

Optimal exposure for closure of ventricular septal defects through the tricuspid valve

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Closure of a ventricular septal defect (VSD) is one of the most common procedures performed in congenital heart surgery. With the advances in surgical and anesthetic technique, precise knowledge of the anatomy, refinements in perfusion during cardiopulmonary bypass, and post-operative intensive care management, closing a VSD has become a routine and low-risk procedure. As a benchmark operation, results are hardly judged in terms of survival which is the expected norm with a procedure-related mortality of less than 0.5% (1), but rather in terms of completeness of repair (i.e., no residual defects), and minimizing morbidity (reduced intensive care and hospital stays, no heart block or tricuspid valve insufficiency). In a recent article (2), Dr. Pourmoghadam *et al.* describe two techniques involving incisions into the tricuspid valve to enhance visualization and ease of exposure for the closure of 130 conoventricular VSDs, compared to not manipulating the valve, in similar patients comparing age and weight. Between 2005 and 2016, 130 patients with an isolated VSD were operated upon, 26 using a leaflet detachment (LD) technique, 15 with a chordal detachment (CD) technique, and 89 without tricuspid instrumentation used as a control group.

Although the LD group required statistically significant longer cross clamp and cardiopulmonary bypass times owing to more time needed to detach and re-attach the septal leaflet of the tricuspid valve, this did not translate into clinically relevant changes for the patients. More

importantly, enhanced exposure allowing full visualization of the defect was achieved with both techniques, the rate of small and hemodynamically insignificant residual defects similarly low, and the degree of more than mild tricuspid valve regurgitation comparable. During the relatively short follow-up period at a median of 2 years, there was no reoperation for tricuspid regurgitation.

The study is interesting and relevant in practice, as the findings could be extrapolated to not only isolated VSD closure, but to that after VSD closure during tetralogy of Fallot, double outlet right ventricle repair, or that of many other complete repairs involving VSD closure such as interrupted aortic arch, truncus arteriosus, or pulmonary atresia/VSD. The LD technique is definitely useful when closing a VSD through a mini right axillary thoracotomy (3), since visualizing the VSD borders when approaching the defect through the tricuspid valve at an acute angle through a small incision requires routine take down of the anterior and sometimes septal leaflet of the tricuspid valve. Obviously, meticulous reconstruction/re-approximation of the leaflet and annulus are required after defect closure to avoid iatrogenic tricuspid valve insufficiency. Through a mini right axillary thoracotomy, VSD closure has successfully been performed in more than 50 patients in my personal experience (4), and reported by others (3).

The authors correctly state that the numbers in each group are small, and the follow-up time relatively short,

which precludes any extensive analysis or comparisons. Ultimately, whichever technique is used, the main goals for congenital heart repair of any defect including VSD closure are:

- (I) Full visualization of the defect rims allowing complete closure with the lowest incidence of post-operative residual defects;
- (II) Atraumatic technique with regards to the tricuspid valve, without inducing iatrogenic insufficiency;
- (III) Atraumatic technique with regards to the conduction system, thereby minimizing temporary or permanent arrhythmias, respectively junctional ectopic tachycardia (5) or complete heart block;
- (IV) Do no harm while performing repair.

In summary, the authors describe and compare two techniques of taking down the tricuspid valve to enhance visualization during closure of a VSD with subsequent reconstruction of the tricuspid valve, to controls not needing tricuspid valve manipulation, and conclude to their safety and efficiency. Knowledge and experience with both techniques will enhance the surgical armamentarium of surgeons frequently dealing with this common lesion.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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