

Case study

Percutaneous balloon mitral valvotomy and PCI of Left anterior descending artery done in same sitting

Abstract: In countries like India where rheumatic heart disease is still a common problem, with improvements in diagnosis and treatment, the lifespan of these patients is increased. With increase in the lifespan, these patients may develop coronary artery disease and present as acute coronary syndrome. In some cases especially RHD with severe MS, thrombus that develop in left atrium may embolize in one of the coronary arteries, leading to acute coronary syndrome. We report a case of 51 year old female who was a known case of rheumatic heart disease and now presented with acute coronary syndrome. Patient was hemodynamically unstable and underwent Percutaneous Balloon Mitral Valvotomy and Percutaneous coronary intervention in the same sitting. This is first of such intervention at our institute and also there are very few such records available online. Patient tolerated the procedure well with significant improvement.

Keywords: Percutaneous Balloon Mitral Valvotomy, Percutaneous Coronary Intervention, Severe Mitral Stenosis, Left Anterior Descending Artery Stenosis, Rheumatic Heart Disease.

Abbreviations: RHD: Rheumatic heart Disease; MS: Mitral stenosis; PCI; percutaneous coronary intervention; BMV: Balloon Mitral Valvotomy; ACS: Acute coronary Syndrome

Introduction: Rheumatic Heart disease remains one of the leading cardiac diseases in tropical developing countries like India. Around 25%–30% of all cardiac visits to hospitals are related to RHD¹. Patient with RHD can present with left ventricular (LV) dysfunction due to multiple causes including primary rheumatic myocarditis, secondary to LV remodelling due to altered hemodynamics in valvular pathology, cardio-embolic phenomenon involving coronaries, or co-existing coronary artery disease itself. Mitral Stenosis (MS) is most common valvular pathology in RHD. In countries like India where rheumatic heart disease is still a common problem, with improvements in diagnosis and treatment, the lifespan of these patients is increased. With increase in the lifespan, these patients may develop coronary artery disease and present as acute coronary syndrome. In some cases especially RHD with severe MS, thrombus that develop in left atrium may embolize in one of the coronary arteries, leading to acute coronary syndrome. Management of RHD patient with significant valve dysfunction and significant coronary artery disease, is primarily revascularisation of affected vessels by Coronary Artery Bypass Graft (CABG) Surgery and Valve replacement. In selected patients with pliable mitral valve and single vessel disease, percutaneous interventions are possible, like BMV and PCI. However, there are limited guidelines about management of overtly symptomatic patients with ACS in cases of RHD who may not tolerate major surgical intervention.

40 Case Report:

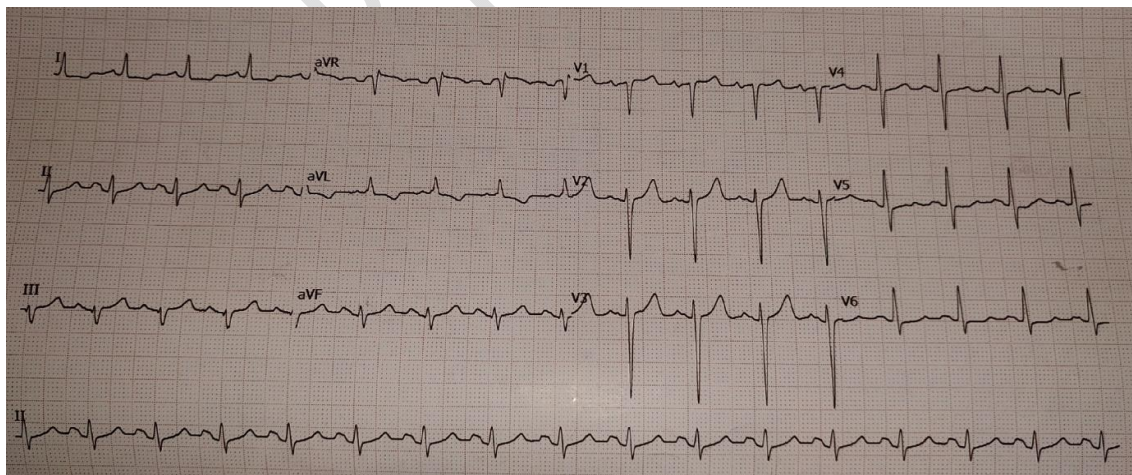
41 51 year old female, known case of RHD with MS, admitted in peripheral hospital with
42 multiple episodes of Paroxysmal Nocturnal Dyspnea (PND) in last 1 month. She developed
43 acute onset chest pain and NYHA class IV breathlessness on the same day. Patient was
44 transferred to our hospital in the night on oxygen support and inotropic support. On
45 admission- her pulse rate was 110/min, Blood Pressure was 100/80 mmHg on inotropes and
46 bilateral crepts were present on auscultation. Routine blood investigations were normal,
47 Arterial Blood Gas (ABG) showed hypoxia. Her Electrocardiogram (ECG) showed sinus
48 rhythm with poor r wave progression with ST segment downsloping depression in I avL V4
49 V5 V6 and T inversion in I avL (Fig 1). Old ECG obtained from the patient's previous
50 records showed normal progression of r wave with no significant ST T changes (Fig 2). 2D
51 Echocardiography showed Severe Mitral Stenosis (Mitral Valve Area (MVA) by Planimetry -
52 0.67 cm^2 , Wilkins score 7/16, MV gradient- 15/10 mmHg) (Fig 7) with Left Ventricular
53 Ejection Fraction (LVEF) 35%- basal, mid, distal, anteroseptal, anterior and anterolateral
54 segments hypokinetic (Fig 8). Troponin T was significantly raised (50ng/ml). Patient didn't
55 respond well to the medical management, so she was taken in cath lab for percutaneous
56 balloon mitral valvotomy (PBMV) and urgent coronary angiography (CAG). Right femoral
57 venous and arterial access obtained. Pulmonary artery pressure was 54/20 mmHg, aortic
58 pressure was 138/80 mmHg, PCWP was 23 mmHg (mean) and LV-edp was 12 mmHg (Fig
59 6). Gradient across mitral valve was 11 (Fig 6). CAG showed LAD (Left Anterior
60 Descending) artery mid segment thrombotic 90% stenosis (Fig 3). In view of the general
61 condition of the patient, BMV was planned first, because PCI requires injectable heparin as
62 anticoagulation and transeptal puncture is usually done without giving any anticoagulation.
63 ACCURA balloon No.26 was used and inflation of 26 mm was given for 1 sec (Fig 5). Post
64 balloon dilatation gradient reduced to 2 mmHg and the MVA improved to 1.54 cm^2 (Fig 9).
65 Patient was taken up for PCI to LAD. Then LAD was stented with Drug Eluting Stent (DES)
66 $2.75 \times 24 \text{ mm}$ after predilatation. Stent was post dilated with NC balloon $2.75 \times 13 \text{ mm}$. Post
67 stenting check shoot showed TIMI III flow with no residual lesion (Fig 4). Patient tolerated
68 procedure well. Patient was shifted to post operative monitoring and care. Post procedure
69 patient improved clinically. Over next few days she was off oxygen support and inotropes
70 were tapered. Gradually she became ambulatory without symptoms during routine activities.
71 Patient was discharged after 5 days of procedure. Patient is asymptomatic on subsequent
72 follow ups.

73 Discussion:

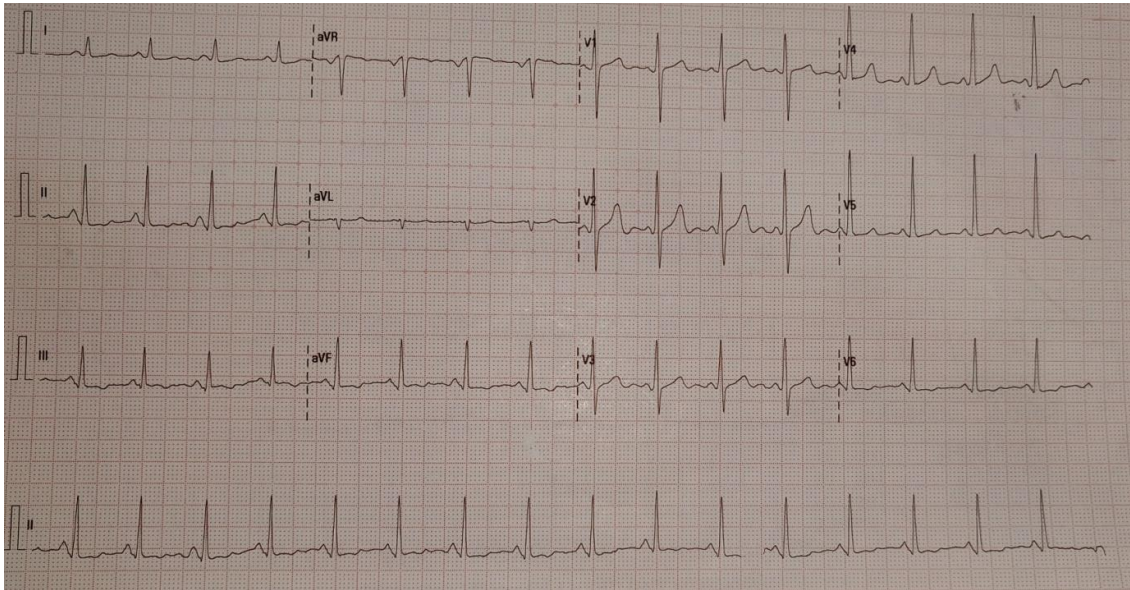
74 In countries like India, patients with RHD are commonly found to have CAD, more often, if
75 presentation is in late middle age or in elderly age group. There is limited data of incidence of
76 primary coronary artery disease in patients of RHD. In study by Jose et al², the overall
77 prevalence of CAD in RHD patients undergoing valve surgery was 12.2%. In another study,
78 done by Dinesh et al³ showed that 9.05% of RHD patients (above 40 years of age) have
79 significant CAD. The Left Anterior Descending (LAD) artery is the most common vessel
80 involved. Acute coronary syndrome in RHD patients can be secondary to cardioembolic
81 phenomenon involving coronaries or due to atherosclerotic disease involving native vessels.

Acute coronary syndrome secondary to thrombo-embolic phenomenon was reported in studies by Radhakrishnan et al⁴, Niniek Purwaningtyas et al⁵, Cardoz J et al⁶. Ideally transesophageal echocardiography should be done to rule out thrombus in left atrial appendage even if the patient is in sinus rhythm. Differentiating these two etiologies, denovo thrombosis or thromboembolic phenomenon, needs intravascular imaging with IVUS (Intravascular Ultrasound) or OCT (Optical Coherence Tomography), either of which was not done in our patient due to hemodynamic instability and financial constraints. There are limited available records of patients undergoing PCI and BMV in the same setting. Patients undergoing PCI needs to be heparinised and loaded with dual antiplatelets and in setting of BMV where septal puncture carries inherent risk of pericardial effusion and cardiac tamponade this surgery carries high risk to the patient. Most of the patients with coexisting CAD and RHD are referred for valve replacement with CABG. However, sometimes patients may not be stable enough or willing for major operative intervention. In our patients we first started with BMV as mitral valve was pliable and there was no significant Mitral regurgitation.. Patient was heparinised after septal puncture and after echo confirmation of no pericardial effusion. Patient was loaded on table with Clopidogrel chewed and kept sublingually, although she was on dual antiplatelets for her ischemic event before procedure as well. The overall procedure was done with due care under fluoroscopic guidance and patient stood procedure well. Similar report of BMV and PCI done in same sitting done by Paul G J et al⁷ was also safe. Paul G J et al⁷ also initiated with BMV and later PCI was done. With our experience and limited available online records it is understood that patients with ACS and RHD can undergo both transluminal valvular and coronary intervention in the same sitting with acceptable safety under adequate caution and care.

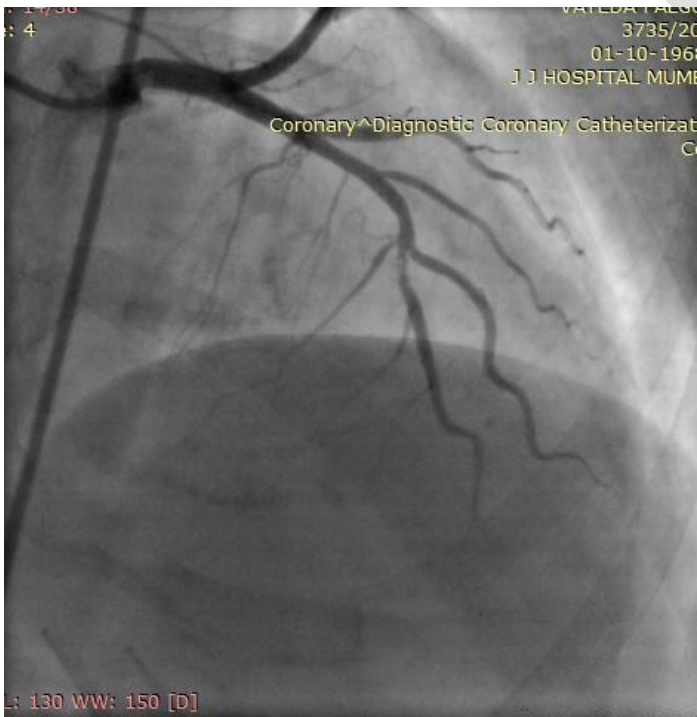
Figure 1: ECG at the time of presentation. Showing T inversion in I avL, ST sagging in lateral leads, Poor R wave progression.



111 Figure 2: ECG from old records of patient. No significant ST-T changes and Sinus Rhythm.

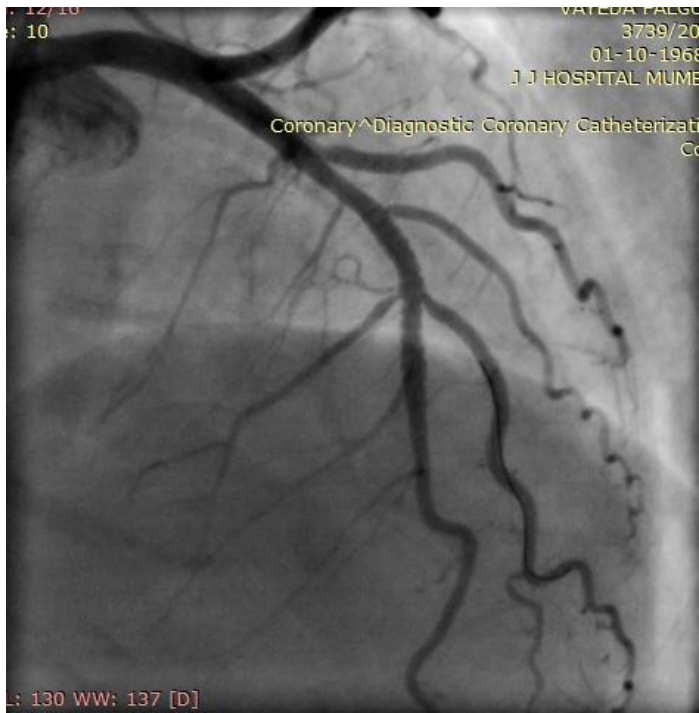


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113 Figure 3: CAG showing LAD mid thrombotic lesion causing significant stenosis.



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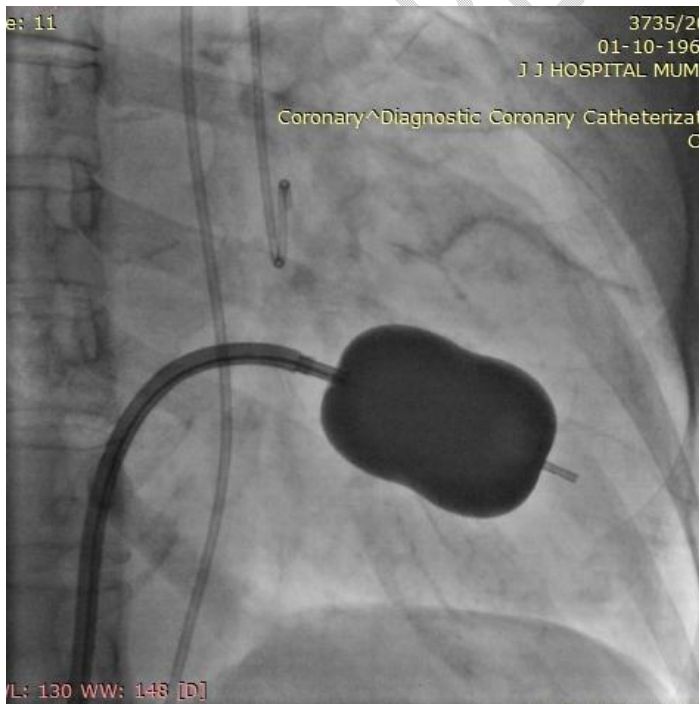
119 Figure 4: CAG post PCI with Drug eluting stent in Mid AD. Good Result. TIMI III flow



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122 Figure 5: Balloon inflation with ACCURA Balloon No. 26 placed across mitral valve and its
123 inflation



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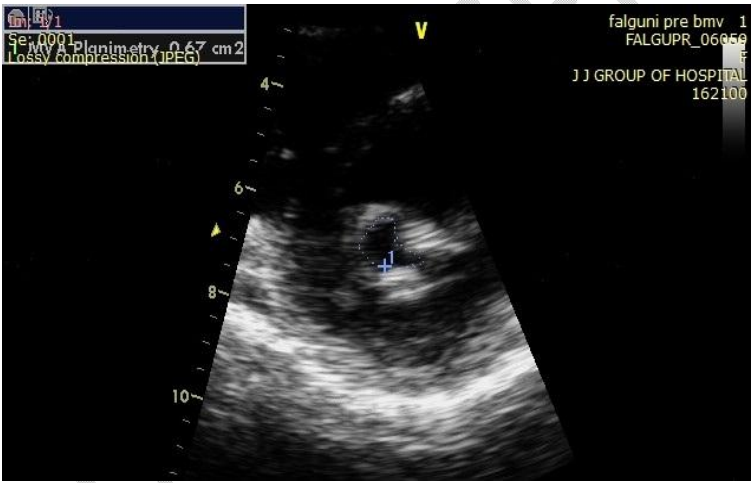
126 Figure 6: Pressure tracing. Blue represent LV pressures and Red represents PCWP (LA
127 pressure).



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130 Figure 7: ECHO image showing pre BMV MVA of 0.67 cm²



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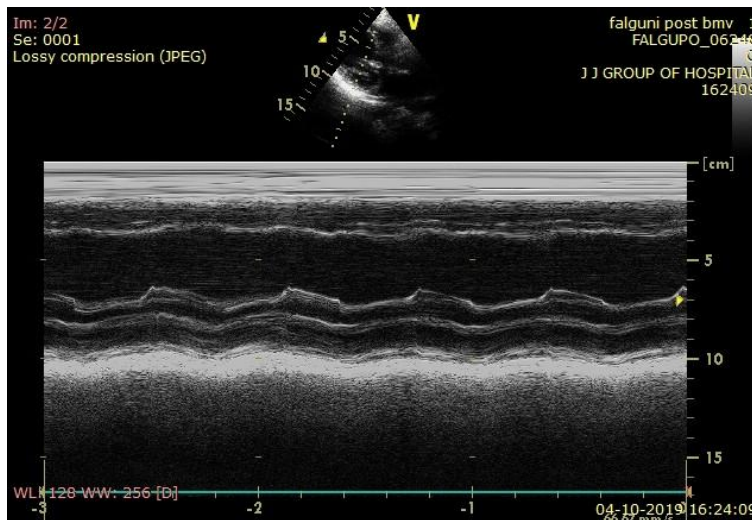
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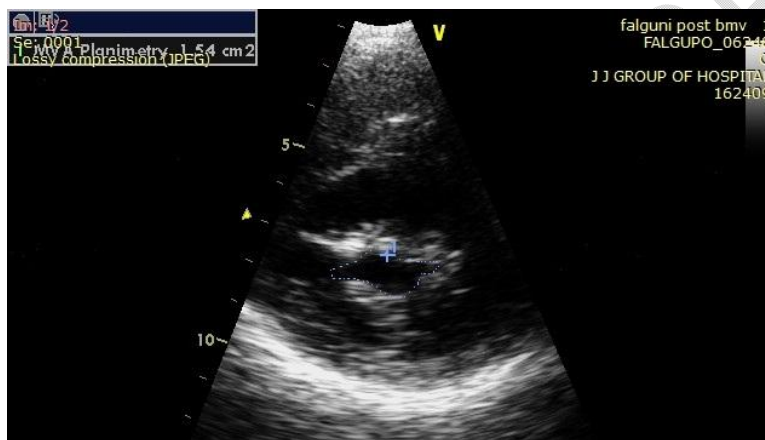
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138 Figure 8: M mode Echo Image showing Anterior wall hypokinesia



140 Figure 9: ECHO image showing post BMV MVA of 1.54 cm²



142 Conclusion:

143 In selected patients with pliable mitral valve and single vessel disease presenting with ACS
144 who are hemodynamically unstable, percutaneous intervention with BMV and PCI may be
145 done to stabilize the patient hemodynamically and symptomatically.

147 References:

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