Surgery for chronic rheumatic valvular heart disease

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• Consultant Cardiothoracic Surgeon
  AlShaab Teaching Hospital
• Associate Professor of Surgery Alzaeim AlAzhari University
This presentation

• History (Sudan)
• The situation now
• Challenges in Africa
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.**
Fig. 7.—Incision of valve commissures by guillotine knife in mitral stenosis. Fig. 8 a and b.
Preparation of pedicle pericardial graft. Fig. 9 a and b.—Probe is inserted through left
ventricular wall and is guided by the intracardiac flap; 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 in 5, 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

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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 Jurisprudence

Courtesy of Prof ME Ahmed
Mr. A. A/Aziz - 1974 = 1000 cases

Rheumatism and the history of mitral valvotomy

by

Ahmed Abdel Aziz Yacoub MS FRCSE D MRCSED
Chief of Surgery, Ministry of Health, Sudan
Department of Thoracic Surgery, Khartoum Hospital
Sudan – 70s & 80s

• 1976 ; Animal experiments with Professor Imbabi
• Feb.1977 ; Visit of Mr.Christopher Lincoln (UK)
  *40 experimental CPBs : 11 goats - 29 sheep

  ✓ 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

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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

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Now - MR

**Indication**
Moderate / severe MR with

1. NYHA FC II-IV symptoms **OR**
2. Impaired LV EF <60 % **OR**
3. LVESD ≥ 40 mm in adults or enlarged LVSED 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 ≥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

Event-free survival
1 yr: 81%
5 yrs: 52%
10 yrs: 41%

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

S Ogendo, A ElSayed in press 2013

20/01/2013

SHS meeting Khartoum Jan 2013
## Distribution of facilities

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Estimated cardiac surgeons in Africa

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Approximately 402 cardiac surgeons

** Estimates

S Ogendo, A ElSayed in press 2013
Collective Effect Of Challenges Of Cardiac Surgery Services

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

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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
Operation types

- Valve: 609, 70%
- Congenital: 159, 18%
- IHD: 64, 8%
- Others: 37, 4%

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Operations/year

Valves
Ischaemic
Cong
Others
Thoracic

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Valve operation types

Valve types

- MVR: 331, 54%
- AVR: 170, 28%
- DVR: 108, 18%

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A ElSayed Sun City 2010
Tricuspid

Valve types

555, 91%

54, 9%

Yes

No
• 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

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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

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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

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“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**