

No Ventricular Septal Defect Patch Atrioventricular Septal Defect Repair



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For the past 10 years, our center has used the no ventricular septal defect patch atrioventricular septal defect repair proposed independently by Wilcox and Nicholson. The technique emphasizes direct closure of the ventricular element of the defect and a pericardial patch for the atrial component. A particular advantage of the operation is that it lends itself to repair in the smaller infant, which allows operative repair at 3-4 months of age, decreasing the risk of perioperative problems with pulmonary hypertension. The result of this strategy at multiple centers is a very low operative mortality, a low incidence of left atrioventricular valve reoperation, and an extremely low incidence of need for a pacemaker. *Operative Techniques in Thoracic and Cardiovascular Surgery* 20:279-292 © 2016 Elsevier Inc. All rights reserved.

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Techniques for repair of complete atrioventricular septal defect (AVSD) have evolved substantially over the years. Surgeons at various times have used the “classic” single-patch technique, the 2-patch technique, and more recently the modified single-patch or “no VSD patch” technique. The modified single-patch (no ventricular septal defect [VSD] patch) technique was independently proposed by Wilcox et al¹ and Nicholson et al.² This strategy eliminated placement of a patch to close the ventricular element of the defect. Rather, there is direct closure of the ventricular component by sandwiching the top of the ventricular septum, the common AV valve, and a pericardial patch. The patch is then used to close the atrial component of the defect. The initial concerns raised regarding the no VSD patch technique were that there would be residual ventricular level shunting and an increased risk for the development of left ventricular outflow tract obstruction. The reason to adopt the no VSD patch technique primarily revolves around improving the outcome of the repair of the left atrioventricular (AV) valve. This, in many series, has been the “Achilles heel” of complete AVSD repair.

Our program transitioned from sole utilization of the 2-patch technique to essentially complete adoption of the no

VSD patch or modified single-patch technique over a 5-year period from 2000-2005.³ This was based on our initial experience that the modified single-patch technique was performed with significantly shorter cross-clamp and cardiopulmonary bypass times with comparable results. However, further follow-up has demonstrated that the incidence of reoperation on the left AV valve and incidence of need for pacemaker placement have been less than with the other techniques.⁴ Of critical importance our recent evaluation demonstrated that left ventricular outflow tract obstruction does not appear to be a significant post-operative issue with the modified single-patch repair.⁵ The following illustrations demonstrate use of the no VSD patch technique for complete AVSD in 2 different patients; 1 with Rastelli type “A” configuration of the AV valves and the other with Rastelli type “C” configuration of the AV valves.⁶

At Ann & Robert H. Lurie Children’s Hospital of Chicago we transitioned from using the 2-patch technique to now using almost exclusively the modified single-patch or “no VSD patch” technique (Figs. 1-10). This transition began in the year 2001. By 2006, we were using the modified single-patch technique on all patients except for those with an extremely large ventricular component (>15 mm). From 2000-2013 we performed no VSD patch AVSD closure in 77 patients. During that same time period we only used the 2-patch technique twice. Patient characteristics are shown in Table 1.

Results were as follows: there was 1 early mortality for a 2% overall mortality rate. The median postoperative length of stay was 10 days. No patient required a

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Table 1 Patient Characteristics for No VSD Patch AVSD Repair

Patients	n = 77
Median age	4.2 mo
Median weight	5 kg
Trisomy 21	57 (74%)
Prior Coarctation repair	8 (10%)

pacemaker in the postoperative period. Only 2 patients have required reoperation for left ventricular outflow tract obstruction and both had prior coarctation repair. Coarctation repair appears to be a marker for the need for reoperation for

left ventricular outflow tract obstruction unrelated to the type of AVSD repair. All patients with left ventricular outflow tract obstruction requiring reoperation had Rastelli type "A" configuration. In all, 3 patients required reoperation on the left AV valve, 1 early and 2 late. Among all, 1 patient required reoperation for a residual VSD. This patient also had a reoperation on the left AV valve.

The results of a meta-analysis that we performed comparing the modified single-patch (no VSD patch) to the 2-patch and classic single-patch technique are shown in [Table 2](#).⁴ The no VSD patch strategy has a lower operative mortality, lower need for reoperation on the left AV valve, and a lower

Table 2 Meta-Analysis of 3 Operations for Atrioventricular Repair

	No VSD Patch (n = 272)	2-Patch (n = 889)	Classic Single-Patch (n = 350)
Mortality (%)	1.2	3.5	4.9
Left AV Valve, Reoperation (%)	2.2	7.2	9.7
Heart block requiring pacemaker (%)	0.4	1.9	2.3

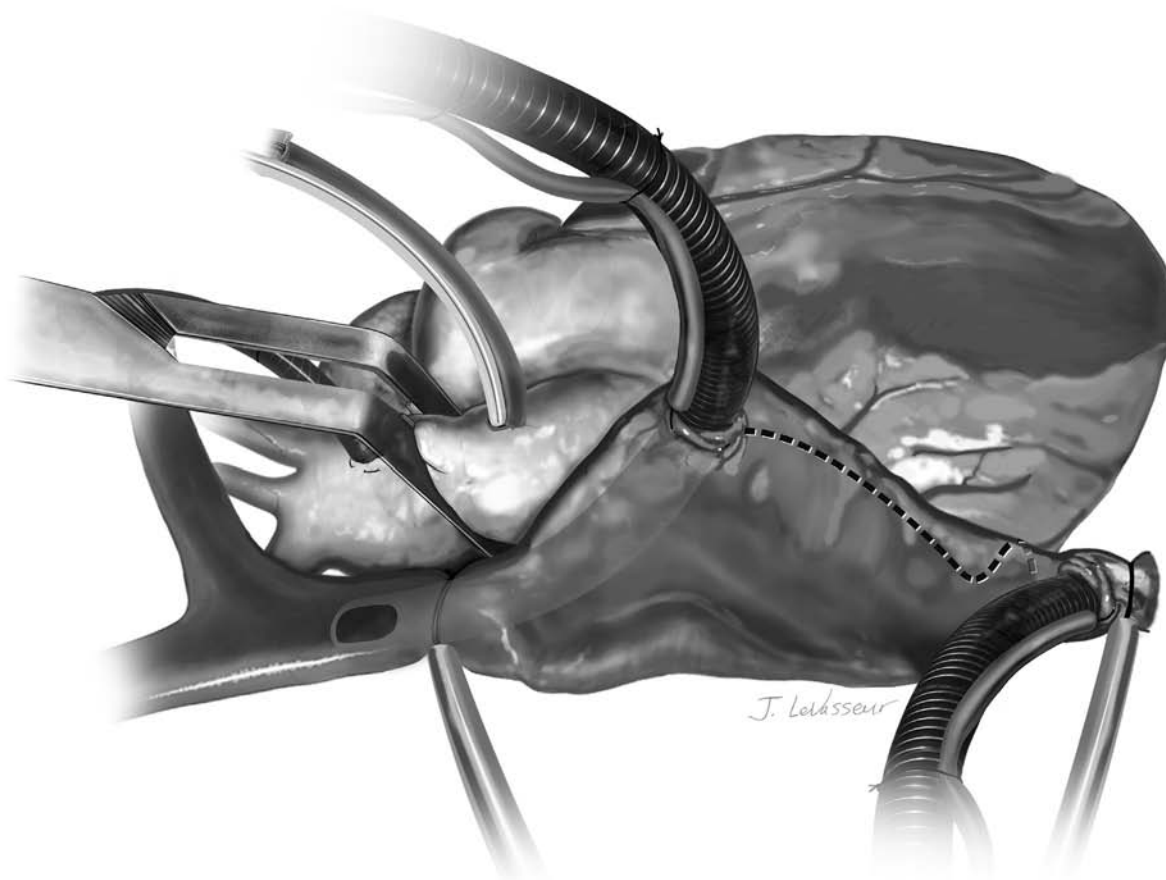


Figure 1 The child has been placed on cardiopulmonary bypass with venous cannulae in the superior and inferior vena cava. The aorta has been cross-clamped and cold blood cardioplegia delivered. The dotted line shows the incision to be made for exposure in the right atrium. Note the atrial incision is carried medial to the inferior vena cava, which allows the visualization of the AV valve to be substantially improved. This "unhinges" the right atrium from the ventricle for excellent exposure of the atrioventricular valve.

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