Surgical repair of complete atrio-ventricular canal: one more approach?

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Under a new name (the ‘one-and-half patch’ technique) [1], the authors describe an intermediate technique (between those described at 1 and 2, below) for the surgical treatment of complete atrio-ventricular canal (CAVC) or atrio-ventricular septal defect (AVSD)—with a patch under the superior bridging leafllet (SBL) and direct attachment to the ventricular crest of the defect under the inferior bridging leafllet (IBL)—that is already advocated by some [2], who indicate that it can be used in cases with a “large” ventricular septal defect component. The technique was used in their centre in 16 cases, whereas others in their centre used the two-patch technique in 45 cases and the “modified” single-patch in 13 cases. They claimed a shorter cross-clamp time (66 m vs 81 m in the two-patch procedure) and fewer re-operations (0 vs 1 for two-patch and 3 for the modified technique). The mean follow-up period was three years.

Despite the good results obtained, two questions arise: what are the advantages of this technique and is it of interest?

Let us recall the two basic concepts in the repair of CAVC:

(1) Close the ventricular and atrial components of the defect (using one—as initially described by JC Rastelli [3]—or two patches [4]), and divide the common valve orifice into right- and left-sided, re-attaching the valve components at the native level or height on the patch or patches. Re-attachment at the correct level is one of the issues associated with this technique and, by the way, is one of the problems shared by the single-patch and two-patches solutions.

(2) As reported more recently, radically transform the CAVC into a partial AVC (where there is no ventricular component of the defect, despite the fact that the shape and size of the septal defect are the same in both), lowering and suturing the common valve to the ventricular crest of the defect, thus creating right and left sides of the division and closing the ventricular component of the defect. It then remains to close the atrial component of the septal defect with a patch. Initially [5], this technique was adopted when the ventricular component was not considered to be large, and subsequently used regardless of size [6].

Each of these techniques has its history, its advantages and its inconveniences and, obviously, its adherents. Interestingly, in a relatively recent presentation in a well-attended session on congenital heart surgery at the Society of Thoracic Surgeons (Fort Lauderdale) [7], there was about 50% support for the two-patch, 25% for the classic and 25% for the modified single-patch technique, so no real consensus exists.

More recently, some tried to promote the modified single-patch option as the best technique, regardless of the size of the defect [8]; nevertheless, in their experience, they indicated the occurrence of a small gradient between left ventricle and aorta in some patients. The topic of subaortic obstruction is a prominent issue relating to this technique, when you consider that the naturally narrow left ventricular (LV) outflow should not have a gradient, even a mild one, created by surgery. The issue of potential (or future) LV outflow obstruction remains a point of discussion; however, several authors tend to be unconcerned by this and report no occurrence, while some others have expressed some concern in this area [9].

If this issue of LV outflow is to be considered to be trivial or non-existent even, we do not see the relevance of a slightly more complex intermediate solution—as proposed by the authors—which falls between the partial and total solution 2, and loses the supposed advantages of a simple and more rapid technique.

Let me add a personal point of view on the choice of operation in CAVC. I have been trained to perform the original Rastelli single-patch technique. Why do I not use the more popular two-patch procedure? Because (i) adequate height of the ventricular septal defect component is a common problem in both techniques (ii) choosing the adequate area between right- and left-sided part of the common valves is identical in both techniques (iii) suturing the undivided valve to a ventricular patch and then to a second atrial patch does not save any more valve tissue than dividing the valve and re-attaching it to a pericardial patch; (iv) adequate insertion of an interventricular patch under the often crowded by chordae IBL appears much simpler after dividing it.

Why do I not choose the more modern solution 2, despite its greater simplicity? This is a matter of left-sided valve competence.

During our training in Boston CHMC (and in my subsequent experience) it was shown to me that, preoperatively, CAVC was in general more competent than the partial AVC. Postoperatively, by the way, it turned out to be the same! It has been exactly so in our experience and, with the classic single-patch technique [7], we have reported a 91% absence of significant MR at 15 and 20 years in an experience of 93 long-term survivors. Therefore, why transform the complete-into an incomplete AC?
Finally, I would like to quote a sentence from the textbook by Kirklin and Barratt-Boyes (taken from the first edition of 1986 and still present in the 2013 edition [10], which has been revised by prestigious congenital heart disease surgeons, after all new techniques had been described): "Repair techniques vary considerably but, when used properly, all appear to provide good results."

In conclusion, I would just like to say that, despite the fact that there is no evident advantage, this one-and-half patch technique also ‘works’ but needs more follow-up!

REFERENCES


