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Pulmonary Artery Stenosis Disease: Current Trends

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Short Communication

Stenotic pulmonary artery lesions can be congenital or acquired. Different etiologies might damage the pulmonary arteries at different levels, unilaterally or bilaterally. The clinical setting, age at which the patient presents, and the precipitating incident may all provide insight into the underlying cause. The diagnosis is critical since these lesions can have hemodynamic and clinical implications. Multi-detector computed tomography angiography allows for a comprehensive assessment of the pulmonary arterial wall, intra- or extra luminal involvement, associated cardiac or extra cardiac anomalies, effects secondary to pulmonary stenosis on the cardiac chambers, and associated causative or resultant lung parenchymal changes [1].

In the context of normal cardiac anatomy and physiology, pulmonary arteries (PA) are the vessels that transport deoxygenated blood to the lungs. The major pulmonary artery (MPA) originates from the right ventricular outflow tract (RVOT) and divides into two branches: the right pulmonary artery (RPA) and the left pulmonary artery (LPA), each of which enters the lungs via the respective lung hila. Valves arise when cavities form inside the endocardial cushions, with the core portion forming the leaflets and the peripheral portion forming the sinus wall [2]. The truncus arteriosus gives rise to the MPA and the aorta, which are divided by fibroadipose tissue. The infundibulum of the pulmonary valve is formed by the muscular endocardial cushion along the inferior face of the valve, whereas the infundibulum of the aortic valve regresses and creates a tissue that separates it from the sub pulmonary infundibulum. The branches of the pulmonary artery arborize and serve distinct parts of the lungs within the lung parenchyma. To compensate for flow across the blockage, RV hypertrophy ensues. The hypertrophied RV can function in rest and stress without a considerable increase in end-diastolic pressure; nevertheless, in the presence of severe blockage, there is an increase in end-diastolic pressure and impaired right ventricular compliance.

In reaction to RV strain, the right atrium (RA) dilates as well. When there has been a protracted period of severe obstruction, the RV becomes non-compliant and dilates. This causes tricuspid annulus dilation and tricuspid regurgitation, which leads to even more pronounced RA dilation and right-sided cardiac failure. The first imaging modality used to diagnose cardio-pulmonary illness and lung pathology is chest radiography. A chest radiograph may reveal isolated or diffuse pulmonary oligemia, RA/RV enlargement, or a contour bulge as a result of post-stenotic dilatation [3]. However, because it is a two-dimensional modality, it does not provide reliable information about the lesions' morphology. MDCT angiography provides excellent details of the valve morphology and stenotic segments of P As and their branches. Owing to its high spatial and temporal resolution, MDCT angiography provides accurate information of the stenotic lesions at any level. Knowledge of the pulmonary valve morphology plays an important role in surgical planning for pulmonary stenosis [4]. CT pulmonary angiography using the bolus tracking technique is used to evaluate the pulmonary valve and pulmonary stenosis while keeping the monitoring region of interest in the MPA. The scan is taken from the caudo-cranial direction, so it can be obtained before the left-sided heart fills up.

The dysplastic valve is a rare variation in which three leaflets are present but there is no commissural union. With pulmonary valvular ring hypoplasia, the valve leaflets thicken and become redundant. Valve leaflets indicate primitive gelatinous material generating myxomatous replacement on histological examination. Sub-valvular stenosis is caused by a thicker infundibulum, which results in infundibular stenosis. TOF, atrial septal defect, ventricular septal defect, valvular pulmonary stenosis, and double outlet right ventricle are all linked to infundibular stenosis. Isolated infundibular stenosis is a somewhat uncommon condition.

Pulmonary artery stenosis can be caused by a variety of factors, and it can affect both children and adults. Because of the clinical and hemodynamic implications, it is critical to identify these lesions. To arrive at a precise diagnosis, a high level of clinical suspicion along with excellent imaging examination is required.

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