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To cite this article: James L. Cox (2012) Editorial Comments on: “A Swedish Consensus on the Surgical Treatment of Concomitant Atrial Fibrillation”, *Scandinavian Cardiovascular Journal*, 46:4, 192-193, DOI: [10.3109/14017431.2012.708119](https://doi.org/10.3109/14017431.2012.708119)

To link to this article: <https://doi.org/10.3109/14017431.2012.708119>



Accepted author version posted online: 29 Jun 2012.
Published online: 29 Jun 2012.



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EDITORIAL

Editorial Comments on: “A Swedish Consensus on the Surgical Treatment of Concomitant Atrial Fibrillation”

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I was honored to be asked to provide editorial comments on “A Swedish Consensus on the Surgical Treatment of Concomitant Atrial Fibrillation” that appears in this issue of the *Scandinavian Cardiovascular Journal*. It was my good fortune to have participated in the first cardiac arrhythmia operation ever performed in Sweden on May 10, 1980 when Dr. Eva Berglin, the late Dr. Goran William-Olsson, and I successfully divided an accessory atrioventricular connection that was responsible for the Wolff-Parkinson-White (WPW) Syndrome at the Sahlgrenska University Hospital in Goteborg. Thus, I have followed the evolution of cardiac arrhythmia surgery in Sweden with a special interest for over 30 years and as in many other areas of medicine, Sweden has consistently been in the forefront of development in this field.

This Swedish consensus statement represents a milestone in the history of treating atrial fibrillation by surgical intervention. Although the statement limits its scope to “Concomitant Atrial Fibrillation,” it is perhaps the most aggressive effort ever attempted by a single society to establish consensus standards of surgical therapy for *any* category of atrial fibrillation. The Swedish consensus statement is the product of over 18 months of laborious efforts on the part of the country’s recognized leaders in the field of arrhythmia surgery and the final product is perhaps the most accurate and concise statement presently available in the surgical literature on how Concomitant Atrial Fibrillation should be treated. The authors are to be congratulated on their diligence and accuracy in analyzing the literature and in their ability to reach a true consensus on such a perplexing problem.

This Swedish consensus statement is designed to instruct cardiac surgeons in the treatment of atrial fibrillation in patients who will already be in their operating rooms for the primary purpose of having surgery for some other cardiac problem. Surgeons have two options regarding their approach to atrial fibrillation in such patients: 1) treat it with a concomitant surgical procedure, or 2) ignore it. Unfortunately, despite two decades of documenting the success of treating atrial fibrillation by surgical means, and despite numerous articles extolling both the early and late benefits of relieving these patients of atrial fibrillation, it is more common today for cardiac surgeons in every country to ignore Concomitant Atrial Fibrillation than to treat it.

Not only does the Swedish consensus statement emphasize the importance of treating Concomitant Atrial Fibrillation, it also provides a sound scientific rationale for the recommended surgical techniques based on extensive reviews and discussions of the medical and surgical literature. As outlined in the statement, it is clear from the literature that bilateral atrial lesions are superior to left atrial lesions alone for the treatment of Concomitant Atrial Fibrillation. However, it is worth mentioning as a part of this accompanying editorial that these differences do not appear to be as great when treating Concomitant Atrial Fibrillation as they are when treating so-called “Stand-Alone Atrial Fibrillation” where the differences are quite profound.

One of the most important statements in the consensus is that all lesions, regardless of the energy source or specific pattern used, must be *transmural* in order to be effective. Indeed, all cardiac arrhythmia surgery is based on that principle, for regardless of

the lesion pattern or the means by which it is created, a non-transmural lesion is at best ineffective and at worst, arrhythmogenic.

While the authors are perhaps wise in refraining from making recommendations on how to deal with the left atrial appendage, it should be remembered that the most devastating complication of atrial fibrillation is stroke. Though there are those who would disagree, I believe that virtually all strokes associated with atrial fibrillation originate in the trabeculated portion of the left atrial appendage. Although the eminent German physician, Rudolf Virchow (1821–1902), did not actually describe the three factors that lead to intravascular thrombosis that carry his name (“Virchow’s Triad” of hypercoagulability, intimal injury, and stasis), those three factors have proven to be the most important ones causing this problem. It is important to recognize the fact that during atrial fibrillation, *both* atria are fibrillating. Why then, do we not see thromboembolism from the right atrium in the form of pulmonary emboli? Since a patient’s hypercoagulability problem would be the same in both atria and since there is no evidence of intimal injury as a cause of left atrial thrombi during atrial fibrillation, the only remaining factor in Virchow’s Triad that could lead to thromboembolism in atrial fibrillation is *stasis*. Why would the stasis of blood flow be more likely to occur in the left heart than in the right heart? The orifice of the right atrial appendage is broad and is positioned almost directly within the blood stream as blood courses from the superior vena cava and inferior vena cava to the tricuspid valve. Thus, the right atrial appendage is continuously “washed” by the blood stream, preventing stasis even during atrial fibrillation. Conversely, the primary blood stream in the left atrium is from the four pulmonary veins directly into the mitral valve. The left atrial appendage is quite remote anatomically from this mainstream of blood flow and its orifice is small in comparison to that of the right atrial appendage. Thus, during atrial fibrillation, stasis of blood flow occurs in the left atrial appendage but not in the right atrial appendage. Indeed, the left atrial appendage is the only place inside the heart where the free flow of blood during sinus rhythm converts so dramatically to severe stasis of flow during atrial fibrillation. Therefore, in my opinion, the left atrial appendage should be closed or removed whenever possible.

The authors of the Swedish consensus statement recommend the specific lesions of the Maze-III pattern. While this specific lesion pattern has proven to be history’s most successful, other patterns of lesions that subscribe to the concept of a “maze” may be equally effective in ablating atrial fibrillation. It is the

concept of the maze pattern that is important in ablating atrial fibrillation, not the specific *pattern* itself. There are numerous possibilities for maze patterns that might be placed on the atria and theoretically, any of them should be effective in ablating atrial fibrillation. However, there are *two* objectives of an operation for atrial fibrillation: 1) ablation of the arrhythmia, and 2) leaving the majority of both atria capable of being activated by the sinus node. Thus, while many different patterns of lesions may be capable of ablating atrial fibrillation (for example, simple “bread-loafing” of the atria into separate isolated compartments), an effective alternative to the concept of creating a maze pattern to accomplish *both* of these goals has not been forthcoming.

If one chooses to alter the pattern of atrial lesions from that of the Maze-III, even if the new pattern is effective in ablating atrial fibrillation, one must be aware of the “law of unintended consequences.” The patterns of the Maze-I and Maze-II procedures were quite different from the pattern of the Maze-III procedure, yet all three of these different patterns were equally effective in ablating atrial fibrillation. However, the Maze-I pattern destroyed the ability of patients to develop a normal chronotropic response to exercise, and it also created an inter-atrial conduction block causing the left atrium and the left ventricle to be activated simultaneously, resulting in the apparent lack of function of the left atrium which was contracting against a closed mitral valve. Thus, while new, often arbitrary, lesion patterns have been proposed by multiple authors, none have matched the efficacy of the Maze-III pattern in ablating atrial fibrillation while leaving the atria capable of sustaining a sinus rhythm with the preservation of atrial transport function. The recognition of this fact is central to the importance and validity of the Swedish consensus statement and is just one of the many reasons why this outstanding document is destined to become the foundation on which all other national consensus statements regarding surgery for atrial fibrillation will be modeled. In my opinion, the Swedish consensus statement should be adopted immediately, and in its present form, by all countries where cardiac surgery is performed.

Acknowledgement

Dr. Cox wishes to recognize in particular, the scientific contributions of Dr. Eva Berglin to the field of cardiac arrhythmia surgery.

Declaration of interest: The author report no conflicts of interest. The author alone is responsible for the content and writing of the paper.