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Case Report

Iatrogenic Perforation of Left Ventricle during Left Ventricular Angiography: A Case Report

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Abstract

Left ventricular (LV) perforation accompanied by cardiac tamponade is a rare but life threatening complication with substantially high intrahospital mortality and usually requires emergent surgical repair. In the current era of interventional cardiology, perforation of cardiac structures during cardiac catheterization is rare. We report, a 45 year old lady with normal left ventricle who developed left ventricular perforation following left ventricular angiography with a pigtail catheter leading to cardiac tamponade.

Keywords: *Cardiac Catheterization; Left Ventricle Perforation; Pigtail Catheter*

Introduction

Left ventricular (LV) perforation is a rare but most dreaded complication of cardiac catheterization and usually requires emergent surgical repair. It occurs most commonly in the setting of acute myocardial infarction. Frequency of myocardial perforation (MP) reported in acute myocardial infarctions is around 0.45% [1]. Other causes of MP include blunt and penetrating cardiac trauma, primary cardiac infection, aortic dissection and is rarely related to cardiac catheterization procedures. LV perforation occurs in 0.15% of Transcatheter Aortic Valve Replacements (TAVR) and are mostly related to guide wire injuries [2]. LV perforation during coronary angiography is extremely rare. Here, we present a case of perforation of normal left ventricle with pigtail catheter.

Case Report

A 45 year old lady with history of dyspnea NYHA class II was evaluated at outside hospital. 2D echo showed 14mm ostium secundum atrial septal defect with left to right shunt and mildly dilated right atrium and right ventricle. Cardiac catheterization with oximetry and coronary angiography was planned. Cardiac catheterization showed step up in right atrium. Coronary angiography revealed normal coronary arteries. Left ventricle angiography was done with pigtail catheter, which showed normal left ventricular systolic function. Post procedure, patient developed cardiac tamponade. Emergency pericardiocentesis with autotransfusion of aspirated blood was done and injection Protamine was given. On reviewing the angiography, left ventricle perforation was noted during left ventricular angiography (Figure 1). Emergency surgical closure of the perforation was planned. But as the blood stopped oozing, as no recollection of blood in pericardial space noted on 2D echocardiography, surgery was deferred. There was no drainage through pigtail for twenty-four hours and pigtail was removed. Patient was discharged from the hospital in hemodynamically stable condition. Seven days later, she started developing breathing difficulty at rest and was brought to our hospital. Her vitals were HR- 120/min, BP-100/60 mmHg, RR- 24/min. 2D echocardiography showed large pericardial effusion with no evidence of tamponade. Cardiothoracic consultation was taken for closure of the defect. Two hours later, she developed cardiac tamponade and emergency pericardiocentesis was done. Then she was taken up for

surgery. Intraoperatively, two partially sealed defects were noted in the left ventricle which were sealed with bio glue. Additionally, the atrial septal defect was found to be very small (6 mm diameter) and was not closed. Post operative period was uneventful and she was discharged from the hospital in stable condition. On follow up at 30 days, patient was clinically stable and no pericardial effusion was seen on 2D echocardiography.

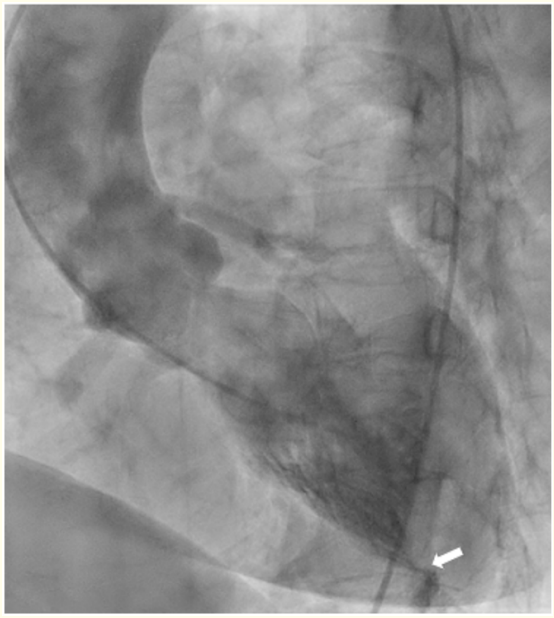

Figure 1: *Left ventricular angiography with pigtail catheter. White arrow showing leaking of dye from left ventricular cavity into pericardium.*

Discussion

Left ventricular perforation with pigtail catheter is infrequent but a life-threatening complication. Risk factors for left ventricular perforation are use of end hole catheters, infarcted and friable myocardium, hypercontractile state, thin muscular wall and a small Left ventricle cavity. If left ventricular perforation is accompanied by acute cardiac tamponade, the location, mechanism of injury and extent of bleeding should be identified immediately. Only a few cases demonstrate feasibility of percutaneous management of left ventricular perforation with pseudoaneurysm and sealing through closure devices [3,4]. Immediate surgical intervention is required in almost all cases [5]. The helical muscle configuration of left ventricle with resulting transverse and circumferential muscle contraction of descending and ascending segments may support sealing of perforation site [6]. This passive self-sealing capacity of the left ventricle is limited to punctual injuries and fails in longish lacerations. Even in punctual injuries, constant haemodynamic and echocardiographic assessment is essential and conversion to open heart surgery may be required in some cases if bleeding recurs.

In the above case, LV perforation occurred during angiography of a non-infarcted, normal size LV with a normal wall thickness. LV perforation has been reported previously with use of end hole catheters for angiography, but in the present case LV perforated even with a

pigtail catheter. Possible reason for LV perforation in the present case could be LV injury related to guide wire as in TAVR. Management of LV perforation requires emergent surgical repair in almost all the cases. But in the above case, possibly due to passive self-sealing capacity of left ventricle, patient stabilized initially with pericardiocentesis and did not require emergent cardiac surgery. Subsequently, patient developed subacute cardiac tamponade and destabilized. Then, she was taken up for cardiac surgical repair, where intraoperatively, partially sealed defects were seen in the left ventricle. The partial sealing of defects in LV can be explained by helical muscle configuration of left ventricle. Hence, passive sealing capacity of LV may seal the LV perforation either completely or partially. Partially sealed defects may present later with subacute cardiac tamponade. So, constant hemodynamic monitoring post initial stabilization and regular clinical and echocardiographic follow up post discharge is required to assess the recurrence of cardiac tamponade.

Conclusion

In conclusion, this case highlights a rare possibility of perforation of normal LV during LV angiography with a pigtail catheter. Secondly, stabilization of patient with pericardiocentesis alone may defer the need for emergent cardiac surgical repair, but warrants constant hemodynamic monitoring and regular follow up to assess the recurrence of subacute tamponade requiring surgical cardiac repair, as was seen in our case.

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