Surgery for atrial fibrillation has been performed now for more than 20 years. The Cox-Maze procedure was introduced in 1987 by Dr. James Cox at Barnes-Jewish Hospital in St. Louis. This procedure, which has since been used in various centers, has been successful at eliminating symptomatic atrial fibrillation with success rates of more than 90% at 10 years (1–4). Patients undergoing this operation also have had an extraordinarily low incidence of late stroke. In a series of almost 200 consecutive patients with a mean follow-up of more than 5 years, there was only one incident of stroke during follow-up. Most patients were off all anticoagulation (2). This high success rate has been attributed to not only eliminating atrial fibrillation but also to the fact that the left atrial appendage is excised during this procedure.

Recently, there has been great interest in less-invasive and alternative surgical approaches for atrial fibrillation. Many of these approaches now use a stapler to exclude the appendage or, in some instances, endocardial suture exclusion. Moreover, surgeons routinely exclude the base of the left atrial appendage with suture during routine mitral valve surgery. Interestingly, there are little data regarding the reproducibility and effectiveness of the various surgical techniques to exclude the left atrial appendage. Particularly, there have been no comprehensive studies that use transesophageal echocardiography (TEE) to evaluate late results. Therefore, this report by Kanderian et al. (5) from the Cleveland Clinic in this issue of the Journal is both timely and important.

One hundred thirty-seven of 2,546 patients who underwent surgical left atrial appendage closure had TEE after surgery. The authors characterized unsuccessful appendage closure as: 1) the presence of a patent left atrial appendage due to dehiscence of the suture or staple line; 2) an excluded left atrial appendage with persistent flow into the appendage, as defined as the presence of a color flow jet between the left atrium and the left atrial appendage; or 3) the presence of a remnant appendage, which was defined as a residual pouch remaining in the left atrial appendage >1 cm in maximal length after closure. Of these 137 patients, 52 underwent excision and 85 underwent exclusion (73 with suture and 12 with a stapler). Surprisingly, only 55 of 137 closures were successful. Although the best technique was surgical excision (73%), both suture exclusion and stapler exclusion had extraordinarily low success rates. In fact, none of the patients with stapler exclusion had successful closure.

These are important findings and have significant implications for both cardiologists and surgeons. A number of authors have proposed that, by excluding the left atrial appendage, it may be safe to stop anticoagulation with the use of warfarin in patients who are at risk for stroke. Although this proposal has been challenged by some investigators (because clots can rarely be observed in other parts of the left atria), there has yet to be a randomized study showing that left atrial appendage occlusion can decrease the rate of post-operative stroke. This study raises significant concern regarding present surgical techniques regarding closure of the left atrial appendage. Stapler exclusion as well as our present techniques of suture exclusion need to be improved if they will continue to be used. Most importantly, if treating physicians are planning on discontinuing anticoagulation medication in high-risk patients, they should consider performing TEE prior to this decision to ensure successful left atrial appendage closure.

Although this study has significant shortcomings, particularly the very low percentage of patients having a post-operative TEE, these results pose a significant challenge to surgeons treating atrial fibrillation. At the present time, the only reliable technique appears to be surgical excision. Unfortunately, excision of the left atrial appendage is difficult, if not impossible, during minimally-invasive mitral valve surgery, which is usually performed through a right thoracotomy. It also requires cardiopulmonary bypass. For the less-invasive procedures in which most surgeons presently either suture exclude or staple the appendage, this study presents clear evidence of the inadequacy of these techniques. These results are a clarion call to surgeons and cardiologists to develop a more effective means of less-invasive left atrial appendage exclusion.

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REFERENCES


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