Myxomatous Mitral Valve Repair: What are the Mechanisms of Failure?

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Background

- Reported 10-20% late MV repair failure rate

- Immediate failure of mitral repair may be reduced by greater attention to the mechanism of valve dysfunction and by changes in valvuloplasty technique.
  Late failure after mitral repair occurs predominantly due to progression of disease, particularly in patients with severe myxomatous or annular abnormalities that are prone to progress.
  Mechanisms of failure of mitral valve repair: An echocardiographic study AHJ, vol 122, Issue 1 Part 1, July 1991 P 149-156

- Most mitral valve repair failures are procedure-related in degenerative disease and valve-related in rheumatic disease
  Rupture of previously shortened chordae is a common cause of late failure in patients with degenerative mitral valve disease
  Reoperation for failure of mitral valve repair, JTCVS, vol 113, Issue 3, 1997, p 467-475

Objective

To identify the rate and the morphological mechanisms of mitral valve repair failure

Patients

- Prospective FU
- From 2004, 532 Patients, myxomatous disease
- Prospective FU 3-95 Months (Mean 28±24)

Failure rate 8% (44 patients):

- Recurrent, moderate or severe MR (55%)
- Reoperation on MV (45%)

Patients

	Failed	Successful	P Value
N	44	488	
Age	57±13	58±14	0.682
Male	36(82%)	368(75%)	0.461
EF (%)	58±10	60±8	0.338
Mean FC	2.2±0.9	2±0.8	0.150
FCI (Asymptomatic)	11(26%)	151(31%)	0.687
FC II-IV	33(74%)	337(69%)	
previous operation	2(5%)	19(4%)	0.689

Operative data

	Failed (n=44)	Successful (n=488)	P Value
Timing: Elective	32(72%)	415(85%)	
Not Elective	12(28%)	73(15%)	0.048
Con. Procedure:			
TVR/TVr	5(11%)	67(14%)	0.820
Maze	8 (18%)	76(16%)	0.666
CABG	6(14%)	68(14%)	1.000
AVR	2(5%)	24(5%)	1.000
Aorta	1(2%)	5(1%)	0.406
Mini Invasive	7(16%)	70(14%)	0.822

Operative technique

	Failed(n=44)	Successful (n=488)	P Value
Leaflet resection	19(43%)	213(44%)	1.000
Artificial chords	26(59%)	279(57%)	0.874
Edge-to-Edge	2(5%)	12(3%)	0.325
Annuloplasty	43(98%)	479(98%)	0.581
Open ring	19(43%)	147(30%)	0.089

Early clinical results

	Failed(n=44)	Successful (n=488)	P Value
Mortality	0(0%)	2(0.4%)	1.000
CVA	0(0%)	3(1%)	1.000
TIA	0(0%)	12(2%)	0.612
Low Cardiac Output	1(2%)	6(1%)	0.455
Renal F/Dialysis	4(9%)	12(2%)	0.036
Pacemaker	1(2%)	7(1%)	0.501
Length Of Stay	8±4	6±3	0.041

Late Results

	Failed(n=44)	Successful (n=486)	P Value
Clinical FU duration (m)	34±30	30±26	0.406
Echo FU duration (m)	29±27	24±24	0.229
Late death (all causes)	2(5%)	14(3%)	0.788
Mean FC:	1.7±0.9	1.4±0.7	0.039
FC I	22(49%)	330(68%)	0.061
FC II	14(31%)	102(21%)	
FC III	7(17%)	49(10%)	
FC IV	1(3%)	5(1%)	
EF (%)	56±10	56±8	0.908

Late clinical results

	Failed(n=44)	Successful (n=486)	P Value
CVA	0(0%)	9(2%)	0.603
TIA	3(7%)	33(7%)	1.000
Bleeding events (all)	2(5%)	12(2%)	0.304
CV events	5(11%)	52(11%)	0.803
Arrhythmia (AF,ablation,DCCV)	10(23%)	101(21%)	0.848
MI	1(2%)	0(0%)	0.085

Late Echo

	Failed (n=44)	Successful (n=486)	P Value
Mean MR	3.3±0.4	1.5±0.5	<0.001
MR grade 0/1	0(0%)	228(47%)	<0.001
MR grade 2	0(0%)	258(53%)	
MR grade 3	33(75%)	0(0%)	
MR grade 4	11(25%)	0(0%)	
Freedom from MR 2+	0(0%)	228(47%)	<0.001
Freedom from MR 3+	0(0%)	486(100%)	<0.001

Failure modes

Failed(n=44)

Recc.Prolapse/flail	23(52%)	
same segment	17(74%)	Elongated gortex
Other segment	6(26%)	
Technical problem	4(9%)	(suture dehiscense, artificial chordae rupture / rupture from papillary muscle)

Failure modes

	Failed(n=44)
Mal coaptation	1(2%)
SBE	3(7%)
SAM	1(2%)
Restriction	4(9%)
Other	8(19%)

Conclusions

- Late recurrent MR after MV repair is significant, and is caused by several mechanisms
- The majority of late failures are recurrent prolapse including of the repaired segment, some of them are due to true or relative elongation of artificial chords
- Artificial chords should not be used in patients with enlarged LV that is expected to positive remodel and normalize in size

THANK YOU !