN HEART SURGERY
GLOBAL EXPANSION

- Non Governmental Organizations

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Save A Child’s Heart
Ibadan

Slide 86
Outcome of patients undergoing open heart surgery at the Uganda heart institute, Mulago hospital complex

- Lack of direct funding for open heart surgery programs is a major obstacle limiting the number of children that can be operated by local teams as only very few families can pay for the costs of the surgeons.

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OPEN HEART SURGERY GLOBAL EXPANSION

- Fondations
- Donors
- Industries

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IVORIAN HEART FOUNDATION

The Ivorian Heart Foundation is the charity that leads the fight for heart health for all the populations living in Côte d’Ivoire. We aim to prevent people from heart and circulatory diseases; and we also aim to help those suffering from it by providing comfort and assistances; and through the research...

ENUGU TEACHING HOSPITAL : TEAM OF CARDIAC SURGERY

Regional Cooperation

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TRIBUTE TO PAST DISTINGUISHED LECTURERS (1990-2014)

American College of Surgeons
THE DISTINGUISHED LECTURE OF THE INTERNATIONAL SOCIETY OF SURGERY

The Distinguished Lecture of the International Society of Surgery was established by the Board of Regents in June 1990, and the first lecture was delivered at the 1992 Clinical Congress in New Orleans, LA.

This Lecture was proposed and endowed by the U. S. Chapter of the International Society of Surgery to recognize the Society’s worthwhile activities by honoring distinguished international surgeons at the annual Clinical Congress of the American College of Surgeons.
DISTINGUISHED LECTURERS OF THE INTERNATIONAL SOCIETY OF SURGERY AT THE AMERICAN COLLEGE OF SURGEONS CLINICAL CONGRESS SINCE 1992

2015: Koffi Herve Yangni-Angate, Lagos, Nigeria
Challenges in Open Heart Surgery in Africa: Côte – d’Ivoire Experience

2014: Meena Nathan Cherian, MD Surgical Care in Global Health Agenda

2013: Professor Norman S. Williams,
Attempts to Innovate in Coloproctology and Beyond

2012: Ari Leppaniemi, MD, PhD, Helsinki, Finland
Humanitarian Missions: Can One Surgeon Make a Difference?

2011: Eilis McGovern, Dublin, Ireland
Surgical Training and Surgical Practice: Are We Getting the Formula Right?

2010: Alberto Raul Ferreres, Buenos Aires, Argentina
Ethics and Errors in Surgery

Healthcare Reform in the United Kingdom

2008: Kenneth D. Boffard, Houghton, Rep. of South Africa
Defining Competence: Remuneration, Results, Rewards, and Reinvestment

2007: Michael G. Sarr, Rochester, MN
What Can the Academic Community Offer the Third-World Surgeon?

2006: Henrik Kehlet, Copenhagen, Denmark
Fast Track Surgery – From Here to Where?

Evidence-based Surgery: The Future?!

2004: John Wong, Hong Kong, Peoples Rep. of China
Esophageal Cancer Worldwide: Same Name, Different Disease, One Mission

2003: Jose F. Patino, Bogota, Colombia
Chaos Theory, Uncertainty, and Surgery

2002: Ainslie G. R. Sheil, Sydney, NSW, Australia
Xenotransplantation and Cloning: Facts and Future

2001: Jorge Cervantes, Mexico, DF, Mexico
Virchow’s Legacy: Venous Thrombosis and Pulmonary Embolism

2000: Hans G. Beger, Ulm, Germany
Pancreatic Head Resection in the New Millennium – Changing Face of Surgical Morbidity

1999: Sir Alfred Cuschieri, Dundee, Scotland
Minimal Access Therapy in the Next Millennium

Kidney Transplantation: A Remarkable Story in Modern Medicine

1997: Sir David Carter, Edinburgh, Scotland
Cancer of the Digestive System – Has Surgery Nothing Further to Offer?

1996: Umberto Veronesi, Milan, Italy
The Present and Future of Breast Cancer Management

1995: Hans Borst, Hannover, Germany
Aortic Dissection – A Multi-disciplinary Challenge

1994: Michael Trede, Mannheim, Germany
Progress in the Surgical Treatment of Pancreatic Carcinoma

1993: John Terblanche, Cape Town, South Africa
The Changing Face of Biliary Tract Surgery in 1993

Future Prospects in Organ Transplantation

Slides 96-97-98
How Empowering Women Can Help End Poverty in Africa
WITH JOY AND OPTIMISM

Slide 103

"I have a dream"
Ces discours qui ont changé le monde

« Ask not what your Country can do for you - ask what you can do for your Country »

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