

procedures, such as routine aortic arch replacement and total aortic root replacement or valve sparing aortic root reconstruction, should be performed [22–25]. In our experience, as long as the primary intimal tear was resected, there was no patent false lumen left postoperatively in either the aortic root or aortic arch in any of the patients using adventitial inversion technique. Therefore, ascending aorta/hemiarch replacement with supracoronary tube graft would suffice for most of the patients with acute type A aortic dissection in the absence of Marfan or annuloaortic ectasia.

4.4. Limitations of this study

The main limitation of the present study was that it was retrospective in nature without control group. Furthermore, the follow-up period is relatively short to prove the superiority of this technique in preventing late pseudoaneurysm formation or redissection compared to conventional anastomotic techniques using felt strips or biological glues. A large-scale prospective randomized clinical controlled study would be necessary to address these issues.

5. Conclusion

The adventitial inversion technique provides an excellent immediate hemostasis and facilitates thrombotic closure of the proximal and the distal false lumen in the treatment for acute aortic dissection. This technique is a promising alternative procedure to Teflon felt or biologic glues for restoring the integrity of the aortic wall in the surgical treatment of acute type A aortic dissection.

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Editorial comment

Reinforcing the anastomotic cuff in aortic dissection

The dissected aorta is prone to anastomotic complications such as bleeding and dehiscence. The aortic wall is friable due to medial cystic necrosis, fragmentation of the elastic

lamellae, focal fibrosis, and the dissecting hematoma between the middle and the outer third of the media. Yet the adventitial layer remains intact [1]. Current methods to reinforce the

aorta make use of Teflon or Dacron strips and biologic glue. Resulting possible disadvantages are difficulties to accurately localize anastomotic bleeding and a bulky anastomosis predisposing to luminal narrowing and pressure decrease. Therefore, reference surgeons recommended neither to use prosthetic reinforcement nor the inclusion technique [2].

Tanaka et al. present the formerly described adventitial inversion technique for the repair of acute type A aortic dissection with respect to closure of the false lumen [3,4]. The dissected flap is trimmed back 1 cm distal to the resection line. The redundant layer of adventitia including the adherent outer third of media is folded into the lumen and tacked down. Thereby the resulting anastomotic cuff consists of two adventitial and external elastic lamina layers "sandwiching" two thirds of the friable media. A tough but soft cuff for anastomosis is created, with a low profile enabling accurate suturing and precise localization of bleeding points. Besides, the cuff has a desirable sealing effect by activation of the extrinsic coagulation pathway via exposed adventitial collagen and tissue factor [5]. The latter is a cell membrane bound glycoprotein, and upon exposure to blood, binds to factor VII. The tissue factor–factor VIIa complex activates factor X and thence generates thrombin.

This technique carries the potential risk of thrombus formation at the adventitial anastomotic rim with subsequent embolization. In small caliber anastomoses with intima–adventitia apposition, thrombus deposition has been observed only at the adventitial rim not causing luminal narrowing [6]. It is unlikely that in a high-flow system such as the aorta, protruding thrombus is developing at the anastomotic site. However, surface irregularities are certainly filled up by thrombus that becomes subsequently replaced by neointima during anastomotic remodeling [7]. The embolic potential is probably very low.

The proposed technique ensures that the false lumen is excluded from antegrade flow at the anastomotic level. Although important, Tanaka et al. show that other means are

equally crucial in contributing to the closure of the intimal tear at the entry site. They underscore the importance of exploration of the aortic arch including replacement whenever necessary and avoidance of distal clamping to prevent damage to the aorta beyond the anastomosis.

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