Communications between the ascending aorta and pulmonary artery constitute a spectrum of malformations which is collectively designated “aortopulmonary window,” “aortic septal defect,” or “aorticopulmonary window.” The communication is distal to the aortic and pulmonary valvar leaflets, but may be found in any position where the great vessels are contiguous, from the sinus of Valsalva to the origin of the brachiocephalic vessels.

Aortopulmonary windows have been subclassified into Type I (proximal defects between the left lateral wall of the ascending aorta and the pulmonary trunk), Type II (defects involving the right pulmonary artery and its origin – also called distal defects), and Type III (a large defect combining the other two types). It is probably more useful to view them as a continuum of pathology. The proximal communications tend to be very large and round or oval-shaped, while smaller, more rare and distal lesions may join the posterior aorta to the anterior right pulmonary artery, similar to a Waterston anastomosis. As suggested by the name “window,” there is usually no length to the communicating channel. The origin of the right pulmonary artery from the aorta is sometimes considered to be an example of the most extreme type of aortopulmonary window. Either the right or (less commonly) the left coronary artery may arise on the pulmonary side of the window. About half of the cases of aortopulmonary window occur as isolated lesions, while the other half has associated major or minor cardiac malformations. These include interrupted aortic arch, tetralogy of Fallot, persistently patent arterial duct, and ventricular septal defect.

Surgical repair of aortopulmonary window is done virtually always as an open heart procedure with cardiopulmonary bypass or, in small infants, with low flow or profound hypothermia and total circulatory arrest. A patch of Dacron or other material is used to close the defect, taking care to leave the orifices of the coronary arteries in continuity with the aorta. Associated malformations are generally repaired at the same time.
3.1 Aortopulmonary window. The external appearances of a large proximal defect are seen from the front.

3.2 The aorta has been opened in the case above to show the large aortopulmonary window just above the orifice of the left coronary artery. The orifice of the right coronary artery lies close to the window, although this is not immediately apparent in the photograph. The origins of the right and left branch pulmonary arteries are seen through the window.
3.3 Repair of the aortopulmonary window may be done through an incision in the aorta (1), through the window itself (2) with a sandwich technique, or through an incision in the pulmonary artery (3). Cannulation must be sufficiently distal on the lateral side of the aorta (A) or transverse aortic arch (B) to permit safe application of a clamp above the window; the branch pulmonary arteries are temporarily occluded to maintain a perfusion pressure and prevent flooding of the lungs on bypass.

3.4 Exposure through an aortic incision allows visualization of the coronary arterial orifices, both of which must be identified with certainty. A patch of either prosthetic material or composite prosthetic material/pericardium is then inserted with a continuous monofilament suture. Sutures near the coronary orifice are placed accurately, with the patch at a distance for good visualization.

3.5 The patch is lowered down when the suture line has cleared the coronary arterial orifices. It may be carried into the pulmonary artery when a coronary artery lies on that side of the window. Alternatively, a flap of vessel wall may be used to tunnel the aorta to the coronary artery. As the suture line approaches the origin of the right pulmonary artery (star), it is deviated into the aorta to avoid any narrowing of that vessel.

3.6 The aortotomy is closed, working from proximal to distal end, so that the aortic leaflets and coronary arterial orifices may be visualized at the bottom of the suture line.
Suggested Reading


Ho SY, Gerlis LM, Anderson C, Devine WA, Smith A. The morphology of aortopulmonary windows in regard to their classification and morphogenesis. Cardiol Young 1994;4:146.


A Practical Atlas of Congenital Heart Disease
Smith, A.; McKay, R.
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