Aortico-left ventricular tunnel- A rare case report

SARAVANA BABU S
Department of Cardiology,
MADRAS MEDICAL COLLEGE AND GOVERNMENT GENERAL HOSPITAL

Abstract:
Aortico-Left Ventricular Tunnel (ALVT) is a tunnel connecting between the aorta and the left ventricle. It causes blood to flow through it in the diastolic period, causing aortic regurgitation. Large percentage of patients presented with congestive heart failure and almost half of them were asymptomatic. ALVT is a rare cause of aortic regurgitation, incidence ranging from 0.1 to 0.46. We report a case of ALVT who presented to our department.

Keyword: Aortico left ventricular tunnel, Aortic regurgitation, cardiac failure

Introduction:
Aorto-ventricular tunnel is a congenital, extracardiac channel which connects the ascending aorta above the sinotubular junction to the cavity of the left, or (less commonly) right ventricle. There may be associated defects of the proximal coronary arteries or the aortic or pulmonary valves. Occasional patients present with an asymptomatic heart murmur and cardiac enlargement, but most suffer from heart failure in the first year of life. The etiology of aorto-ventricular tunnel is uncertain. It appears to result from a combination of maldevelopment of the cushions which give rise to the pulmonary and aortic roots, and abnormal separation of these structures. Its incidence is also uncertain, estimates ranging from 0.46% of fetal cardiac malformation to less than 0.1% of congenitally malformed hearts in clinic-pathological series. Optimal management of aorto-ventricular tunnel consists of diagnosis by echocardiography supplemented with cardiac catheterization as needed to elucidate coronary arterial origins or associated defects, and prompt surgical repair.

Case report:
A 40-year-old male referred to our department for the evaluation of breathlessness, palpitation on exertion and fever for 1 month duration. Breathlessness was present for 1 month duration of class III severity. His palpitation was present during mild exertion and relieved by rest. His fever was low grade intermittent not associated with chills and rigors. He was not a known case of Diabetes Mellitus, Hypertension, Coronary Artery Disease and Chronic Obstructive Pulmonary Disease.
His clinical evaluation revealed a thin built middle aged male, dyspnoeic on mild exertion, no pallor, no cyanosis and no pedal edema. His pulse rate was 120/min with peripheral signs of aortic run off present. His cardiovascular examination revealed normal first and second heart sounds, Holo Diastolic Murmur of grade 3/6 in 2nd Aortic Area and grade 3/6 Ejection systolic murmur in Aortic area. With this clinical background a provisional diagnosis of severe Aortic Regurgitation was made and patient was subjected to investigations such as ECG, Blood Culture and ECHO. ECG revealed Sinus Tachycardia with volume overload pattern of LV enlargement and also features of LA enlargement (Fig 1). Trans Thoracic Echocardiogram showed Bicuspid Aortic Valve and a tunnel communicating between Right coronary Sinus of aortic valve and Left Ventricle with Severe Aortic Regurgitation and moderate LV dysfunction with no evidence of vegetation (Fig 2). TransEsophageal Echocardiography confirmed the diagnosis (Fig 3). CT angiogram confirmed the communication between the Right coronary sinus and Left ventricle (Fig 4). Blood Culture for Infective Endocarditis was negative. So patient was diagnosed to have Congenital Aortico Left ventricular tunnel and referred for surgery to cardiothoracic department.

Discussion:
The embryological basis for ALVT remains unknown. Speculation has included an anomalous coronary artery, possibly the conal vessel, opening in the LV (1) and rupture of a sinus of Valsalva aneurysm. Other theories included an anterior aortic wall abnormality with communication into the LV, defective incorporation of the distal end of the bulbus cordis, and persistence of embryonic crests of the fifth aortic arch. Aortico–left ventricular tunnel is extremely rare (0.001% patients with congenital heart disease. A male predominance, often early presentation with CHF, and a significant incidence of associated cardiac defects is noted. Aortico–left ventricular tunnel can be diagnosed by transthoracic, transesophageal, and fetal (3) echocardiography and by magnetic resonance imaging. A significant amount of “aortic regurgitation” in infants should raise the possibility of this lesion (4). In the apical four-chamber view, the tunnel and valvar AR jets may be superimposed. Clinical findings, regurgitant jet width, LV dilation, and retrograde flow in the descending aorta are useful in assessing the severity of tunnel regurgitation. Transesophageal echocardiography is helpful during surgery and interventional catheterization. Surgical closure has been recommended at the time of diagnosis, including asymptomatic patients (5), due to inadequacy of medical management (5) risk of developing severe AR in patients repaired later, and satisfactory surgical results in neonates and infants. Surgical closure techniques have included combinations of suture or patch closure of the aortic orifice of the ALVT, obliteration of the tunnel, and occlusion of the ventricular orifice, all with comparable long-term survival. There has been concern about possible AoV leaflet distortion after direct suture closure of the aortic orifice compared with patch closure. Some investigators have favored patch closure in neonates and infants and those with a larger aortic orifice, to avoid valvular distortion. Aortic regurgitation may be secondary to turbulence-related damage to the leaflets or progressive aneurysmal dilation of the aortic root in patients surgically repaired at an older age, lack of support of the right aortic sinus, concomitant congenital AoV abnormalities, or iatrogenic surgical distortion.
of the valve. Successful percutaneous closure of an ALVT has been reported.

**Conclusion:**
Aortico Left ventricular tunnel is a rare Congenital Malformation. Other differential diagnosis such as infective endocarditis should be ruled out. We report this case due to its rarity.

**References:**


