An innovation, but is it better?

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In this study, Sandrio et al. [1] describe their experience with an intraluminal band placed in the main pulmonary artery (PA) in 32 patients over an 8-year period, and advocate its use as optimal palliation for children requiring control of excessive pulmonary artery flow. The technique in itself is not new; Piluiko et al. [2] and Locker et al. [3] both described an identical procedure to the primary technique reported in the current manuscript. What is different is that both these authors conclude that intraluminal banding is effective/preferred in patients who require cardiopulmonary bypass for the performance of cardiac repairs in addition to placement of the pulmonary artery band, whereas the authors of the current manuscript advocate the intraluminal band in all patients.

Adopting an innovative approach when a well-established technique exists behoves one to carefully analyse the results to ensure that the change can be justified, especially if it involves a more complex intervention with potentially increased risk. In the current study, the issue is the claimed benefits of the new approach balanced against the risks of placing a small neonate on cardiopulmonary bypass.

The benefits the authors claim are that the intraluminal band is associated with low risk (both short and long term) and is more accurate. They demonstrate low perioperative mortality (0%) albeit 2 patients required extracorporeal support. In the long term, it is claimed there were no complications, particularly no pulmonary valve impairment, though 2 patients required pulmonary artery patching.

The argument to achieve accurate pulmonary artery size following banding is less convincing. There are table of normal ranges for cardiac structures, but the correct amount of obstruction required for a specific individual is unpredictable; in palliative procedures, anatomical precision does not translate directly into physiological adequacy. There are many variables that influence pulmonary vascular resistance and these will affect the apparent efficacy of the PA band. In particular, as the authors themselves identify, the use of CPB further complicates the assessment of the adequacy of the band due to the pulmonary vascular response to bypass. Furthermore, unlike the traditional approach, the intraluminal device is fixed and does not allow for any adjustment to ‘fine tune’ the obstruction to match the pulmonary physiology, adjustment of the band requires a further period of CPB. In the longer term, the authors report that the intraluminal band can be balloon-dilated so as to prolong the period of adequate palliation, but this is no different from the traditional device [4].

The risks with the traditional technique are well known. Results for the current era show a perioperative mortality rate of around 4% and in the long term the incidence of pulmonary valve regurgitation is significant [5]. Residual multilevel right ventricular outflow tract obstruction and pulmonary artery distortion are well recognized, the latter particularly associated with band migration (though this can largely be prevented by adequate fixation of the band to the pulmonary artery root); this may necessitate further surgery. Finally, there is a reported incidence of inadequate obstruction in up to 30% following conventional banding, but in these patients it is relatively straightforward to tighten the band in the early postoperative period. However, the significant benefit is that cardiopulmonary bypass is avoided.

Nothing that a surgeon does is risk-free and a choice between two differing interventions demands an assessment of the risk/benefit balance of each. This is not the same for every surgeon/team and, despite efforts to standardize operations, each surgeon/team has a different experience with procedures and associated complications. The authors of the current paper have demonstrated good results with their technique for intraluminal pulmonary artery banding and conclude that it ‘... is (their) institutional preference for children who require pulmonary artery banding’. Other surgeons/teams need to weigh up this evidence against their own experience to ascertain whether the risk of bypass in small neonates justifies its use in potentially preventing long-term complications associated with the traditional approach.

REFERENCES


