Failed Percutaneous Mitral Commisurotomy due to congenital anomaly of inferior vena cava
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Abstract
Since its inception in 1982, percutaneous transvenous mitral commissurotomy (PTMC) has gained increasingly wide use internationally in patients with Rheumatic Mitral stenosis. PTMC offers an alternative to surgery in patients who have pliable mitral valve. Very few reasons were reported to abort the procedure when patient lies on the table. This study presents two case reports in which congenital venous anomalies were one of the reasons to terminate the procedure.

Keywords: Percutaneous transvenous mitral commissurotomy, Rheumatic mitral stenosis, Pliable mitral valve.

Introduction
Percutaneous mitral commissurotomy (PTMC) has been approved as a standard treatment in patients with severe rheumatic mitral stenosis with suitable valve score.\textsuperscript{1,2} The procedure is technically successful in over 90% patients, and the long-term durability of commissurotomy is excellent in those with pliable mitral valve leaflets and minimally deformed submitral apparatus. The results are comparable to surgical commissurotomy in relieving the obstructed valve and maintaining a favourable outcome.\textsuperscript{2-7} Majority of cases undergo the procedure successfully using traditional transfemoral approach. However, in some rare cases, venous drainage abnormalities or cardiac anatomic disorientation may cause impediments to successful completion of the procedure. Recently, we came across cases which lead to termination of the procedure due to a congenital anomaly of IVC. This study describes two cases of the rarest form of IVC anomaly associated with a valvular lesion.

Case Report-1:
A 25-year-old pregnant woman, G1P1+0, without any known co morbid was admitted with complaints of progressive shortness of breath (New York Heart Association functional class II-III) for last two months. Cardiovascular examination revealed sinus rhythm, a loud 1st heart sound, and a mid-diastolic rumbling murmur at the apex. On series of investigation, the patient was diagnosed as having acquired rheumatic mitral stenosis. Echocardiography showed an enlarged left atrium and mitral stenosis with a valve area of 1 cm\textsuperscript{2}. There was associated tricuspid regurgitation with moderate pulmonary artery hypertension with an estimated mean pulmonary artery pressure of 70mm Hg. Chest radiography indicated mild cardiomegaly. Initially she was treated conservatively with diuretics, digitalis, and penicillin prophylaxis for endocarditis and later scheduled for balloon mitral valvuloplasty. After premedication with intravenous alprazolam 1 mg, the procedure was performed under subcutaneous local anaesthetic infiltration with lidocaine, and monitored by electrocardiogram, O2 saturation by spirometry, and invasive blood pressure recordings via the right femoral artery. The right femoral vein was punctured, but the guidewire did not pass through. A radiopaque dye injected through the cannula showed a narrow and tortuous course of the right IVC. Dye injected at this level and at the femoral level, it was seen to travel to the RA bilaterally on both sides of the spine. The procedure was abandoned, and the patient was advised to have a computed tomography (CT) venogram followed by open mitral commissurotomy.

Case Report-2:
A 21 years old male was admitted in NICVD with history of palpitation and shortness of breath on exertion for two years. On clinical examination, he had features consistent with Mitral stenosis. Echocardiographic evaluation showed that he had' Severe Mitral stenosis with moderate Pulmonary Hypertension'. Wilkins score was six. We...
decided to treat the patient with PTMC. PTMC via traditional femoral approach was scheduled. Cannulation of right femoral vein disclosed an incidental finding of anomalous venous drainage (Figure-1).

Discussion
The embryogenesis of the IVC is a complex process involving the formation of several anastomoses between three paired embryonic veins. The result is numerous variations in the basic venous plan of the abdomen and pelvis. Briefly, the normal IVC is composed of 4 segments: hepatic, suprarenal, renal, and infrarenal. The hepatic segment is derived from the vitelline vein. The right subcardinal vein develops into the suprarenal segment by subcardinal-hepatic anastomoses. The renal segment develops from right supra-subcardinal and post-subcardinal anastomoses. In the thoracic region, the supracardinal veins give rise to the azygos and hemiazygos veins. Progressive changes in the abdomen lead to replacement of the postcardinal veins by the subcardinal and supracardinal veins. In the pelvic region, the postcardinal veins persist as the common iliac veins. This complex process of IVC formation results in several variations in systemic venous return. In few cases there is an absence of the hepatic segment of the IVC along with the liver; below this level, the IVC and left renal vein were draining into the dilated collateral paravertebral veins and the hepatic veins were draining into an enlarged suprahepatic segment of the IVC. Dilated collateral paravertebral veins were draining into the dilated azygos vein that joins the SVC at the normal location. Absence of the hepatic segment of the IVC with azygos continuation has also been called the azygos continuation of the IVC. The prevalence of this entity was reported as 0.6%. However in our patients interrupted IVC was joined with both side collateral paravertebral veins at the level of the renal veins and the collateral paravertebral veins were draining into the azygos vein (Figure-2). The association of such anomalies with a symptomatic disorder leads to incidental diagnosis, as in these cases.

Radiological diagnosis by CT has led to early recognition of such anomalies, which has been helpful in early treatment. Although vascular structures can usually be readily identified on contrast-enhanced CT scans, identification of unusual venous arrangements may be difficult in those cases in which intravenous contrast material is contraindicated. Among such patients, MR imaging may be used to distinguish aberrant vessels from masses by demonstrating flow voids or flow-related enhancement. A working knowledge of IVC and renal vein anomalies is essential to avoid diagnostic pitfalls.

Limitations:
Non-invasive procedures as CT scan could not be
performed on both cases due to financial constraints.

References


