History of Mitral Valve Surgery

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Disclosures

Adagio Medical, Inc – Laguna Hills, CA
  - Co-Founder, Board of Directors, Stockholder, Stipend

Atricure, Inc – Mason, Ohio
  - Consultant, Stockholder, Stipend

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Lucid Diagnostics – New York City, NY
  - Board of Directors

PotentiaMED, Inc – St. Louis, MO
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Early History of Mitral Valve Surgery

1920 - 1970

- **1920**
  - Closed Commissurotomy (Cutler)

- **1930**
  - Closed Commissurotomy (Harken, Bailey)

- **1940**
  - Cardiopulmonary Bypass (Gibbon)

- **1950**
  - Open Commissurotomy
  - MV Replacement (Starr)

- **1960**
  - MV Replacement (Starr)

- **1970**
  - MV Replacement (Starr)
Modern History of Mitral Valve Surgery
1970 - 2020

MV Repair
(Carpentier)
Mitral Valve Anatomy

Anterior leaflet

Posterior leaflet

Anterior commissure

Posterior commissure

A1

A2

A3

P1

P2

P3
Mitral regurgitation

Primary MR: primary valve disease
Secondary MR: primary myocardial disease

Degenerative
Functional

Bonow RO, Editor, *JAMA Cardiology*, 2016
Carpentier’s “Functional Classification”

Type I
Normal Leaflet Motion

Type II
Excess Leaflet Motion (Prolapse)

Type IIIa
Restricted Leaflet Motion (Opening)

Type IIIb
Restricted Leaflet Motion (Closing)

Carpentier A, Adams DH, Fiboufi F: Carpentier’s Reconstructive Valve Surgery, Saunders (Elsevier), 2010
Mitral Valve Repair

1. Leaflets
2. Chords
3. Annulus
Quadrangular Resection
Quadrangular Resection and Sliding Annuloplasty
Triangular Resection of Anterior Leaflet Prolapse
Alfieri Stitch
Chordal Shortening
Repair of anterior leaflet prolapse: Chordal transfer is superior to chordal shortening


*JTCVS*, 1996;112(2):287-292
Chordal Replacement
“Leipzig Loop”
Annular Rings

Rigid Carpentier PhysioRing

Flexible Duran Ring

Open, Flexible Cosgrove Ring
Modern History of Mitral Valve Surgery

1970: MV Repair (Carpentier)
1980: 
1990: Minimally Invasive MVR/r
2000: 
2010: 
2020: 
Minimally Invasive MV Surgery

Parasternal Approach

Mini-Sternotomy Approach
History of Mitral Valve Surgery

- 1970: MV Repair (Carpentier)
- 1980: Minimally Invasive MVR/r
- 2000: Thoracoscopic MV Repair
- 2010: Robotic MV Repair
- 2020:
Thoracoscopic Mitral Valve Surgery
Robotic MV Repair

Minimally Invasive Mitral Valve Repair
da Vinci Surgical System
Thoracoscopic MV Repair
Robotic MV Repair

History of Mitral Valve Surgery

1970
MV Repair (Carpentier)

1980

1990
Minimally Invasive MVR/r

2000
• Thoracoscopic MV Repair
• Robotic MV Repair

2010
Transcatheter MV Surgery

2020
More Minimally Invasive Approaches
Transcatheter Mitral Valve Repair

Surgical Alfieri Stitch

Transcatheter MitraFlex
Transcatheter Mitral Valve Repair

Surgical Alfieri Stitch

Transcatheter MitraClip
NeoChord Procedure
Harpoon Medical Procedure
Transcatheter MV Ring

Edwards Transcatheter Mitral Ring
Medtronic Intrepid Transcatheter Mitral Valve
100 Years of Mitral Valve Surgery

- 1920: Closed Commissurotomy (Cutler)
- 1940: Closed Commissurotomy (Harken, Bailey)
- 1960: MV Replacement (Starr)
- 1980: MV Repair (Carpentier)
- 2000: Minimally Invasive MV Surgery
- 2020: Thoracoscopic and Robotic MV Surgery
- Cardiopulmonary Bypass (Gibbon)
- MV Replacement (Starr)
Thank You!