

Rare Incidence of Iatrogenic Aortocoronary Dissection by Diagnostic Transradial Cardiac Catheterization- You Expect Something and You See Something Else

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Abstract

A combined, type A Aortic dissection with coronary artery dissection during diagnostic coronary angiography is an extremely rare, but a very critical complication with high mortality. During a coronary artery involvement as an entry point, it can be treated by sealing the dissection plane with a coronary stent. Extensive dissections may require a surgical intervention. Different factors that influence the management decision includes hemodynamically unstable patient, aortic injury mechanism, size, severity, direction in which the dissection spreads, intimal flap presence, and preexisting atherosclerotic disease. We present a case of type A aortic dissection including dissection of ostium of right coronary artery (RCA) caused by a diagnostic coronary catheter. This iatrogenic aortic dissection required emergent coronary artery bypass graft (CABG) to RCA and surgical repair with supracoronary replacement of the ascending aorta.

Keywords: Iatrogenic Acute Aortic Dissection; Type A; Diagnostic Coronary Angiography; CABG; RCA

Introduction

A relatively rare Iatrogenic aortic dissection is a life threatening complication of coronary angiography and angioplasty that requires early recognition and frequently requires emergent surgical treatment [1-4] with a frequency of about 0.02 - 0.04% [5,6]. Aortic dissection may lead to serious complications like myocardial infarction or sudden cardiac death. Most described cases occurred during angiography and angioplasty of the right coronary artery (RCA) [1,7,8]. The morphological and structural differences between right and left coronary arteries may explain the fact that left aortic sinus is less prone to iatrogenic dissection [9]. Several operators treated right coronary artery dissections by coronary artery bypass grafting with aortic dissection repair [10], some just stented the RCA and monitored the aortic dissection by means of transesophageal echocardiography (TEE) [11], while others implanted coronary stents to maintain coronary blood flow before surgery and repairing aortic dissection surgically.

In our patient, RCA dissection was treated by SVG graft and surgical repair performed with supracoronary replacement of the ascending aorta.

Case Report

A 68-year-old Female, a known case of Ischemic heart disease, hypertension, PVD, lower limb tropical ulcer was admitted for further diagnostic work-up and treatment plan. The patient had no abnormality on physical examination. Electrocardiography (ECG) was normal and echocardiography showed no regional wall motion abnormality with a normal ejection fraction.

Coronary angiography was performed via right transradial approach using a 5 French Tiger (Terumo Corporation, Somerset, New Jersey) diagnostic catheter. Coronary angiography demonstrates normal left coronary circulation (Figure 1 and 2). When tried to engage right coronary artery, first injection for obtaining image revealed a dissection of ostial RCA and ascending aorta (Figure 3 and 4) followed by an ascending aortography screening confirmation.

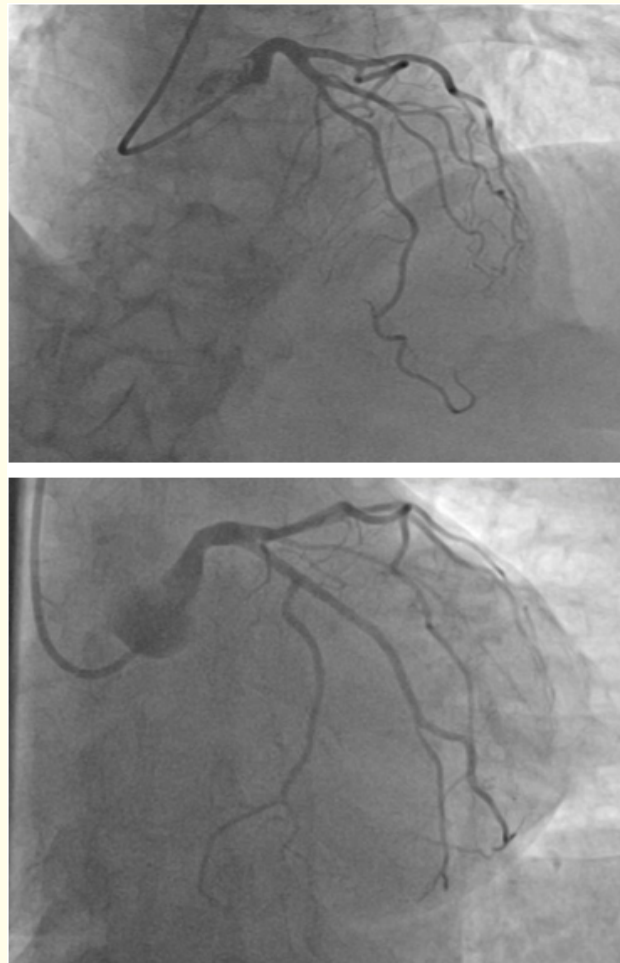


Figure 1 and 2: Coronary angiography demonstrates normal left coronary circulation.

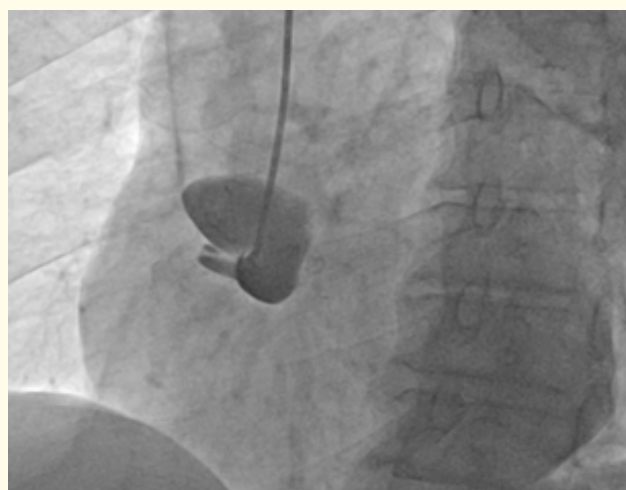


Figure 3: Catheter induced dissection.



Figure 4: Ascending aorta screening reveals localized dissection with contrast retention within the false lumen.

The patient shortly experienced a severe sustained chest pain, ischemic changes in ECG in inferior leads and was hemodynamically unstable. An urgent Heart team discussion was followed up and was decided to revascularise RCA.

CABG with an SVG to RCA was performed. After grafting RCA dissection plane moved towards ascending aorta and surgical repair with supracoronary replacement of the ascending aorta was performed with a SVG to RCA.

Patient recovered well and remained stable with no electrocardiogram (ECG) changes. Cardiac enzymes, which were elevated, normalized within 1 week. ECG and Echocardiography performed after the operation did not reveal regional wall motion abnormalities. Patient remains well till date.

Discussion

Iatrogenic aortic root dissection is a rare and a potentially catastrophic complication of coronary angiography and intervention. In published reports, the estimated incidence of iatrogenic aortic dissection is 0.02% [1]. The right coronary ostium is involved in most cases and is most often guiding catheter induced [1-3].

Most of the iatrogenic aortic dissections from the coronary ostia remain limited to the coronary sinus and almost all are confined to the ascending aorta (Stanford type A; DeBakey types 1 or 2) [1,2]. The mechanism of dissection of the RCA occurs more often than the left coronary artery is not yet clear [3,4,12]. A histological biopsy was taken from the site of dissection which shows an atheroma, explaining a pre-existing atherosclerotic plaque at the dissection site [13]. Two mechanisms for dissection flap spread have been put forward, which further contrast injection into the already existing dissection and shearing forces during systole and diastole [3,12]. Several pre-existing factors might play an important role in the propagation of the dissection: (a) the presence of calcification in the aortic root and at the dissection site, which reflects loss of elastic properties of the vessel; (b) it is common in older patients i.e. 60 years old and those with hypertension, reflecting on the process of cystic medial degeneration of the media of aorta and the coronary sinuses; (c) it is common in patients with recent infarct, reflecting possibility of inflamed vessel wall onto which PTCA is being attempted and (d) use of intra-aortic balloon pump (IABP) may accelerate ante grade and retrograde extension of dissection [3,12].

Conclusion

In conclusion, this case demonstrates an extremely rare iatrogenic acute aortic dissection where coronary arteries were involved as well, which most likely occurred as a result of rather aggressive use of a catheter as well as other co-morbidities involved. Fortunately, this patient recovered well after urgent replacement of the supracoronary ascending aorta and SVG to right coronary artery. However, this complication is extremely dangerous and is a life-threatening situation; therefore, it is critically important to prevent a catheter-induced aortic dissection during any interventions. In particular, the operator should be extremely meticulous in maneuvering the catheter's knowing the possibility of dissection and other complications.

Conflict of Interests

The authors declare no conflict of interests regarding the publication

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