



Case Report

Percutaneous transvenous mitral commissurotomy in a patient with fixed flexion deformity of hip

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Abstract

Percutaneous transvenous mitral commissurotomy is indicated in severe rheumatic mitral stenosis with pliable leaflets and suitable morphology. Valvuloplasty via conventional transfemoral approach is difficult in patients with orthopaedic abnormalities including kyphoscoliosis, hip or knee deformities. Here we describe the case of a 45-year-old gentleman with a fixed flexion deformity of the right hip joint and knock knees who presented to us with symptomatic severe mitral stenosis. The initial attempt at valvuloplasty was aborted suspecting an inadvertent iatrogenic femoral arteriovenous fistula. Anticipating difficulties, during the next attempt, successful arterial and venous accesses were obtained with ultrasound guidance. Successful trans-septal puncture and balloon mitral valvuloplasty without complications were performed. (Indian J Cardiol 2022;25 (3-4):59-62)

Introduction

Acute subclavian artery thrombosis in the young age Rheumatic heart disease (RHD) continues to be a cardiovascular malady in developing countries¹. Mitral stenosis is the most prevalent form of RHD and percutaneous transvenous mitral commissurotomy (PTMC) remains the standard of care for anatomically pliable valves². Despite being a common interventional procedure performed in developing countries, it becomes technically challenging in patients with distorted vertebrae or in the presence of bony abnormalities including kyphoscoliosis, knock knees and fixed flexion deformity of hip. Difficulties arise secondary to impediments during vascular access, during transeptal puncture or in delivery of the balloon

across the mitral valve. Here we report the procedural difficulties encountered during transfemoral PTMC in a patient who had both fixed flexion deformity of the hip and knock knees.

Case report

A 45-year-old man presented with chief complaints of breathlessness on exertion progressively worsening over past 3 years from NYHA class II to NYHA class III and easy fatigability which had worsened in the preceding 2 years. On examination, he had a loud first heart sound and an apical mid diastolic murmur. On focused orthopaedic examination, he had a fixed flexion deformity of the hip joint with right anterior superior iliac spine (ASIS) placed superior in comparison to posterior superior iliac spine and total restriction of movement of hip

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Fig. 1 : Supine image of the patient's hip and knee joint showing medial rotation at hip joint; higher ASIS and inguinal crease on right side compared to left.



Fig. 2 : Lateral view highlighting the fixed flexion deformity at hip joint

joints (Fig 1, 2). There was also medial rotation of right hip joint with genuvalgum more prominent on the right knee. Significant muscle wasting was noticed in both lower limbs. Xray imaging revealed squaring of pelvis with narrowing of joint space at the hip and sclerosed femoral head (Fig 3). X ray also revealed mild scoliosis at the thoracic level.

Electrocardiogram showed left atrial(LA) enlargement, right ventricular hypertrophy with strain pattern. Echocardiography revealed severe mitral stenosis with valve area of 0.7cm^2 , mean gradient of 17mm Hg across the mitral valve. Mitral regurgitation was absent and Wilkins score of 6 suggested suitability for PTMC.

After obtaining informed consent from the patient, PTMC under conventional femoral access was planned. Arterial and venous accesses were obtained with difficulty after multiple attempts. Post trans-septal puncture, after placing the coiled wire in the LA, while attempting to exchange the 8 French dilator (Abbott vascular) with the 14 French dilator to dilate the groin puncture and septal puncture, we noticed torrential pulsatile bleeding from the venipuncture site. Considering the possibility of an inadvertent iatrogenic arterio-venous(AV) fistula, the procedure was deferred, sheaths removed, and adequate manual compression over the puncture site was provided. Later, ultrasound examination showed no evidence of AV fistula in the right groin.

The patient was again explained about the risks and benefits of PTMC and the specific problems in

his case. The option of surgical valve replacement in the context of the technical difficulties anticipated with PTMC were briefed; still the patient opted for PTMC. The re-do procedure was scheduled after a month.

Anticipating difficulties in transfemoral puncture, ultrasound guided vascular puncture was performed. Arterial and venous accesses were obtained and sheaths were secured successfully. The fluoroscopic image of the femoral head(Fig 4) revealed that the usual



Fig. 3 : Panel A- X-ray postero-anterior view of hip joint illustrating squaring of pelvis with right pelvic bone higher than left, loss of joint space on both sides Panel B- Illustrates knock knees on the right side.

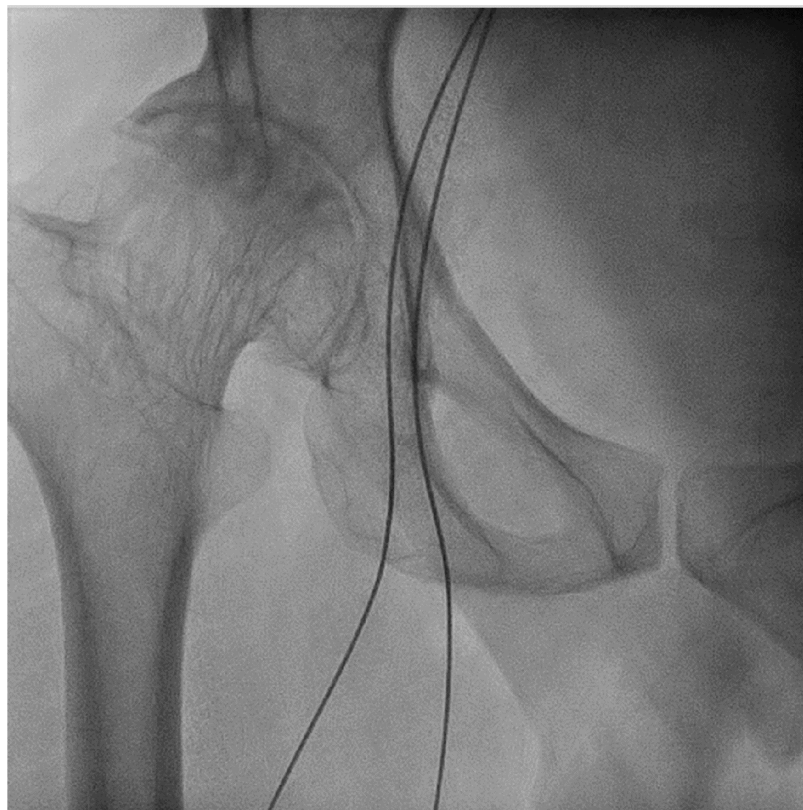


Fig. 4 : Fluoroscopy image after successful arterial and venous puncture demonstrating usual landmarks were of no help in guiding vascular access in this patient

fluoroscopic landmarks were of no help in guiding vascular access in this case owing to the patient's distorted anatomy. After marking the non-coronary sinus of the aorta with a 5 French pig-tail catheter, successful transeptal puncture was done using Brockenbrough needle and 8-French Mullin's dilator (Abbott vascular) assembly. Successful PTMC was done with a 24mm Accura mitral valvuloplasty balloon (Vascular concepts, UK). Post procedure echocardiography showed reduction in trans-mitral gradient to 6mm Hg and valve area increased to 1.2cm². Mean LA pressure decreased from 19 to 9mm hg. There was no pericardial effusion or mitral regurgitation.

Discussion

Orthopaedic anatomic abnormalities can be a major impediment to successful transfemoral access. As highlighted in our case, instead of a conventional arterial and venous puncture use of ultrasound for guidance of access can be crucial. Ultrasound not only reduces the incidence of vascular complications but also reduces the time spent in securing a successful access³. Though difficult transeptal puncture was anticipated due to possible difficulty in non-engagement of needle against the septum considering the distorted bony anatomy, there was no difficulty in our patient.

A literature review revealed only few case reports of PTMC in patients with orthopaedic abnormalities and all reported patients were with severe kyphoscoliosis⁴⁻⁵. We could not find reports on PTMC in patients with hip and knee deformity. Trans-jugular approach in comparison to trans-femoral needs a much shorter distance from the puncture site to the interatrial septum. It would have been an ideal option for our patient as it would have circumvented the

need for a difficult femoral puncture. It is also an ideal option in patients with scoliosis. Lack of technical expertise and non-availability of appropriate hardware⁶ deterred us from choosing this option. Trans-arterial and transhepatic access are alternate options in patients with difficult transfemoral access. Usage of ultrasound guided vascular access averted the need for other approaches in our patient.

Conclusion

Anticipation of difficulties in patients with anatomic impediments such as deformity of hip or knee joint and familiarity with imaging guided vascular puncture can help the operator perform a successful PTMC in the presence of orthopaedic impediments.

References

1. Carapetis JR. Rheumatic Heart Disease in Developing Countries. *N Engl J Med.* 2007 Aug 2;357(5):439-4
2. Manjunath CN, Srinivas P, Ravindranath KS, Dhanalakshmi C. Incidence and patterns of valvular heart disease in a tertiary care high-volume cardiac center: A single center experience. *Indian Heart J.* 2014 May;66(3):320-6.
3. Sorrentino S, Nguyen P, Salerno N, Polimeni A, Sabatino J, Makris A, et al. Standard Versus Ultrasound-Guided Cannulation of the Femoral Artery in Patients Undergoing Invasive Procedures: A Meta-Analysis of Randomized Controlled Trials. *J Clin Med.* 2020 Mar;9(3):677.
4. Ramasamy D, Zambahari R, Fu M, Yeh KH, Hung JS. Percutaneous transvenous mitral commissurotomy in patients with severe kyphoscoliosis. *Cathet Cardiovasc Diagn.* 1993 Sep;30(1):40-4.
5. Joseph G, Varghese MJ, George OK. Transjugular balloon mitral valvotomy in a patient with severe kyphoscoliosis. *Indian Heart J.* 2016 Sep;68(Suppl 2):S11-4.
6. Joseph G, George OK, Mandalay A, Sathe S. Transjugular approach to balloon mitral valvuloplasty helps overcome impediments caused by anatomical alterations. *Catheter Cardiovasc Interv.* 2002;57(3):353-62.