

Significance of Premature Restriction or Closure of Foramen Ovale in the Fetus

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Aims: To review the frequency and consequences of restrictive foramen ovale (RFO) in foetuses with and without structural heart disease.

Methods: 10 year review of 2324 foetuses that were referred for cardiac screening to the University Hospital of Wales.

Results: Premature restriction or closure of foramen ovale was encountered in 35 fetuses, of which 25 had isolated restrictive foramen ovale (IRFO) and right ventricular dilatation but the remaining 10 foetuses had associated congenital heart defects (CHDs). In fetuses with CHDs there were four with hypoplastic left heart syndrome, two with critical aortic stenosis, two with transposition of the great arteries, one with congenitally corrected transposition, and one with pulmonary atresia and intact ventricular septum. Two fetuses died in utero, three died after surgery, and four fetuses are alive after surgery. In fetuses with normal hearts, dilated right heart structures, redundant-aneurysmal primum atrial septum, and posterior angulation of the ductus arteriosus were the most consistent and striking features. A small aortic isthmus mimicking coarctation of the aorta, relatively small left ventricular cavity imitating hypoplastic left heart, partial obstruction of left ventricular inflow, and premature atrial contractions were other additional findings. One fetus who was born prematurely at 26 weeks died after birth, two foetuses had to be delivered early at 37 weeks of gestation due to severe restriction of mitral inflow but remaining 22 fetuses were delivered at term (mean 38.68+/-0.46 weeks). Appearance of redundant-aneurysmal atrial septum, and right heart dilatation both resolved rapidly in all newborns with no significant cardiac problems occurring in the follow up.

Conclusion: IRFO results in disproportionately large right ventricle and imitates serious congenital heart disease in the foetus. IRFO should be considered among the causes of right ventricular dilatation. Although restrictive foramen ovale confers a significant risk to foetuses with structural heart disease, IRFO appears to be well tolerated with favourable outcome in foetuses with structurally and functionally normal hearts.