the limitations of our study is the lack of availability of long-term echocardiographic and cardiac catheterization data. We expect to shortly provide more data in this direction. Our findings are in sharp contrast to a recent study from China [15] in which 876 patients with VSD and PAH underwent VSD closure. In 195 of these, a UVP was used to close the VSD. The authors performed a multiple logistic regression analysis with propensity score matching, and found that in the 138 propensity-matched pairs, there were no significant differences in early and late survival. Whether these findings hold true for our patient population will be known only after more follow-up of our patients.

CONCLUSION

UVP for closure of VSD helps in tiding over immediate post-operative period in patients with borderline operability. Early- and mid-term results of this technique are promising but long-term results are awaited. The use of UVP in patients with established Eisenmenger's syndrome needs further evaluation.

Conflict of interest: none declared.

REFERENCES


eComment. An oval-shaped unidirectional check-valved patch for treating ventricular septal defects

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We read with great interest the manuscript of Talwar et al. [1], in which the authors presented their experience of ventricular septal defect (VSD) closure with a unidirectional valved patch in patients with severe pulmonary hypertension. We would like to comment on a few points of the authors’ paper.

As a referral centre for the region, we receive similar patients, i.e. who are still operable but are high risk candidates for VSD closure due to increased pulmonary vascular resistance, and we use a similar technique. All patients receive detailed echocardiographic examinations and cardiac catheterization studies preoperatively. As soon as the patients are prepared for operation, a transoesophageal echocardiography probe is inserted. The dimensions, shape, and boundaries of the VSD are once again verified. A surgeon prepares the valved patch while the other starts the operation so that the delay during cardiac arrest is minimized. A hole is created on a square Dacron patch with an aortic punch. Another ‘U’ shaped Dacron patch is sewn on this patch 4-5 mm away from the margins of the fenestration. The open end of the ‘U’ is left unseen. The exact size of the patch is adjusted when the VSD is explored. Most often, although three-dimensional, the VSDs are round or oval. An oval-shaped patch has smooth edges and is also easy for VSD closure. Thus we usually trim the reconstructed patch into a round or oval-shape. The authors used a folded, fenestrated patch [1]. Although it seems easier and faster to construct such a patch, size adjustment, if needed, does not seem easy, since trimming may encounter the suture lines. Moreover, since the fenestration is directed at the left ventricular apex, the sharp margin of the patch may be faced towards thetricuspid or semilunar valves, which may perhaps have valvular consequences. Additionally, when open, the valve of the patch may lead to outflow tract obstruction and leaflet damage in the long term.

Another point is regarding the postoperative management of the patients. Authors stated that none of their patients had required nitric oxide during the intensive care unit stay [1]. In our practice we routinely administer inhaled nitric oxide to facilitate postoperative recovery in pulmonary hypertensive patients. In the manuscript, mean systemic saturation was 96.3 ± 4% (87% being the lowest) and 18% of the patients had episodes of systemic desaturation indicating a right-to-left shunt due to increased pulmonary pressure [1]. We believe that nitric oxide would have been very beneficial, especially in those patients.

We would like to congratulate the authors for their successful management strategy of such a high risk patient group and for stressing once again the importance of unidirectional valved patches in treating patients with increased pulmonary vascular resistance.

Reference


eComment. Ventricular septal defect correction in patients with severe pulmonary hypertension

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Pulmonary hypertension secondary to increased pulmonary vascular resistance (PVR) is one of the most important determinants of operative morbidity and mortality as well as long-term survival after repair of a left-to-right shunt. We read with interest the paper of Talwar et al. [1] about the use of a unidirectional valved patch (UVP) for ventricular septal defect (VSD) correction in patients with severe pulmonary hypertension. The reported result looks very optimistic. We have also had some experience with such an approach but ours was not so impressive. Since 1997, 15 patients have been operated on with a similar technique. There were two hospital deaths and one case of the infective endocarditis on follow up.

Now, there is no doubt that the survival of patients with Eisenmenger’s syndrome is much better with UVP than after corrective surgery with residual high pulmonary hypertension. This is why the indication for VSD closure even with valved patch must be precisely verified. Sometimes it is very difficult to make a decision. Indications for open heart surgery in our centre are completely based on acute vascular reactivity test data. If the increased PVR is found to be “reactive,” the shunt may usually be closed, but the risk of surgical repair is high. In our practice, we use the two-stage approach proposed by Batista et al [2] in 1997. The hospital mortality after banding procedure was less than 4% (78 cases) and there were no deaths after total correction of VSD (46 cases).

Nevertheless, the excellent results of this series suggest that the unidirectional valve patch technique may be a valuable surgical tool.

References


EComment. Unidirectional flap valve patch closure of ventricular septal defects

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Talwar and colleagues are to be congratulated on the excellent results they have obtained with this difficult group of patients [1]. Patients with pulmonary hypertension and elevated pulmonary vascular resistance represent a very significant proportion of children with congenital heart defects in developing, transitional and emerging countries around the world secondary to the large percentage of these populations with poor access to sophisticated medical care [2]. Labelling a patient as “inoperable” secondary to pulmonary hypertension and elevated pulmonary vascular resistance based upon questionable cardiac catheterization data is committing these children to inexorable decline in health and progression to Eisenmenger’s physiology. The expense of electromagnetic cardiac output (ECMO) and the sophisticated medications that are required to combat post-operative pulmonary hypertension is simply beyond the budgetary scope of most hospitals developing countries [3]. The fenestrated unidirectional flap valve ventricular septal defect (VSD) closure technique is a simple and inexpensive alternative.

There is no absolute level of pulmonary vascular resistance for which the unidirectional flap valve technique should be used. The protection provided by the fenestration works whether an acute crisis develops or there is sustained pulmonary hypertension post-operatively. As such the technique provides an opportunity to extubate these patients early post-operatively, thus avoiding the potential complications associated with paralysis, sedation and relatively long intubation times. Moreover this approach is far more cost effective and in countries with restricted health care funds the benefits are self-evident.

The long-term benefit of this technique is controversial. Gan et al. recently published a report stating that there was neither short term nor long term benefits using this technique [4]. Retrospectively analyzing two propensity matched groups, one with the uni-directional technique and the other using routine VSD closure, they found no difference in early or late mortality. Interestingly we found that for simple VSD closure using our modification resulted in a 3.6% (54/56) mortality rate [5], much below the 6.5% mortality rate they quoted for the routine closure VSD mortality rate in this propensity matched group. We were unable to show any difference in survival up to 8 years following surgery for those with a pre-operative pulmonary vascular resistance above 10 Wood units compared to those below 10. The world-wide availability of Sildenafil and relatively modest cost in most countries presents an opportunity for those patients with elevated pulmonary vascular resistance to receive potential life-altering procedures. The unidirectional flap valve VSD closure technique will provide these patients with a relatively low operative mortality rate and the use of Sildenafil for those who have persistent pulmonary hypertension a medical therapy to help lower pulmonary artery pressure. We have just completed a study of 36 consecutive double patch flap valve operations using Sildenafil in the post-operative period (unpublished data). Enrolment required a pulmonary artery pressure of greater than 50% systemic post-operative. Hospital mortality was 2.8% (1/36), and following 3 months of therapy 78% (28/35) had normal pulmonary pressures by echo.

The uni-directional flap valve VSD closure technique is beneficial and simplifies the post-operative management and decreases the operative mortality in this challenging group of patients.

References


