Case Report

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Rupture of Atrioventricular Groove During RSPV Venting in a Case of Aortic Valve Replacement

Aju James Ashok[1], B Girish[2], Ashwini Kumar Pasarad[3], Chandana NC[4], Anand Subraya Bhat[5]

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Abstract

Aortic valve replacement is a commonly performed surgery for severe Aortic stenosis. Atrioventricular groove (AVG) hematomas range from simple hematomas to complex AVG disruptions that cause frank rupture with massive bleeding and subsequent mortality. AVG hematoma and disruption is a rare and dreaded complication encountered in less than 2% of patients undergoing mitral valve replacement (MVR). When it occurs, it necessitates going back on cardiopulmonary bypass, explanting the valve, pericardial patch reconstruction of the AV groove and then prosthesis reimplantation. Mortality sharply rises if this injury goes unrecognized before sternal closure. We describe successful management of rupture of the posterior atrioventricular groove caused iatrogenically while performing aortic valve replacement.

Keywords: Aortic valve replacement; Atrioventricular Groove bleed; Cyanoacrylate glue**.**

INTRODUCTION

Aortic valve replacement is indicated in symptomatic patients with severe stenosis with mean pressure gradient of more than 40 mm Hg or maximum jet velocity of more than 4 m/s or in asymptomatic patients with impaired left ventricular ejection fraction.[1] AVG hematomas and disruptions very rarely occur following aortic valve replacement. Treasure's type I injuries can be managed by external approach which maybe pragmatic for a quick and effective rescue. External repair is done by using polypropylene sutures with teflon felt or bovine on-lay pericardial patch. An obtuse marginal artery bypass grafting maybe needed very rarely if involved in the injury in a patient with a dominant left circumflex artery.[2] We report a rare case where in a right superior pulmonary vein (RSPV) vent injury caused iatrogenically at the posterior atrioventricular groove resulted in profuse bleeding. This was recognised intraoperatively and managed successfully by external approach.

Author's Affiliation: [1]Resident, [2]Professor and Unit Chief, [3,4]Associate Professor, [5]Assistant Professor, Department of CTVS, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bengaluru 560069, Karnataka, India.

Corresponding Author: Chandana NC, Associate Professor, Department of CTVS, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bengaluru 560069, Karnataka, India.

E-mail: chandu219@gmail.com

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CASE REPORT

A 62 year old female patient came with complaints of chest pain, syncope and breathlessness since 3 months. Her echocardiogram showed severely stenotic and calcified aortic valve with annular size of 24 mm and AV gradient 107/74 mm Hg. Her coronary angiogram revealed normal epicardial coronary arteries. She underwent aortic valve replacement with 21 mm mechanical valve prosthesis.

Post aortic valve replacement, while patient was being weaned off by pass the pericardial well was persistently filling, indicating significant bleeding from anatomical reasons. On inspection, bleeding was noticed from the posterior atrioventricular groove (Fig. 1).

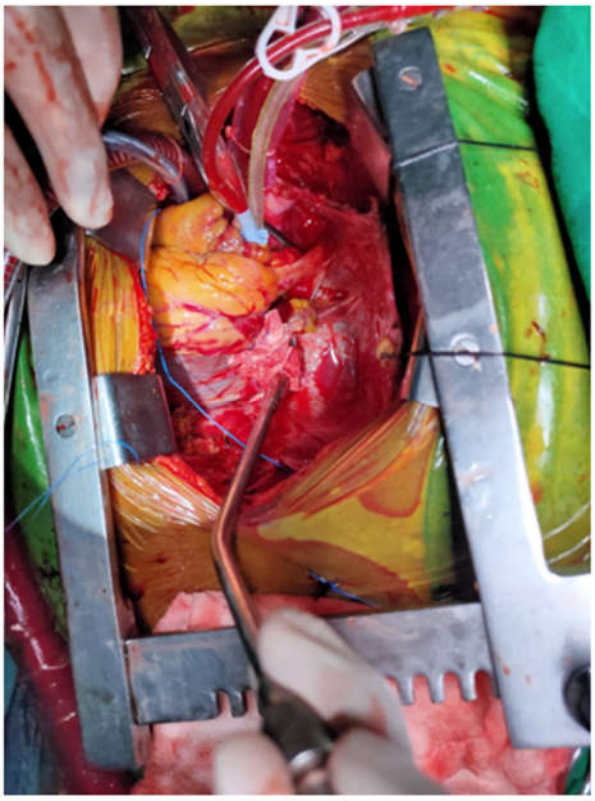

Fig. 1: Operative photograph showing tear repaired with Teflon felt using 4-0 polypropylene sutures and cyanoacrylate applied topically to act as a sealant.

This injury to the posterior atrioventricular groove could have occurred during RSPV venting. A 16 frenchmedtronic DLP vent was used for venting the left ventricle during surgery. It was a Treasure's type I injury. We again arrested the heart, the site of injury causing bleeding was closed with interrupted 4-0 polypropylene mattress sutures with teflon felt on either side. Bleeding reduced but persisted. To achieve hemostasis was a challenging task. Hence, cyanoacrylate was applied topically. This acted as a sealant and hemostasis was achieved (Fig. 2). Patient had no ischemic changes in the electrocardiogram (ECG).

She was then weaned off CPB and shifted to intensive care unit with stable hemodynamics. Post-operatively, 2-Dimensional echocardiogram was done and repeated at the time of discharge. It revealed no effusion, clots or regional wall motion abnormalities. Patient was discharged on the sixth post-operative day and is on regular follow up.

DISCUSSION

The RSPV vent is commonly used by surgeons in patients undergoing aortic valve replacement as venting prevents left ventricular distention, decreases wall tension, eliminates isovolumic systolic pressure work, and improves sub-endocardial coronary flow. Though venting through the left ventricular apex has been mentioned in literature, its not preferred by surgeons. There are no reports available pertaining to trauma to the posterior atrioventricular groove through the right superior pulmonary vein approach. *Treasure* et al[3] in 1974 proposed a classification of AV groove injuries into two types corresponding to the location of the epicardial tear. A type I lesion is defined as a defect along the posterior atrioventricular sulcus, and type II designation refers to a rupture of the posterior wall of the left ventricle at the base of the papillary muscle. In 1979, *Miller* et al.[4] suggested the addition of a third category type III in which the rupture is on the posterior wall of the left ventricle between the base of the papillary muscle and the atrioventricular groove. We encountered a Type I lesion. Traditionally, hemostasis has been achieved using sutures and teflon felt as in our case. If bleeding persists, cyanoacrylate can be topically applied over the felt to act as a sealant and achieve complete hemostasis. Surgical adhesives are being increasingly used in cardiac surgery. Different types of adhesives include aldehyde based glues (BioGlue), fibrin sealants (Tissel), collagen based adhesives and cyanoacrylates.[5] Cyanoacrylate is used to control hemorrhage in critical situations.[6]

Studies have shown that it lacks bacterial contamination.[7] It also has bacteriostatic activity against most microorganisms.[6,7] Cyanoacrylate is not only cost effective but can be used in desperate situations warranting hemostasis. As such it can be seen as an adjunct in cardiac surgery considering its life saving results and documented safety.

CONCLUSION

All cardiac surgeries require paramount care and hence performing safe surgery is of importance. It is imperative that one must be watchful of unusual complications and be prepared to manage them. In desperate times with traditional methods failing to control bleeding; cyanoacrylate has proven to successfully achieve hemostasis and may be used as an adjunct.

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Conflict of Interest: None

Informed consent of patient: Informed written consent was obtained from the patient. Ethical approval was not sought for the present study because no identifiable images or information were used.

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