

Cardiac Interventions for Pulmonary Stenosis Options and Outcomes

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DESCRIPTION

Pulmonary Stenosis (PS) is a congenital heart defect characterized by the narrowing of the pulmonary valve, which restricts blood flow from the right ventricle to the pulmonary arteries. This condition can lead to increased pressure in the right side of the heart, reduced blood flow to the lungs and potential heart failure if left untreated. Fortunately, advancements in medical interventions have improved the management of pulmonary stenosis, offering several treatment options. This article explains the various cardiac interventions for pulmonary stenosis, focusing on treatment options and their outcomes.

The severity of pulmonary stenosis is determined by the pressure gradient across the pulmonary valve, which can range from mild to severe. Mild cases may not require immediate treatment, while moderate to severe cases can lead to significant symptoms, including shortness of breath, fatigue, chest pain and cyanosis (bluish skin due to low oxygen levels). Several cardiac interventions are available for the treatment of pulmonary stenosis, depending on the severity of the condition and the location of the stenosis. The primary goal of these interventions is to relieve the obstruction, improve blood flow to the lungs and normalize right ventricular pressure. Balloon valvuloplasty is the most common and widely accepted treatment for valvular pulmonary stenosis, especially in infants and young children. This minimally invasive procedure involves inserting a catheter with a deflated balloon at its tip into a blood vessel, usually through the femoral vein. The catheter is guided to the pulmonary valve and once in place, the balloon is inflated to stretch the valve and widen the narrowed opening. Balloon valvuloplasty is a catheter-based procedure, which reduces the need for open-heart surgery. Since the procedure does not involve major surgery, patients often recover quickly, with shorter hospital stays and faster return to normal activities. This procedure is particularly effective in treating children with moderate to severe pulmonary stenosis, often providing long-term relief.

Surgical pulmonary valvotomy is an open-heart surgical procedure typically reserved for patients with severe pulmonary

stenosis who are not candidates for balloon valvuloplasty or have complex anatomy that precludes a catheter-based approach. During the procedure, the surgeon makes an incision in the chest, opens the right ventricle and manually relieves the obstruction by cutting or removing the thickened valve leaflets. In some cases, additional repairs or valve replacements may be necessary if the valve is severely damaged. In cases where the pulmonary valve is severely damaged or malformed, valve replacement may be necessary. Pulmonary valve replacement can be performed surgically or *via* a minimally invasive transcatheter approach (known as transcatheter pulmonary valve replacement, or TPVR). The procedure involves removing the diseased valve and replacing it with a bioprosthetic or mechanical valve. In some cases, pulmonary stenosis occurs outside of the valve, either below it (subvalvular) or above it (supravalvular). These cases may require more complex interventions, often involving catheter-based approaches such as stent placement to keep the narrowed area open. Stents are small, expandable tubes that are inserted into the narrowed vessel or valve area to improve blood flow. Long-term management of pulmonary stenosis involves regular follow-up with a cardiologist to monitor for any complications or recurrence of the stenosis. Patients may require additional interventions later in life, especially if they underwent balloon valvuloplasty as a child. In cases of valve replacement, patients need ongoing monitoring to assess the condition of their bioprosthetic or mechanical valve.

CONCLUSION

Pulmonary stenosis is a treatable condition with a range of effective cardiac interventions available. From minimally invasive balloon valvuloplasty to open-heart surgery and valve replacement, the treatment approach depends on the severity and location of the stenosis, as well as the patient's age and overall health. Advances in catheter-based techniques, such as stenting and transcatheter valve replacement, continue to improve outcomes for patients with pulmonary stenosis, offering long-term relief from symptoms and a better quality of life. Regular follow-up and management are essential to ensure optimal outcomes and address any potential complications.

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Received: 01-Oct-2024, Manuscript No. JCEC-24-34672; **Editor assigned:** 03-Oct-2024, PreQC No. JCEC-24-34672 (PQ); **Reviewed:** 17-Oct-2024, QC No. JCEC-24-34672; **Revised:** 24-Oct-2024, Manuscript No. JCEC-24-34672 (R); **Published:** 31-Oct-2024, DOI:10.35248/2155-9880.24.15.917

Citation: Mendal G (2024). Cardiac Interventions for Pulmonary Stenosis Options and Outcomes. J Clin Exp Cardiol. 15:917.

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