

7 Pulmonary Stenosis

Pulmonary stenosis can occur at one or more sites from the proximal right ventricular outflow tract to the peripheral pulmonary arteries. Valvar obstruction and peripheral pulmonary stenosis are usually treated by closed balloon angioplasty; however, surgical repair is performed in many patients, especially those in whom operation is carried out for associated anomalies.

Narrowing of the main pulmonary artery and/or the proximal right and left branches is most commonly associated with tetralogy of Fallot and will be discussed in Chapter 9.

7-1. Valvular Pulmonary Stenosis

Pulmonary valvotomy is performed using cardiopulmonary bypass, including left ventricular venting and aortic cross-clamping; although in unusual circumstances, as in very small neonates, it is most expeditious to avoid the use of a left ventricular vent. In these cases, care must be taken not to allow air from the opened right heart to enter the left heart through an intracardiac communication as a patent foramen ovale. Aortic clamping may also be optional but its use helps in reducing blood flow from the coronary sinus into the right ventricle and the operative field. An alternative method to reduce blood flow into the operative field when not using aortic cross-clamping is the use of a single right atrial cannula that drains coronary sinus as well as caval return. In this instance, the tricuspid valve must remain competent during bypass or otherwise excessive air will enter the venous return line to the pump.

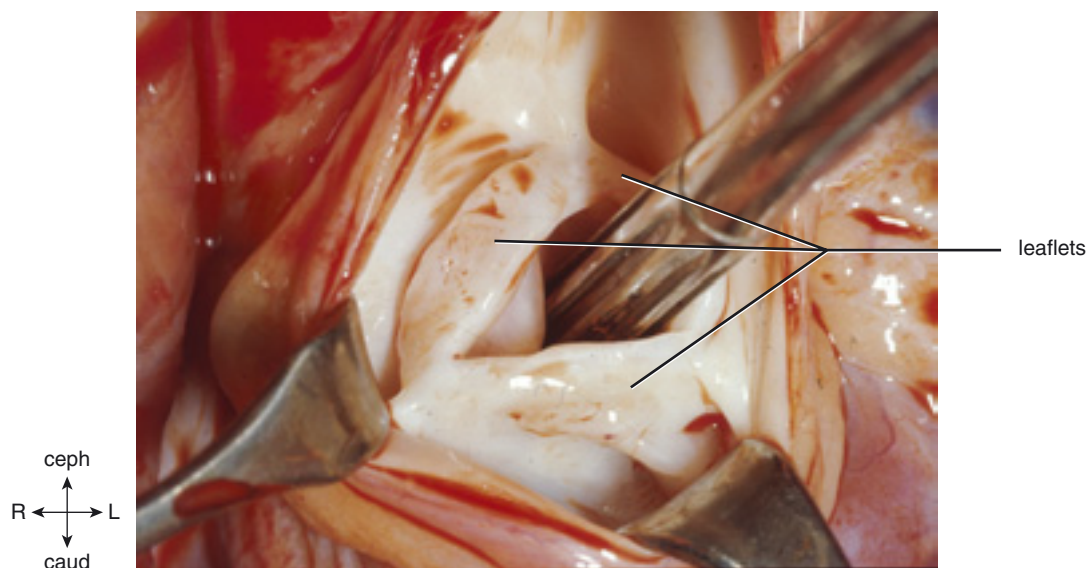


FIGURE 7-1. After the cardiopulmonary bypass is established, the proximal main pulmonary artery is opened transversely or longitudinally. Three commissures of the trileaflet pulmonary valve are stenotic, and there is mild thickening of the leaflets.

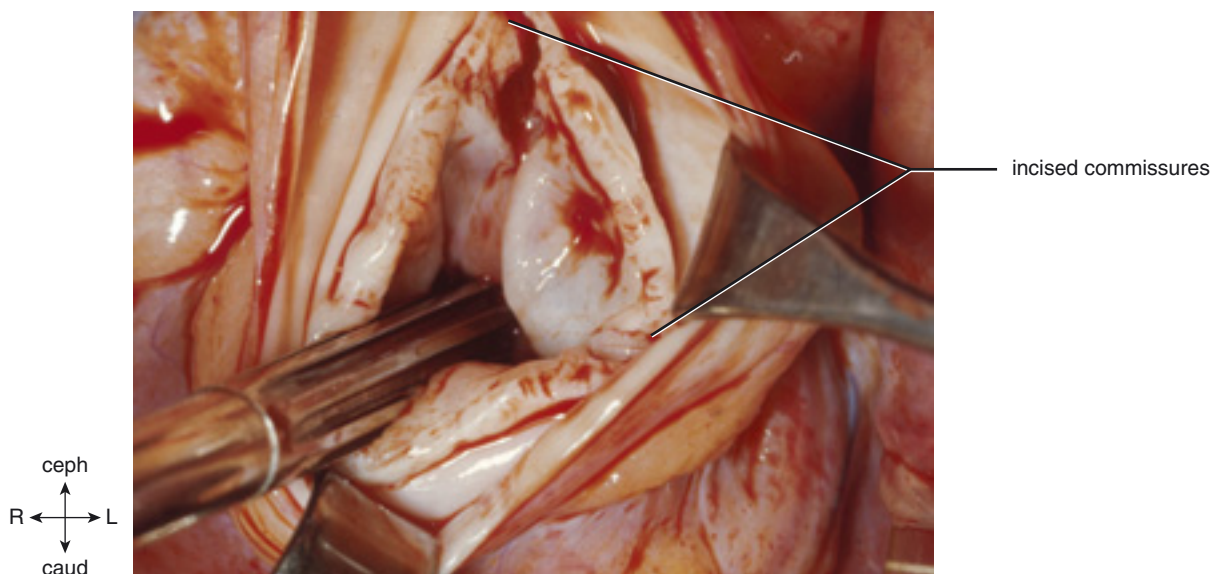


FIGURE 7-2. All commissures are incised to the annulus.

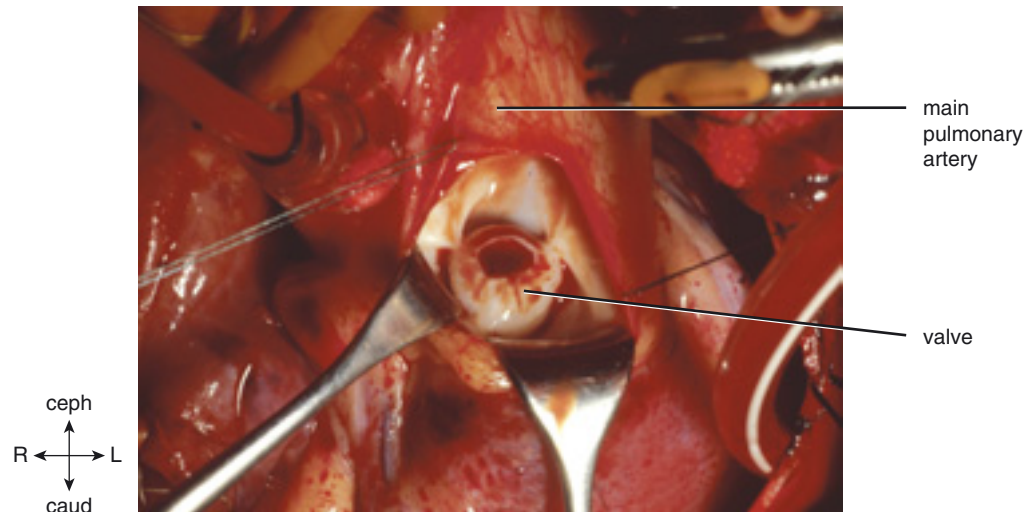


FIGURE 7-3. In this patient, after cardiopulmonary bypass is established, a proximal main pulmonary arteriotomy is made. There are three leaflets with stenotic commissures, and the valve is dysplastic. All leaflets are fibrous with limited mobility. Incising the stenotic commissures alone will not relieve the obstruction, because the leaflets are bulky and will not adequately move out of the stream of blood during systole. Part or all of the leaflets will be resected to avoid residual obstruction.

7-2. Infundibular Stenosis and Double Chamber Right Ventricle

Repair is performed with cardiopulmonary bypass, aortic clamping, cardioplegic arrest, and profound local cardiac cooling.

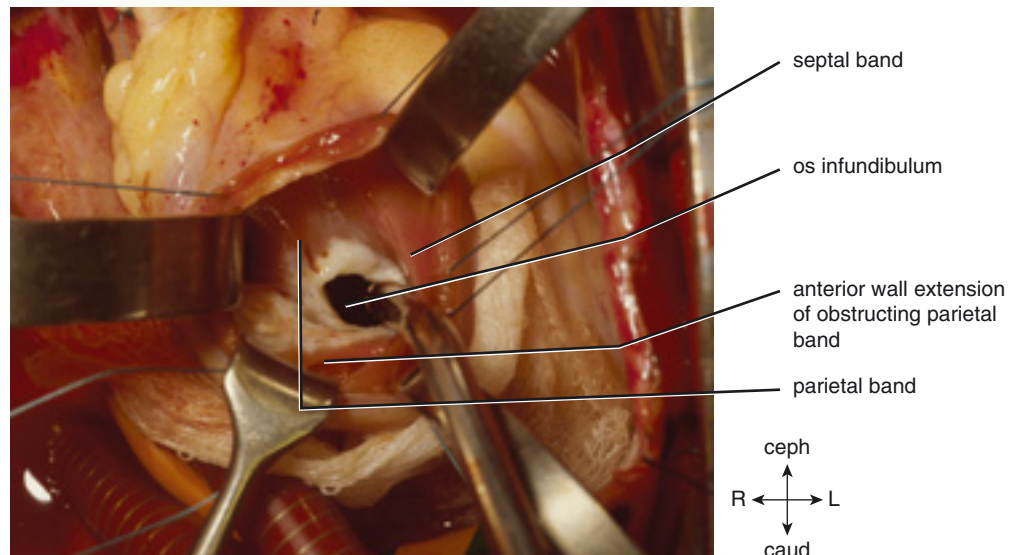


FIGURE 7-4. After the child is placed on cardiopulmonary bypass, a high right ventriculotomy is made. Obstruction at the os infundibulum is identified. There are large muscle ridges in the region of the parietal and septal bands extending to the anterior wall of the right ventricle. Fibrous tissue surrounds the os.

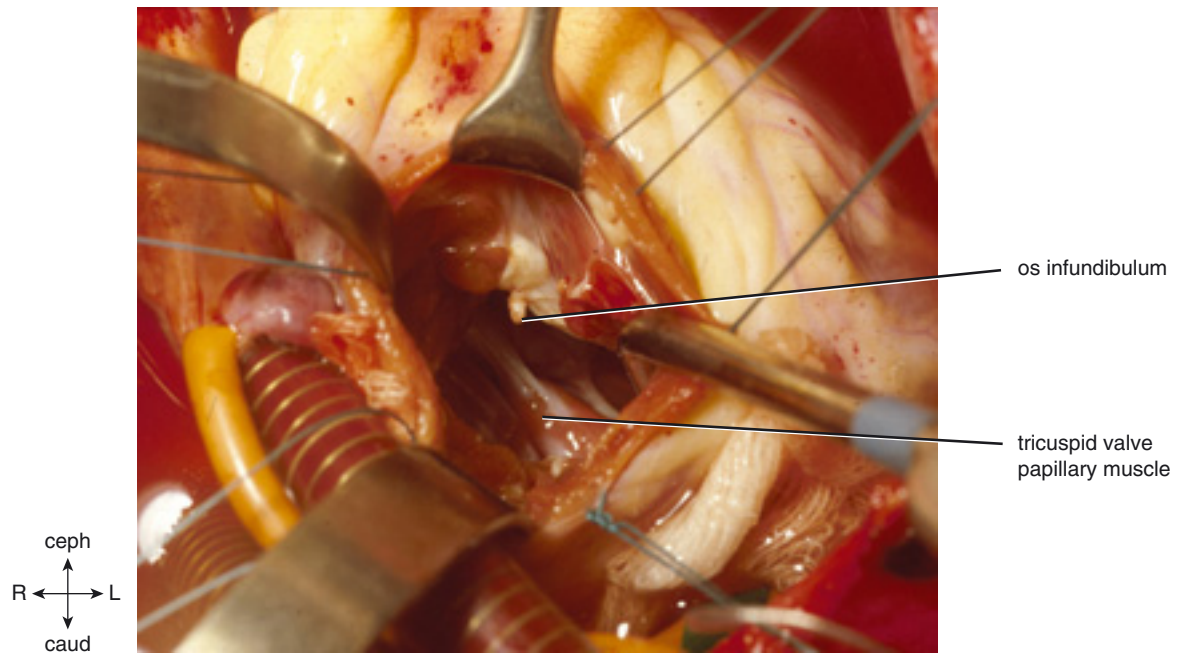


FIGURE 7-5. Obstructing muscle and fibrous tissue has been resected, and the tricuspid apparatus below this area is seen.

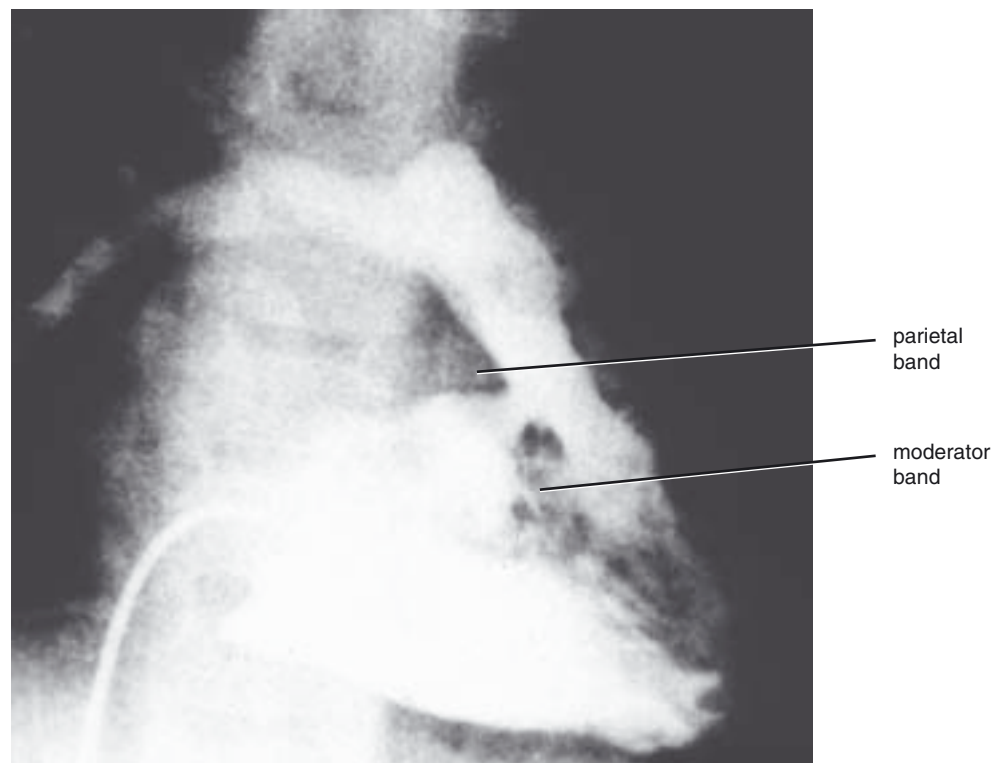


FIGURE 7-6. Double-chambered right ventricle is a form of infundibular pulmonary stenosis caused by muscle obstruction that is primarily in the area of the moderator band, as seen on this ventriculogram.

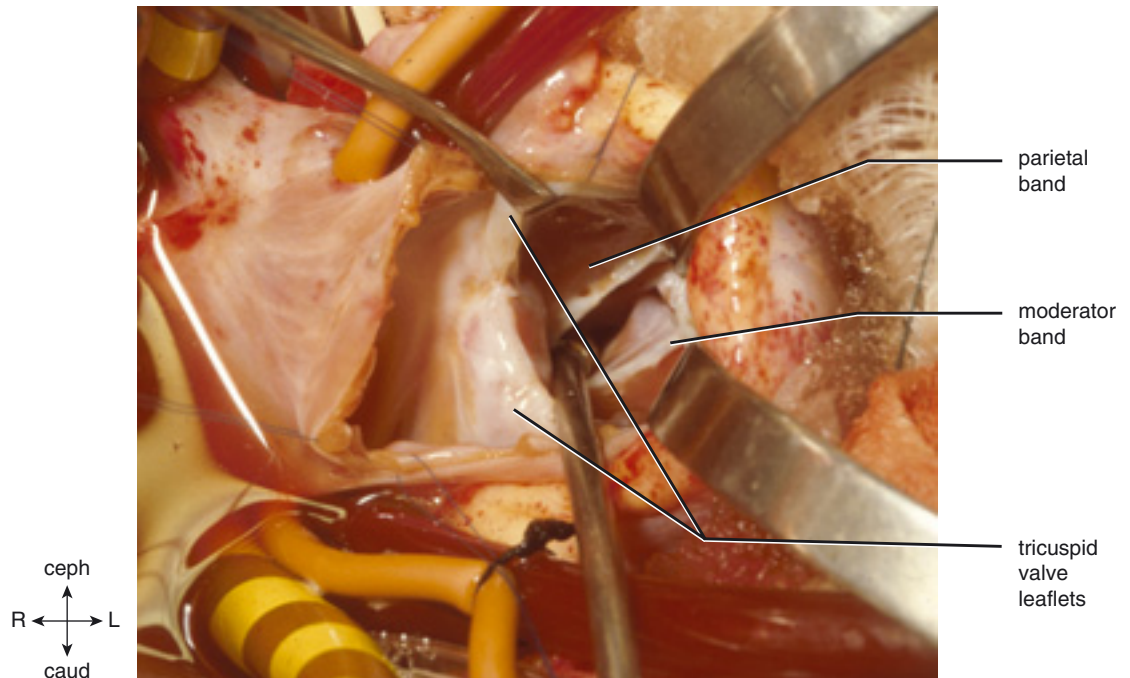


FIGURE 7-7. In this patient with double chamber right ventricle the exposure is through a right atriotomy while the tricuspid valve is retracted. The hypertrophied moderator band forms the major blockage, although an obstructing parietal band is also seen.



FIGURE 7-8. An associated membranous ventricular septal defect (VSD) is located medial to the parietal band.

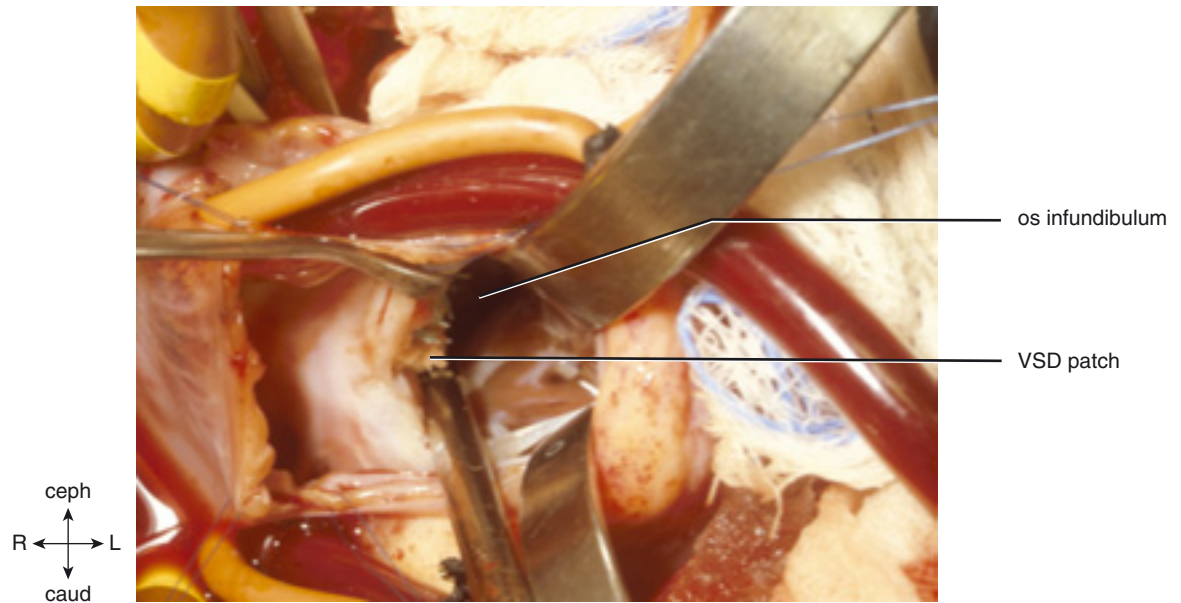


FIGURE 7-9. The parietal and moderator bands are resected, and the os infundibulum is now open. The VSD is closed with multiple interrupted mattress sutures and a Dacron® patch.



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