



Surgery for chronic rheumatic valvular heart disease

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This presentation

- History (Sudan)
- The situation now
- Challenges in Africa



04/10/2015

PASCAR meeting Mauritius

History 1950s & 60s

- Resection of part of a rigid mitral valve created a new one by the use of a vein threaded inside out on a tendon, which was placed in position in the ventricle under direct vision through a cardioscope in such a way as to create a ball valve over the artificial defect.
 - MURRAY, G. (1950), Arch. Surg., 6x, 903.
- Successful aortic stenosis dilatation cases from above through the right carotid artery.
 - BAILEY, C. P. , Jour. Thor. Surg., 20, 516.

MS

&

MR

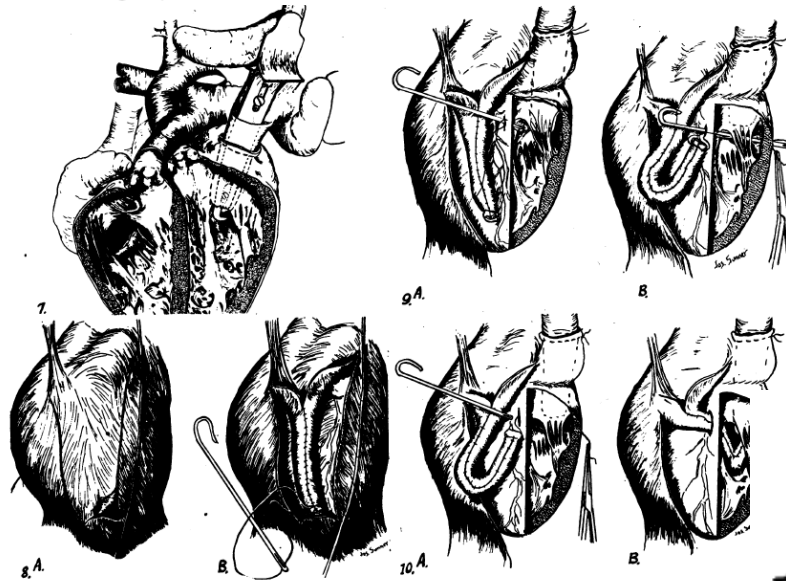
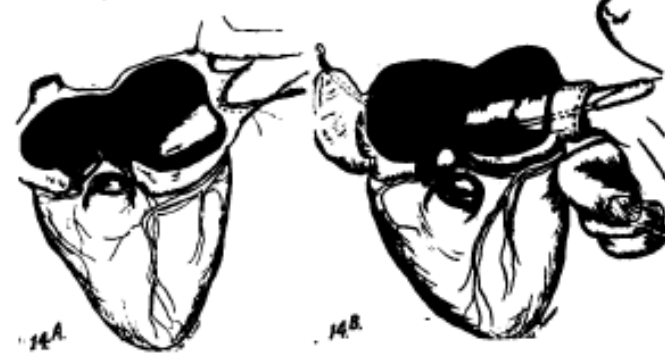
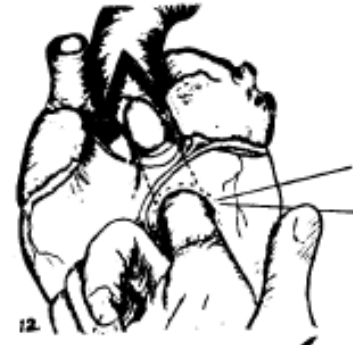


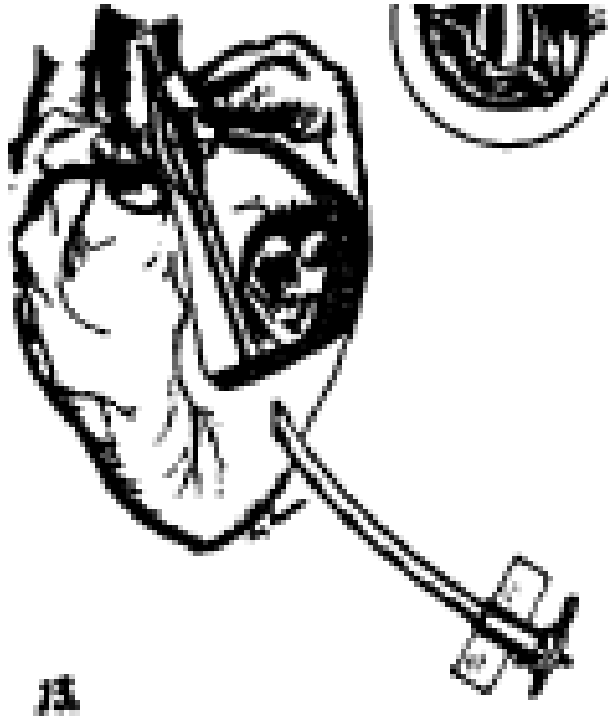
Fig. 7.—Incision of valve commissures by guillotine knife in mitral stenosis. Fig. 8 a and b.—Preparation of pedicled pericardial graft. Fig. 9 a and b.—Probe is inserted through left ventricular wall and is guided by the intracardiac finger along the mitral slit and out through the posterior ventricular wall. Fig. 10 a and b.—Pericardial graft is applied through left ventri-



AS

&

AR



- 12 pts (22-43yrs) followed for 6 mths = 8 died, 2 too sick for op

Results

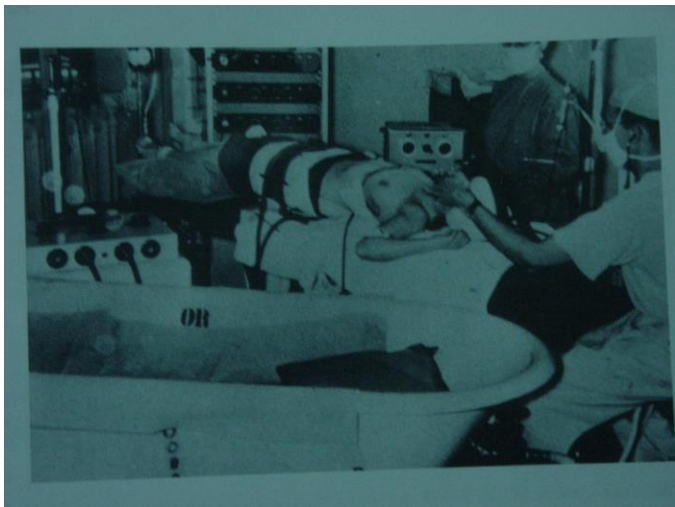
- Transmyocardial palpatory surgery (finger surgery) is a satisfactory approach in the diagnosis and treatment of congenital and acquired cardiac lesions
- Bailey (1951) 214 cases 41.6% excellent, 32.7% improved and 13% unaltered
- Brock et al. (1952) after first 50 = 42 survivors, excellent in 17, good 15, 4 fair and 5 poor.

Sudan -50s and 60s

- 1926 Rheumatic heart disease taught in KTH
- 1937 Mitral stenosis cases published
- '59 –'62 1st operations(Mr John Jacques FRCSED)
 - ✓ 20 CMV for MS
 - ✓ Aortic dilatation (hypothermic circulatory arrest)
 - ✓ Purse string repair of MR
- ✓ 1962 Mr John Jacques died suddenly

MD thesis 2003 Mr Hatim Albashir

The start of the present

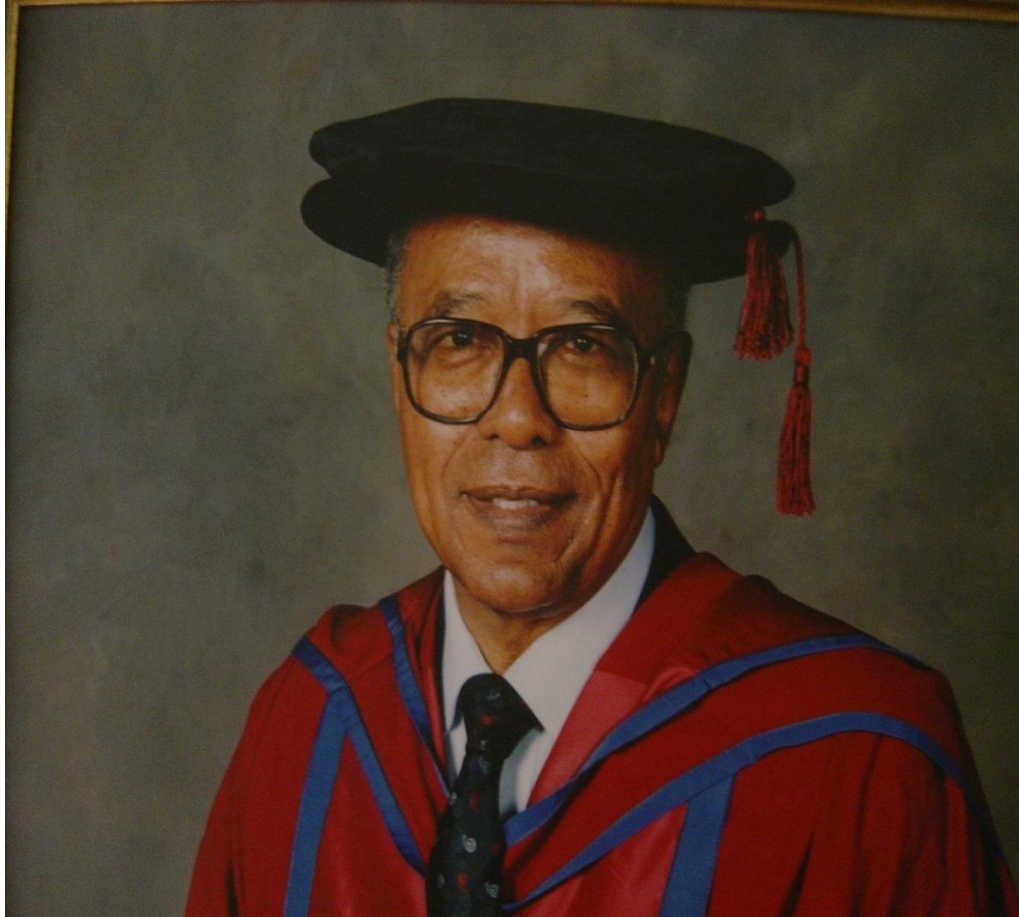


70s & 80s

- Singapore 1967 to 1979 715 surgical procedures
- 654 mitral most child-bearing age females so conservative when possible
- **Valvotomy** for mitral stenosis and for restenosis >50% had a second valvotomy with functional improvement.
- Mitral valve replacement was reserved for the severely distorted valve, sometimes calcified, and where there was stenosis associated with incompetence
- 1971 to 1979 162 mitral valves were replaced and actuarial studies showed 80% survival five years after surgery.
- 30 aortic and mitral valve replacements operative mortality of 16.7%.
- 75 aortic valves were replaced for rheumatic valvular disease and 14 of these also had associated mitral and tricuspid valve disease.
- The prosthetic valves commonly used for replacement were the Starr-Edwards non-cloth covered valves models 6120 and 1260.
- Thromboembolism was low, being 8% for mitral valve replacement and the majority of these episodes occurred in the first three months after surgery.

Sudan – 70s & 80s

Professor Ahmed Abdelaziz Yacoub



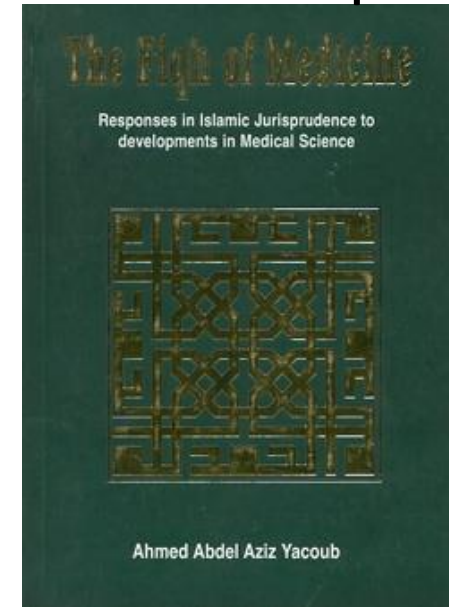
MBBS UofK 1956

FRCS

FRCP

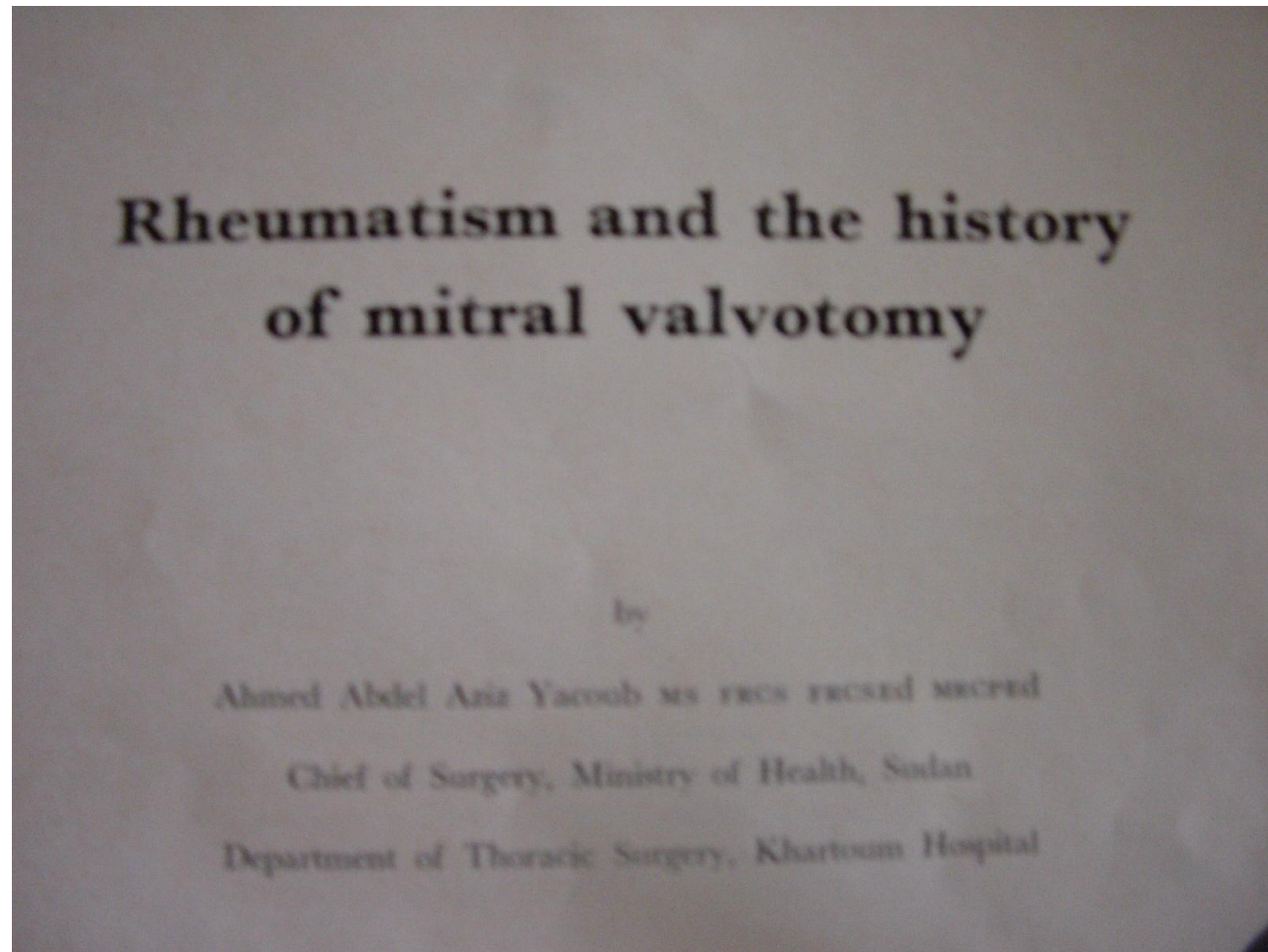
Anaesthesia fellow

PhD Islamic Jurispendence



Courtesy of Prof ME Ahmed

Mr. A. A/Aziz -1974 = 1000cases



Sudan – 70s & 80s

- 1976 ; Animal experiments with Professor Imbabi
- Feb.1977 ; Visit of Mr.Christopher Lincoln (UK)
- *40 experimental CPBs : 11 goats - 29 sheep
- Feb.1980 – Jan.1981 = 1st visitors : Donald Ross & Richard Emanuel (NHH)
- ✓ Ross 5 cases - Yagoub 4 cases (ASD closures – Pulmonary commissurotomies – TGV)
- Feb.1982 : Magdi Yacoub (NHH & Harefield H.)+Richard Emanuel & Siraj Abashar (H.H.)
- ✓ 10 cases : ASD closures & Pulmonary Commissurotomies
- Return of the emissaries (doctors and other staff)
- ✓ Ibrahim Mustafa 1980 .
- ✓ Mohammed Saeed El-Fil 1982
- ✓ First OHO by Mr.Mustafa November 1980.
- ✓ In collaboration with Mr.Yagoub (Patch closure of ASD + OMV)
- ✓ Participation in Ross's 2nd visit & Yacoub's visit

Now - MS

Indication

- Symptoms NYHA FC II–IV

OR

- MVA <1.5 cm²

OR

- PAS pressure >50 mmHg

Treatment

- PTMC by high-volume operator/centre
- Mitral valve repair or replacement if morphology is not suitable for PTMC (e.g. valve is heavily calcified) or if moderate or greater MR is present or late pregnancy

Now - MR

Indication

Moderate / severe MR with

1. NYHA FC II-IV symptoms **OR**
2. Impaired LV EF <60 % **OR**
3. LVESD \geq 40 mm in adults or enlarged LVESD Z-score in children **OR**
4. PAS hypertension >50 mmHg **OR**
5. New onset atrial fibrillation

Surgical treatment

- Mitral valve repair
- Mitral valve replacement with biological or mechanical prosthesis
- Avoid mechanical prostheses, if concerns about warfarin adherence or future pregnancy
- Percutaneous approaches

Now - AS

Indication

- Symptoms NYHA II–IV + mean systolic gradient > 40-50 mmHg or AVA <1.0 cm²
- Impaired cardiac function (EF < 50%) + mean systolic gradient > 40-50 mmHg or AVA <1.0 cm²

Surgical treatment

- Valve replacement
- Ross procedure
- TAVI

Now - AR

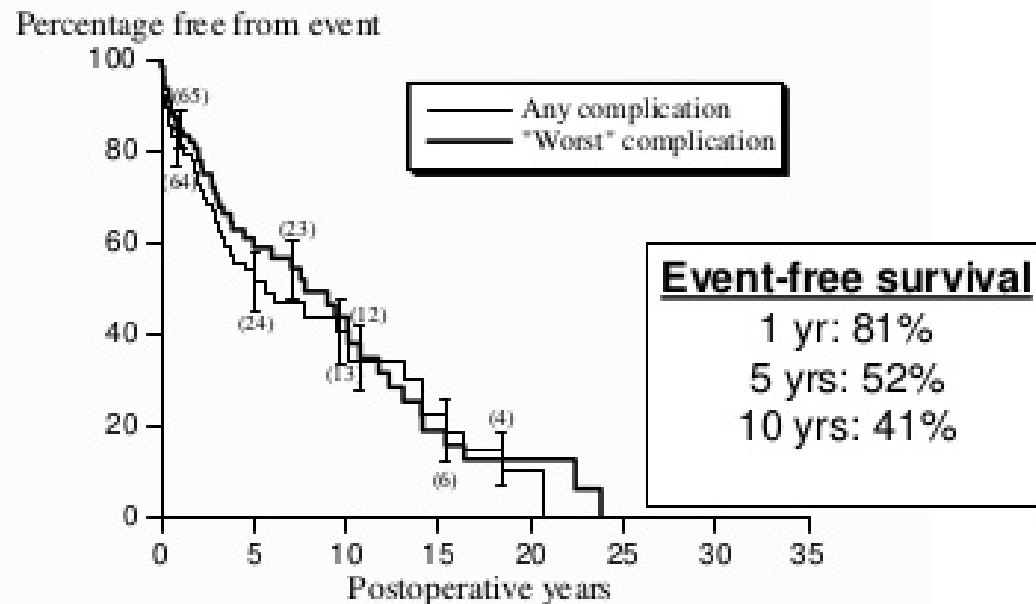
Indication

- Moderate/severe AR with symptoms NYHA FC II–IV
- Asymptomatic moderate/severe AR if:
- LVEF <55% **OR**
- LVESD \geq 55 mm **OR**
- LVEDD >70 mm **OR**
- Enlarged LVESD or LVEDD Z-score (in children only)

Surgical treatment

- Valve replacement:
- **Valve repair**
- Ross procedure

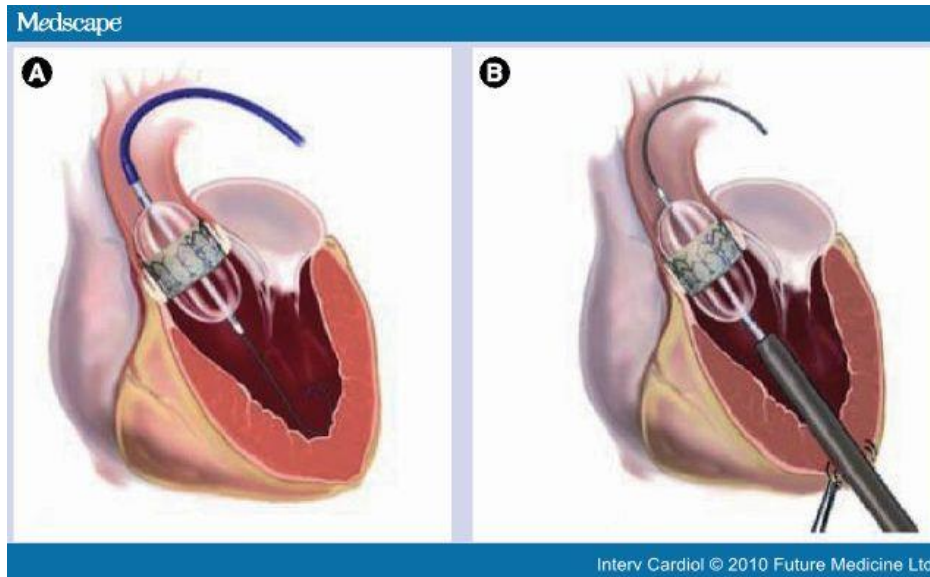
Event-free survival of 80 postoperative survivors of valve replacement for RHD



Carapetis et al, APHJ, 1999

Percutaneous approaches

Aortic



Mitral

- Leaflet plication, coaptation, ablation)
- annulus (indirect: coronary sinus approach or an asymmetrical approach; direct: true percutaneous or a hybrid approach)
- Chordae implantation
- LV remodeling
- edge-to-edge repair
noninferior to open repair (EVEREST II)

Surgery in Africa



Countries able to offer cardiac surgery

Sustained programs = 16

- Algeria
- Angola
- Cameroon
- Egypt
- Ghana
- Ivory Coast
- Kenya
- Libya
- Mauritius
- Morocco
- Namibia
- South Africa
- Senegal
- Sudan
- Tanzania
- Tunisia

Visiting teams = 11

- Botswana
- Burkina Faso
- Eritrea
- Ethiopia
- Mauritania
- Mozambique
- Nigeria
- Rwanda
- Uganda
- Zambia
- Zimbabwe

Distribution of facilities

Egypt	48	Zambia	2
S. Africa	30**	Botswana	1
Tunisia	11	Burkina-Faso	1
Nigeria	9	Cameroon	1
Libya	7	Ghana	1
Morocco	7	Mauritania	1
Sudan	7	Mozambique	1
Kenya	4	Rwanda	1
Algeria	3**	Senegal	1
Tanzania	3	Zimbabwe	1
Ivory Coast	2	Eritrea	1
Mauritius	2	Ethiopia	1
Namibia	2		
Uganda	2		

Estimated cardiac surgeons in Africa

S. Africa	120
Egypt**	100
Tunisia	80
Sudan	12
Nigeria	15
Kenya	11
Libya**	10
Morocco	10
Ivory Coast	7
Tanzania	7
Ghana	6
Senegal	5
Uganda	3

Mauritius**	2
Namibia	2
Mauritania	1
Mozambique	4
Zimbabwe	1
Algeria	?
Botswana	?
Burkina-Faso	?
Cameroon	?
Ethiopia	6

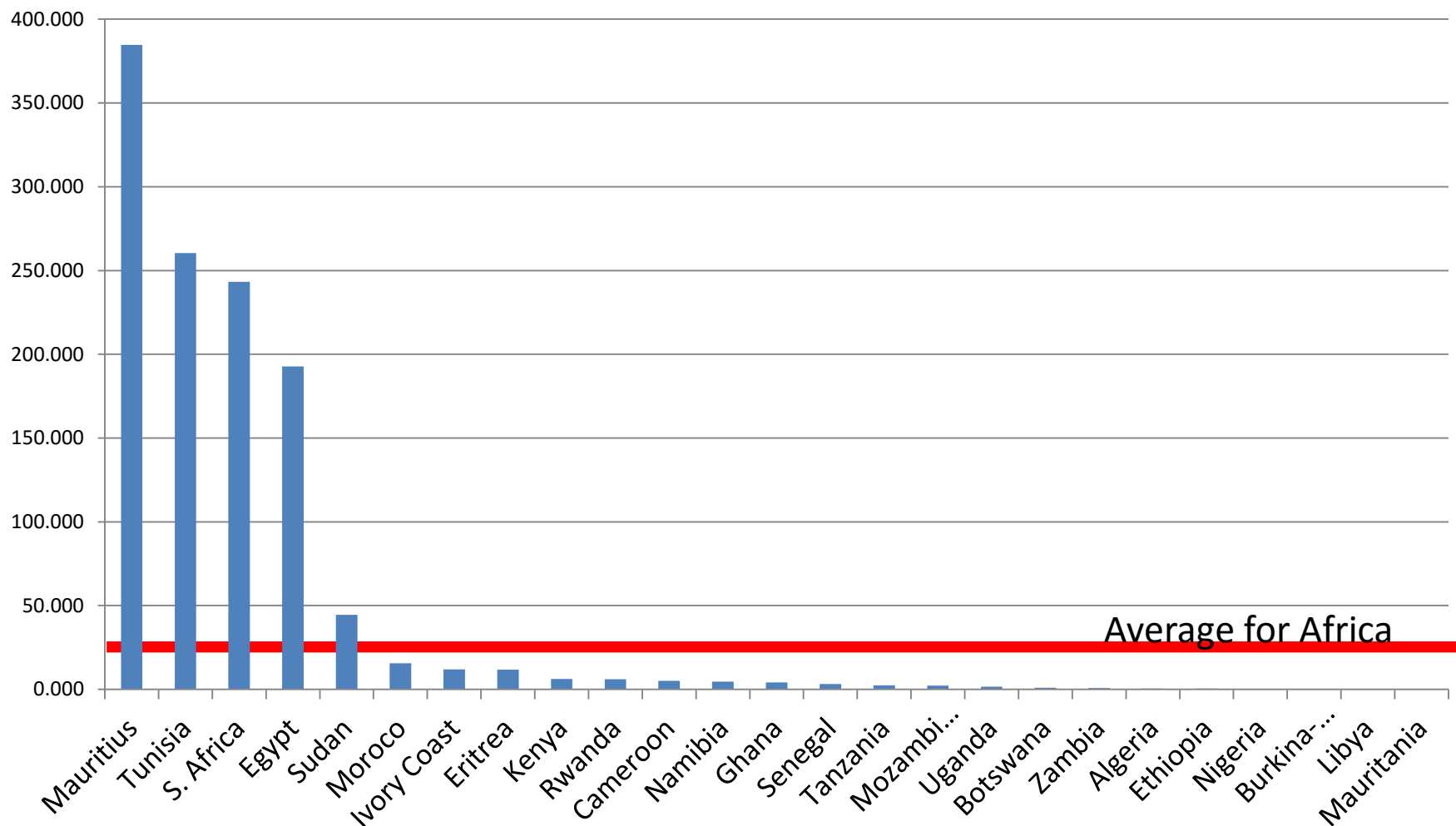
Approximately 402 cardiac surgeons

** Estimates

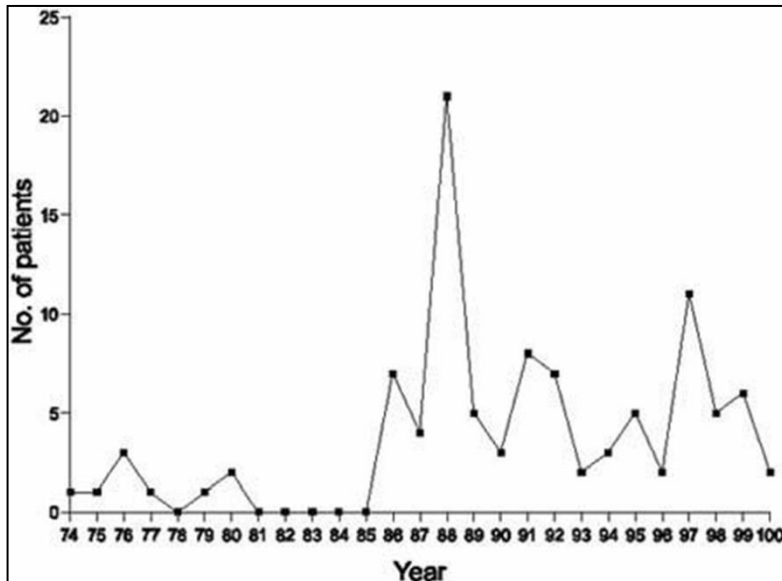
SHS meeting Khartoum Jan 2013

S Ogendo, A ElSayed in press 2013

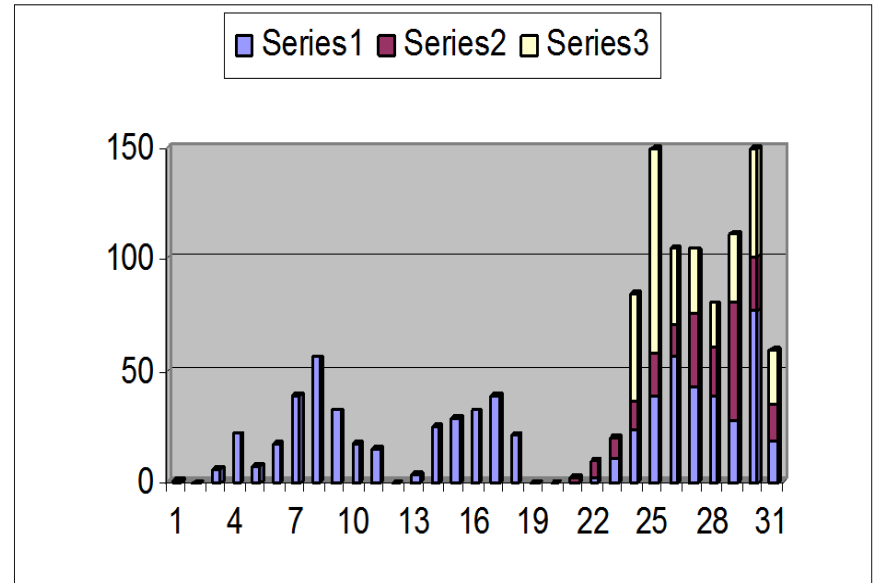
Surgeries Per Population (?Needs)



Collective Effect Of Challenges Of Cardiac Surgery Services



Nigeria: 1974 – 2000.
Tex Heart Inst J. 2007; 34(1): 8–1



Kenya: Ogendo's personal
database

Service

- 1 cardiac unit/6.9 million
- 1 cardiac surgeon/2.6 million
- 33.6 operations / million
- Annual figure
34,600 cases
- Bulk from
 - South Africa
16,000 cases
 - Egypt
12,000 cases
 - Tunisia
2,500 cases
 - Sudan
1,500 cases

S Ogendo, A ElSayed in press 2013

Sudan - Now

- 1998 Ahmed Gasim Hospital
- 2000 Sudan Heart Center
- 2002 AlShaab Hospital
- 2007 Alsalam hospital *****
- 2010 Wad Medani Hospital

Personal review 1999-2009

Methodology

- Personal computer database
- Direct analysis

Total results

- Total operations
 - 877 Open heart
 - 430 thoracic & closed heart

Database

56 variables

Microsoft Access

Table Tools: Home, Create, External Data, Database Tools, Datasheet

Security Warning: Certain content in the database has been disabled. Options...

All Access ...

Tables

- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- A valve
- Age
- Anes
- Ao cann
- aorta
- art press
- attend H
- attendanM
- B flow
- BE
- blood
- blood gr...

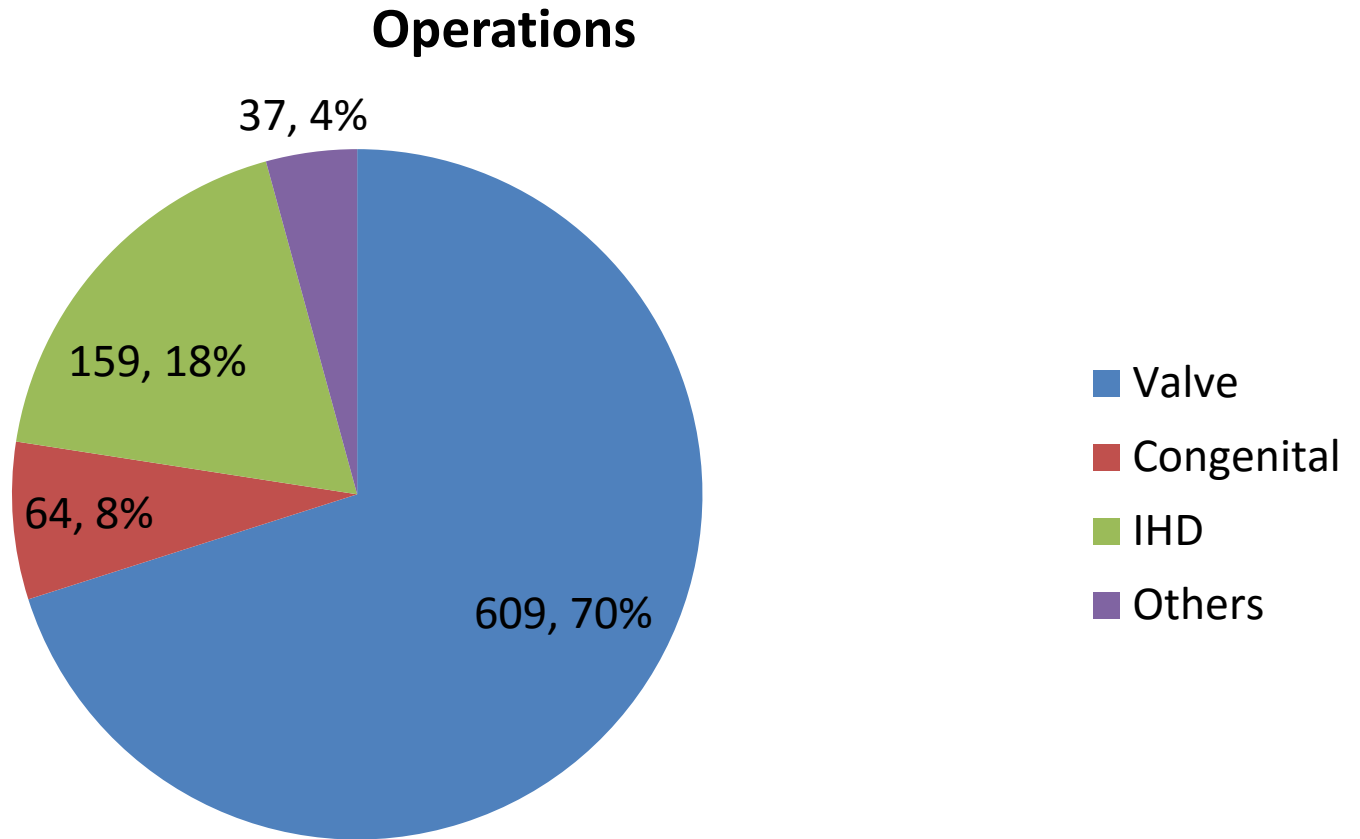
2001

Diag	Clas	Operatic	cond	Date	Age	Stage	Pt,ht	Pt,wt	Bsa	B flow	Ao	Prim	Hepari	Manitol	Nahco	V cann
MS	AQ	MVR	new	06/01/2001	25years	Adult male	167cm	045,0kg	1,47m	03,5lt	26fr	01,5lt	15000lu	100ML	040ml	30fr,32fr
Mvd AS	AQ	DVR	new	07/01/2001	32years	Adult male	166cm	046,0kg	1,47m	03,5lt	24fr	01,5lt	15000lu	100ml	100ml	30fr,32fr
sever MRMS	AQ	MVR	new	16/01/2001	25years	Adult male	166cm	049,5kg	1,56m	03,8lt	28fr	01,5lt	15000iu	100ml	040ml	30fr,32fr
sever AS	AQ	AVR	new	17/01/2001	19years	Adult male	165cm	073,0kg	1,79m	04,3lt	28fr	01,5lt	15000iu	250ml	200ml	36/51fr
MS	AQ	MVR	new	28/01/2001	33years	Adult female	164cm	042,0kg	1,70m	03,4lt	24fr	01,5lt	15000lu	100ml	080ml	26fr,28fr
AR MS	AQ	AVR	new	30/01/2001	33years	Adult male	172cm	050,0kg	1,62m	03,9lt	24fr	01,5lt	15000lu	100ml	200ml	32fr,32fr
AR MS	AQ	DVR	new	04/02/2001	24years	Adult male	174cm	056,0kg	1,68m	04,0lt	26fr	01,5lt	07500lu	100ML	180ML	32fr,32fr
ASDMvprolaps	CHD	ASD	new	06/02/2001	25years	Adult female	147cm	056,0kg	1,48m	03,6lt	24fr	01,5lt	15000lu	100ml	180ml	26fr,28fr
AR	AQ	AVR	new	11/02/2001	17years	Adult male	154cm	045,0kg	1,38m	03,4lt	24fr	01,5lt	15000lu	100ml	180ml	36/51fr
MsAV disease	AQ	DVR	new	12/02/2001	59years	Adult female	155cm	070,0kg	1,68m	04,1lt	24fr	01,5lt	15000lu	100ml	180ml	28fr,28fr
SAM	CHD	SAM	new	15/02/2001	19years	Adult male	168cm	062,0kg	1,70m	04,0lt	24fr	01,5lt	15000lu	100ml	040ml	36/51fr
Rh.sMsMRTri	AQ	DVR	new	17/02/2001	37years	Adult male	174cm	067,5kg	1,80m	04,3lt	24fr	01,5lt	15000lu	100ml	180ml	28fr,30fr
AR MR	AQ	AVR	new	19/02/2001	37years	Adult male	160cm	057,0kg	1,69m	03,9lt	28fr	01,5lt	15000lu	100ml	140ml	36/51fr
MS	AQ	MVR	new	24/02/2001	35years	Adult female	162cm	048,5kg	1,50m	03,6lt	28fr	01,5lt	15000lu	100ml	100ml	32fr,32fr

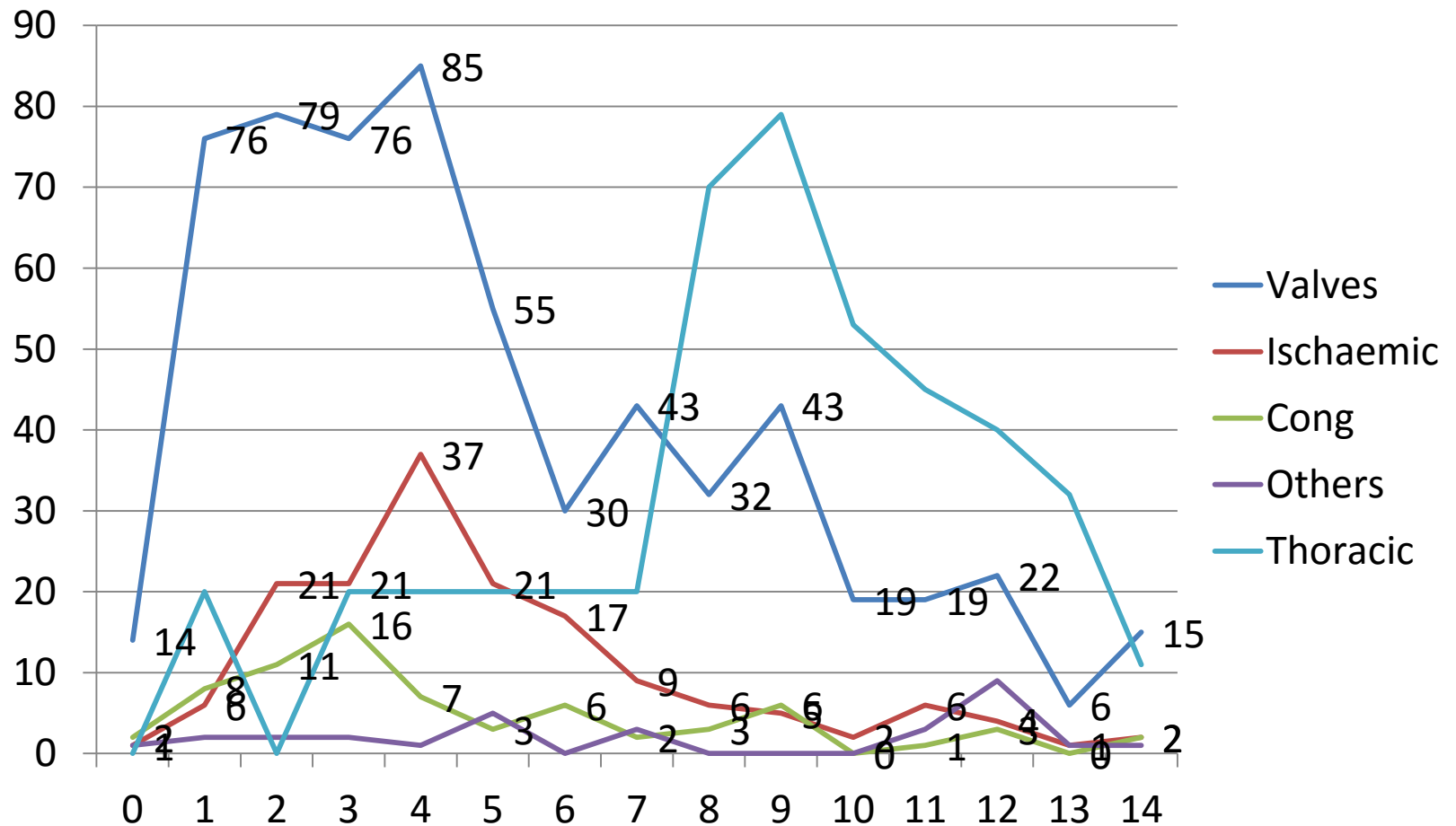
Record: 1 of 92

Datasheet View

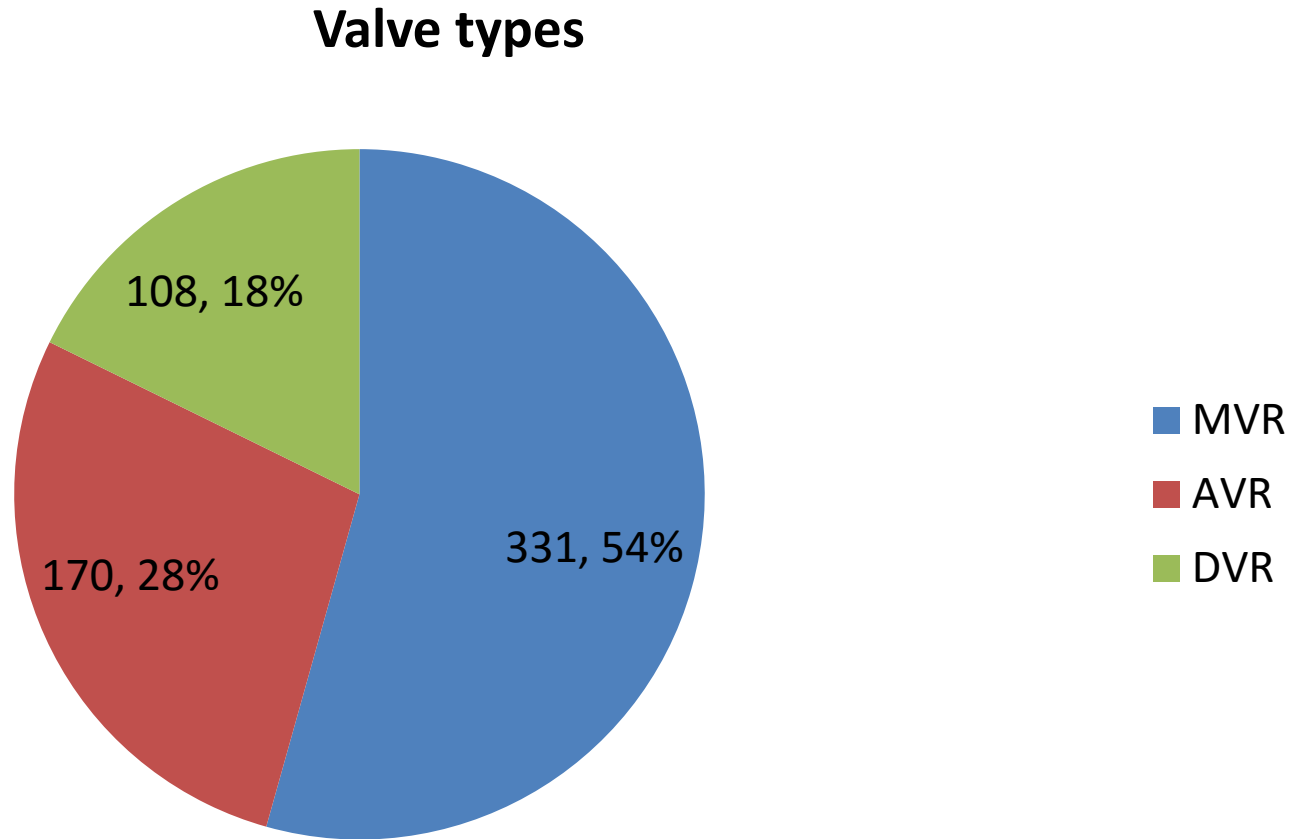
Operation types



Operations/year

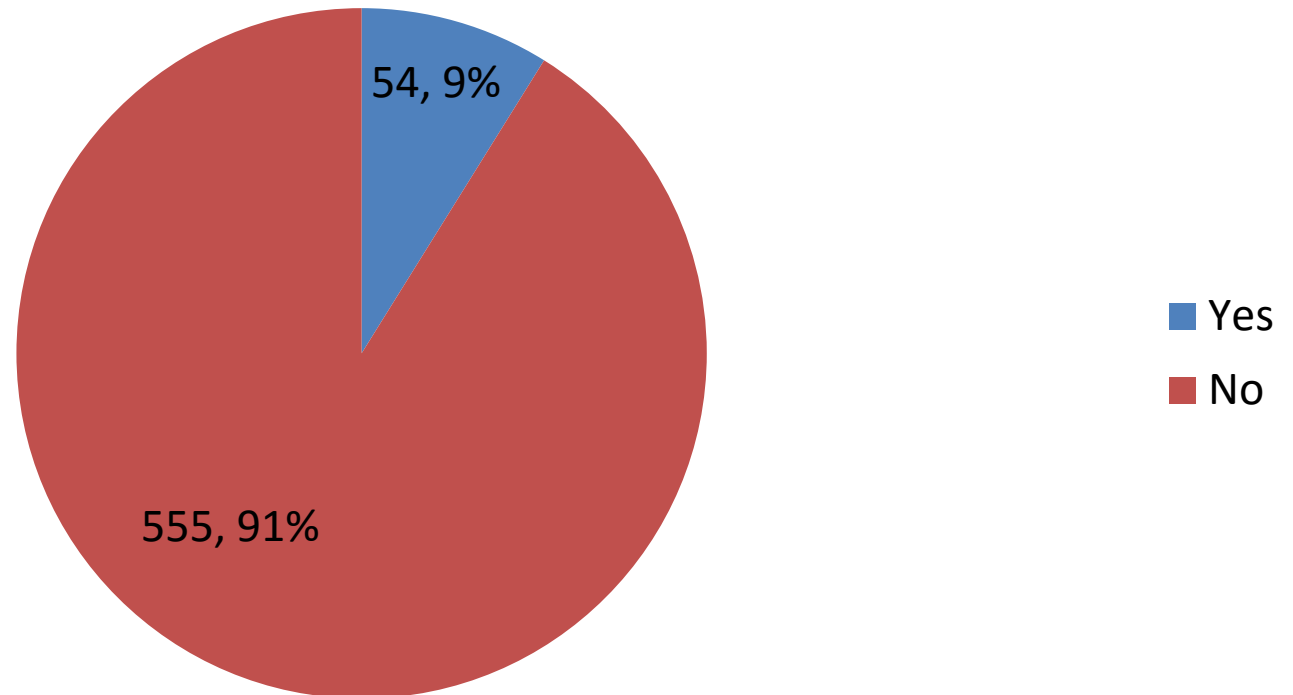


Valve operation types



Tricuspid

Valve types



- Mean age 26 (range 14 – 73)

Aortics older

- Females 63%
- 95% Rheumatic
- Mean BMI 17
- Mean BSA 1.59

Africa problems

Before surgery

- access to echocardiography
- access to a specialist preferably the same specialist, for regular follow up visits
- access to cardiothoracic and interventional cardiology

After surgery

- secondary prevention with penicillin prophylaxis
- Valve type
- adequate monitoring of anticoagulation therapy in patients with atrial fibrillation and/or mechanical prosthetic valves
- Endocarditis + access to oral healthcare
- Pregnancy

Other challenges to Africa cardiac surgery

- Latecomers
- Staff retention
- Cost
- Disposables availability
- Equipment maintenance



Pregnancy – pre & post

Team approach

- MR/AR/AS medical management
- MS MVA>1.6 medical management
 <1.6 or symptoms = PTMC (BSA+partum history)
- Pregnant with valve(heparin-warfarin-heparin)
 - ✓ All LMWH & Warfarin INR 2-3 expensive

Challenges to cardiac surgery

- Disposables
- Retention
- Lack of qualified personnel
- Equipment maintenance

Us + government

Us together

What to do by governments?

- Large tender for disposables
- Support for poorer patients = eg zakat,
- Public insurance
- Special bonuses for surgical staff (help in ICU care & PHC efforts)
- Sponsor trainees

Summary

- Being done but needs further refinement → a lot still to do
- Government support is mandatory but we have to prove it is worth it
- Training should be increased
 - More needed
 - Cross border collaborations

“The only true wisdom is knowing that you know nothing.”
Socrates

Innovation distinguishes between a leader and a follower.”
Steve Jobs

“Success is walking from failure to failure with no loss of enthusiasm.” **Winston Churchill**

“The more you lose yourself in something bigger than yourself, the more energy you will have.” **Norman Vincent Peale**