

Coronary artery obstruction during mitral valve surgery and concomitant left atrial appendage exclusion; choosing a culprit.

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Abstract

This letter is in response to the case report by Kuzmin et al. entitled “Left atrial appendage occlusion device causing coronary obstruction: A word of caution” , published in November 2020 issue of Journal of Cardiac Surgery. The report describes a circumflex lesion occurring following mitral valve (MV) repair, tricuspid valve repair, and left atrial appendage closure (LAAO) using AtriClip device. The authors concluded that LAAO is a safe procedure, but in the setting of a concomitant MV surgery LAAO may be a contributor to the reported event. Circumflex coronary artery occlusion or impingement during MV repair is well described in the literature. On the reported two-dimensional cine, the position of the stenosis is typical of mitral repair induced injury. A ring suture can gather and compress tissue adjacent to the coronary creating stenosis without a discrete ligation. It is also true that vigorous traction on the LAA without due attention to distortion of the adjacent circumflex might be capable of creating compression or accorndioning of the vessel. To mitigate this, the clip should be placed at the true base of the appendage. A residual pouch carries as much or more risk as not attempting to close the appendage at all. The authors’ recommendation to place the clip more distally will inevitably lead to incomplete closures. In conclusion, the reported event was more likely due to a mitral stitch, the path of which is not directly visualized after it breaches the endocardium.

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To the Editor,

I read the report by Kuzmin et. al.¹ that describes a circumflex lesion occurring following mitral valve (MV) repair, tricuspid valve (TV) repair, and left atrial appendage (LAA) closure. Although the patient’s atrial fibrillation was left untreated, the surgeon did close the LAA with an AtriClip. Postoperatively,

there are two significant complications, myocardial infarction and permanent pacemaker requirement. The report focuses on the infarction. Permanent pacemaker requirement is a known complication of double valve repair². Although one cannot say conclusively which ring implantation caused heart block, it is reported more frequently with tricuspid repair as a consequence of violating the Triangle of Koch or impinging on the Bundle of His as it travels along the posterior rim of the Membranous Septum.

Circumflex coronary artery occlusion or impingement during MV repair is well described in the literature³. The cause of coronary obstruction in the reported case is at least , if not more likely due to the MV repair. On two-dimensional cine the ring appears somewhat remote but that is not conclusive, and the position of the stenosis is typical of mitral repair induced injury. A ring suture can gather and compress tissue adjacent to the coronary creating stenosis without a discrete ligation. It is also true that vigorous traction on the appendage without due attention to distortion of the adjacent circumflex might be capable of creating compression or accorndioning of the vessel. At Franciscan Health Heart Center, we have implanted more than 2,400 AtriClips of various models, in a variety of open and minimally invasive cardiac operations over six years, with no such complication.

I would point out that the version of the clip and delivery system reported by Kuzmin et. al.¹ is designed for minimally invasive procedures and is not the clip they implanted. A standard non-V clip was implanted and can be seen on the fluoroscopic pictures. Furthermore, a 50mm clip is rarely implanted, making up <5% of our practice managing appendages of all sizes and anatomies. If the authors are concerned about the possibility of adjacent structure injury, I would encourage gaining familiarity with the different versions of the device, and the prescribed methods of implantation, including sizing. The clip should be placed at the true base of the appendage. In open cases, there is advantage of dissecting certain attachments to ensure safe closure. A residual pouch carries as much or more risk as not attempting to close the appendage at all. The authors' recommendation to place the clip more distally will inevitably lead to incomplete closures.

Whereas it is possible in an open case under direct visualization to create circumflex coronary obstruction with an AtriClip, it is more likely due to a mitral stitch; the path of which is not directly visualized after it breaches the endocardium. If there were no clip seen on the postoperative images, one would assume the circumflex lesion was a consequence of mitral ring implantation. It is simply impossible to determine the mechanism for the case report.

1. Kuzmin B, Staack T, Wippermann J and Wacker M. Left atrial appendage occlusion device causing coronary obstruction: A word of caution. *J Card Surg* . 2021;36:723-725.
2. Moskowitz G, Hong KN, Giustino G, Gillinov AM, Ailawadi G, DeRose JJ, Jr., Iribarne A, Moskowitz AJ, Gelijns AC and Egorova NN. Incidence and Risk Factors for Permanent Pacemaker Implantation Following Mitral or Aortic Valve Surgery. *J Am Coll Cardiol* . 2019;74:2607-2620.
3. Coutinho GF, Leite F and Antunes MJ. Circumflex artery injury during mitral valve repair: Not well known, perhaps not so infrequent-lessons learned from a 6-case experience. *J Thorac Cardiovasc Surg* . 2017;154:1613-1620.