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Pulmonary atresia with intact septum – Impact of right ventricular outflow tract morphology on Radiofrequency assisted pulmonary valvotomy

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Objective:
Radiofrequency assisted pulmonary valvotomy is well established intervention in membranous pulmonary atresia. Successful valvotomy in these patients depends on many factors including well formed right ventricular outflow tract (RVOT). There is limited literature in relation to RVOT morphology and its impact with regards to successful immediate outcome. This study sought to assess morphology of RVOT in relation to procedural outcome.
Methods:
A single-institution, retrospective review of all the patients undergoing radio frequency assisted pulmonary valvotomy between Jan. 2004-May 2013 was performed. Data was collected by reviewing the angiograms and medical notes. Procedural outcome and complications in relation to RVOT morphology were primary outcome variables.
Results:
There were 88 patients found from database. Median age at intervention was 22 days (1-4015), median weight was 3.2 kg (2.3-12.4) and male: female ratio of 1:1. Mean fluoroscopy time was 28.5 minutes (9-100 min) while mean procedure time was 93.8 min. (range 20-200 min). Mean Valve plate thickness was 0.8 mm (0.47-1.3 mm). Mean valve annulus was 5.8 mm (3.6-13.6 mm). Mean RVOT-PA angle was 19.7 degrees (range 5-50). Mean energy used was 4.8 watts (range 2-6 watts). Good interface between the valve plate and MPA lumen (cupping) was found in 59% of the cases. Infundibular stenosis was present in 29% of the cases.
Eleven cases had RVOT-PA angle of more than 25 degrees. Six cases with RVOT-PA angle >25 had missed perforation as compared to none where angle was less than 25 ($p<0.001$). Valve plate was considered thin if this was less than 0.7 mm. The thicker valve plate (>0.7 mm, n=11/56) needed higher energy than thinner valve plate (<0.7 mm, n=2/32) but this was not statistically significant ($p=0.055$).
Conclusion:
RVOT morphology has an important impact on successful outcome of the procedure. Well developed RVOT with thin valve plate had favorable outcome while RVOT – PA angle of more than 25 is a risk factor for misperforation. A thorough assessment of RVOT is important for favorable outcome.