Operative Techniques in Thoracic and Cardiovascular Surgery

Repair of Atrioventricular Septal Defects: The 2-Patch Sandwich Technique

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The key elements in the 2-patch method of repair of complete atrioventricular defects include: (1) closure of the ventricular defects using a Dacron patch, (2) closure of the primum atrial defect using an autologous pericardial patch, and (3) securely partitioning the atrioventricular valves into competent left and right components. With limited exceptions, there is sufficient conservation of morphological features of the atrial and ventricular defects as well as that of the atrioventricular valves to allow standardization of the key elements of the surgical repair.
Operative Techniques in Thoracic and Cardiovasculary Surgery 20:63-74 © 2015 Published by Elsevier Inc.

KEYWORDS Rastelli type A, Rastelli type C, Cleft or zone of apposition between left superior and inferior leaflets, Septation into left and right AV valve components

Introduction

The early and late results of the repair of atrioventricular septal defects (AVSDs) depend in large part on the postoperative function of the left AV valve.[1] The principal challenge in AVSD repair is the relative deficiencies of leaflet surface areas of the right and left AV valves relative to their respective orifice areas. Accordingly, effective execution of the various techniques recommended for repair of AVSDs is dependent on minimization of leaflet distortion, which is to some extent inherent to any type of repair. As there are substantial tolerance limits for cross-clamp duration that are consistent with good biventricular function postoperatively, the repair of AVSDs should emphasize accuracy and precision. This article describes the 2-patch, or so-called sandwich, repair of AVSDs in the usual morphologic setting of balanced ventricular size. Repair options for subtypes featuring hypoplasia of either the right (left dominance) or the left ventricle (right dominance) are described elsewhere.[2,3] However, even if biventricular repair is elected in the setting of unbalanced AVSDs, the principles and methods of surgical repair remain the same as described herein for balanced defects (Figs. 1-10).

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1522-2942/$-see front matter © 2015 Published by Elsevier Inc.
http://dx.doi.org/10.1053/j.optechstcvs.2015.06.001

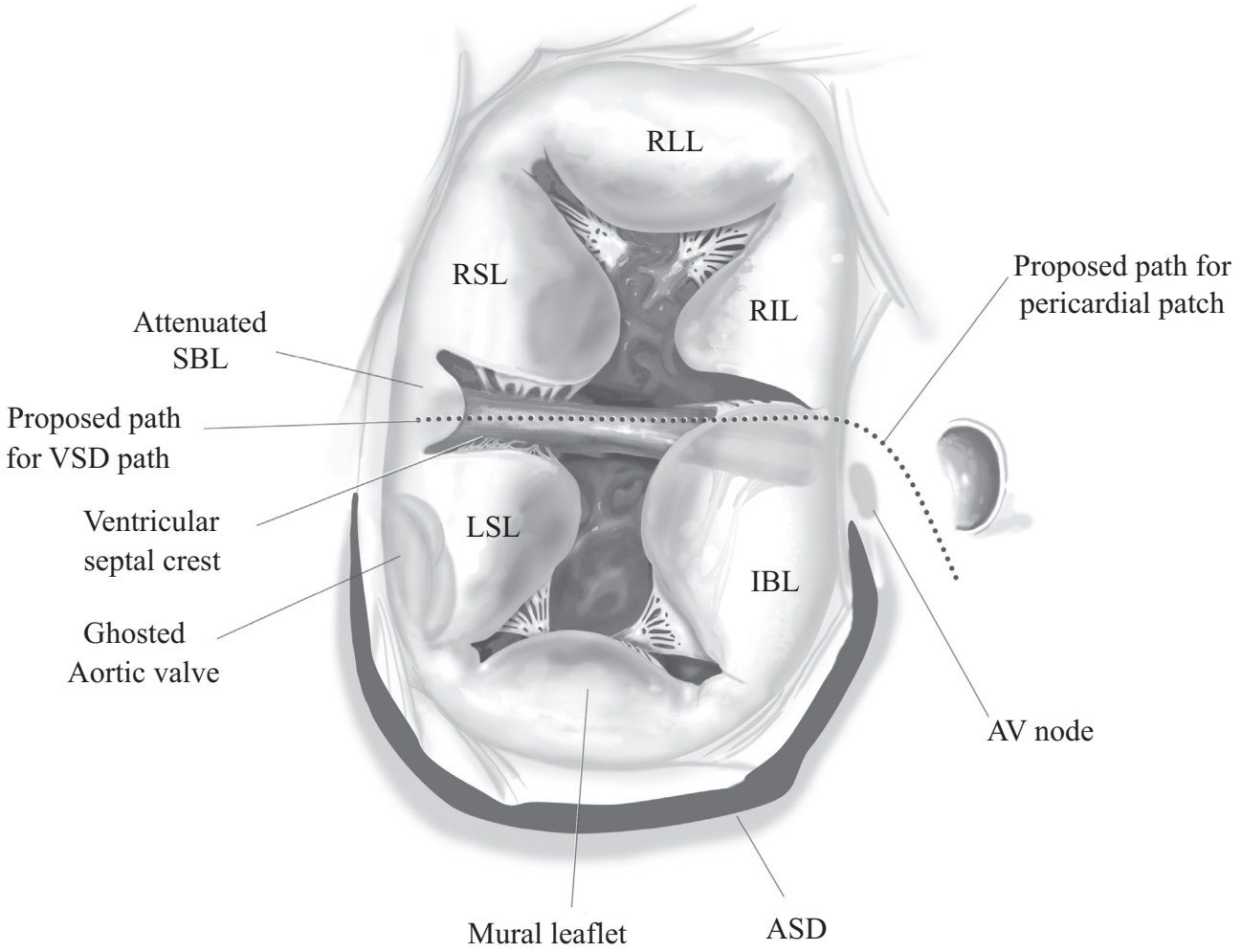

Figure 1 Rastelli type A. Variations in the morphologic features of AVSDs result mainly from the extent of bridging of the superior leaflet across the plane of the VSD. The most common arrangement present in approximately 80% of cases features separation of the superior leaflets into right and left components with limited bridging of either leaflet across the plane of the VSD. In this arrangement, both left and right components of the superior leaflet are supported by symmetrically disposed marginal chordae that attach to the underlying ventricular septal crest. This morphologic arrangement is referred to as Rastelli type A. Less commonly, a distinctly bridging superior leaflet is present but attenuated in the anteroposterior (AP) dimension such that its length is ~5-8 mm, as shown. The other common subtype, referred to as Rastelli type C, features a large superior bridging leaflet with a prominent left-right dimension that overrides both the ventricular chambers in a symmetrical fashion (Fig. 2). The morphology of the posterior bridging leaflet is conserved irrespective of the superior leaflet morphology in that the posterior leaflet invariably exhibits symmetrical bridging across the plane of the VSD. In contrast to the superior bridging leaflet present in Rastelli type C (Fig. 2), the width of the inferior bridging leaflet in its left-right dimension is typically 50% less than that of the superior bridging leaflet. RSL = right superior leaflet; SBL = superior bridging leaflet; LSL = left superior leaflet; RIL = right inferior leaflet; IBL = inferior bridging leaflet; RLL = right lateral leaflet.