Entrapped left atrial pressure monitoring catheter in a prosthetic mitral valve

The Editor,

A 38-year-old American Society of Anesthesiologists grade III female patient with severe mitral stenosis, moderate mitral and tricuspid regurgitation with severe left ventricular (LV) dysfunction was posted for cardiac surgery under the intra-aortic balloon pump standby.

A stable cardiac induction was done after inserting radial arterial line and a right internal jugular central line under local anesthesia. A transesophageal echo (TEE) probe and a femoral arterial line were inserted postinduction. TEE confirmed preoperative echo findings and showed a LV ejection fraction of 36%. A pulmonary artery catheter (PAC) was not used since perioperative TEE was available to assess any cause of hemodynamic instability. Mitral valve replacement using a bileaflet mechanical valve (27mm St. Jude MedicalTM Masters Series) and tricuspid valve repair using a 28mm Edwards MC 3 Tricuspid Annuloplasty Ring (Edward Life Sciences) were done. In order to measure the left atrial pressure (LAP), which is going to be used as a guide for fluid and pressure management postoperatively, a Braun 275 Cavafix® Certo (B. Braun Medical India Private Limited, Bangalore) (18 gauge catheter with 70 cm length) single lumen polyurethane catheter was inserted 3 cm into the left atrium (LA) through the LA suture line just before coming off bypass, and transduced. We then started to fill the heart and de-air the chambers, and as valve movement was satisfactory, we prepared to come off bypass. In the initial weaning process, LAP was normal (5 mmHg) but as we progressed, the LAP suddenly rose to 40 mmHg but with otherwise stable hemodynamics [Figures 1 and 2]. After confirming the catheter patency, it was flushed with saline, the transducer was re-zeroed, and connections of the monitoring cables were checked. However, the LAP remained persistently high. We then re-evaluated by TEE and noted there was severe prosthetic mitral regurgitation with the LA catheter passing through the prosthetic valve preventing its closure. The surgeon was informed, the LA catheter was withdrawn from its initial insertion, and readjusted. Instantly, the valve movement and LAP normalized, and the mitral regurgitation disappeared.

Left atrial pressure monitoring is an invaluable tool used in perioperative cardiac surgical patients with LV dysfunction as a guide for volume replacement and vasoactive therapy.[1] It is useful after complex congenital heart surgeries, situations where there is difficulty in weaning off cardiopulmonary bypass, and recently in optimizing heart failure.[2,3] Several techniques are used to measure LAP directly. These techniques include surgically inserting a catheter directly into the LA, through the right superior pulmonary vein or transatrially using a single lumen catheter inserted through the internal jugular vein or femoral vein.[4] The PAC can be used to indirectly measure LAP but in developing countries due to financial constraints, cheaper alternatives are used. LA catheter is usually preferred over PAC in pediatric patients, in patients with pulmonary vascular disease where pulmonary capillary wedge pressure does not accurately reflect LA pressure and when there is difficulty in insertion.

High LA pressure intraoperatively is mainly due to residual mitral valve pathology, stuck mechanical valve and diastolic dysfunction. Causes of stuck mechanical mitral valve in the intraoperative period are obstruction by residual mitral subvalvular apparatus, LV...
myocardium interfering with the free valve movement, or immobilization caused by unraveled suture.\[5\] We encountered a unique scenario where the stuck valve was caused by the LA catheter obstructing the valve movement. Porter et al. reported a similar problem after coming of bypass but with a monoleaflet Medtronic Hall valve, which resolved after repositioning the LA line.\[6\] Delay in detecting stuck valve will lead to hemodynamic deterioration, myocardial injury, and inability to come off by pass.

Known complications for LAP monitoring catheter are air embolism (cerebral, coronary), arrhythmias, and bleeding leading to tamponade during catheter removal.\[3\] Here we are reporting a rare and potentially life-threatening complication due to catheter migration during the perioperative period. Awareness of this possible complication, early identification and subsequent management will avoid a major disaster.

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