THE RIGHT VENTRICLE
REDUNDANT OR INDESPENSIBLE?

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In the fetal circulation, both right ventricle and left ventricle work in parallel: the left ventricle pumps the oxygenated umbilical vein blood to the cerebral and coronary circulation, while the right ventricle pumps the less oxygenated blood into the rest of the body.

Following birth, the systemic vascular resistance increases, while the pulmonary vascular resistance decreases with a subsequent functional closure of the foramen ovale and ductus arteriosus. Thus, the role of the right ventricle changes from pumping blood into the high systemic vascular resistance into the low pulmonary vascular resistance.

It is the congenital single ventricle associated with tricuspid atresia and the utilization of direct cavo-pulmonary shunt (bilateral Glenn or Fontan procedures) that raised the question “is the right ventricle redundant?”. However, following bypassing the right ventricle by the cavo-pulmonary shunt, many conditions must be ensured such as low pulmonary vascular resistance, high venous pressure, spontaneous breathing and sinus rhythm. This confirms that the function of the right ventricle is indispensable as a volume pump of the whole cardiac output into the low resistance pulmonary circulation.

The pulmonary vascular resistance is essentially the afterload of the right ventricle, and hence a significant increase of the PVR can result in right ventricular dilatation and septal shift.

The increase of PVR with the subsequent pulmonary hypertension can be classified as:

A. Primary pulmonary hypertension
B. Secondary pulmonary hypertension secondary to:
   1. Cardiac diseases such as mitral valve disease, left ventricular failure and L-R shunt resulting in Eisenmenger syndrome
   2. Pulmonary diseases
   3. Pulmonary embolus
   4. Other causes such as anaphylactic reactions and thoracic trauma

Management of RV failure and/or pulmonary hypertension can be summarized as follows:

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