

Complete coronary stent fracture (type V) with pseudoaneurysm formation in right coronary artery managed by surgical revascularization-A rare case report

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Abstract: Coronary stent fracture is an uncommon complication of stent implantation. We report a case of 66 yrs old male patient presented with unstable angina who underwent stenting in right coronary artery 3 months ago. Computed Tomography Coronary angiogram revealed complete type V stent fracture with pseudoaneurysm formation in right coronary artery. This was managed by surgical revascularization by off pump coronary artery bypass grafting. We are reporting this case due to rarity of complete coronary stent fracture (type V) and relatively early presentation.

Keywords: Stent fracture, CABG, Pseudoaneurysm

I. Introduction

The occurrence of stent fractures (SF) is recognized as a potential complication of stent deployment. Its incidence varies markedly in published reports, range from less than 1% to 8% [1]. Exact incidence could not be determined because most cases are not recognized due to difficulty in diagnosis. Stent fracture has currently become an important concern after drug-eluting stent (DES) implantation due to its potential association with in-stent restenosis (ISR) and stent thrombosis [2]. Stent fracture can also lead to coronary pseudoaneurysm formation, which can be life-threatening. The management of stent fracture depends on the clinical consequences it leads to and whether the patient is symptomatic requiring revascularization [3].

II. Case Report

A 66 years old male patient, a known case of coronary artery disease (post PTCA to RCA June 2016) presented to us on September 2016 with history of chest pain for last 3-4 days for which he was investigated. In June 2016 due to inferior wall MI PTCA done to RCA (culprit vessel) only. His coronary risk factors were Diabetes and hypertension. **2D Echocardiography** was suggestive of regional wall motion abnormality (RWMA) and hypo kinetic apex. Normal left ventricle (LV) size and fair LV systolic functions (EF) 50% and mild MR. **Coronary angiography** revealed proximal RCA stent fracture with large pseudoaneurysm formation with in-stent restenosis (ISR) [fig. 1]. Distal RCA stent was patent. Ostial LAD was 80%, mid LAD was 90% blocked, ostial diagonal (D1) 90% blocked and. Left main and circumflex artery had non critical disease. **Computed tomography (CT) coronary angiography** was done to confirm diagnosis which revealed there is no contrast opacification seen with in proximal RCA stent likely in stent restenosis (ISR). There was fracture of proximal RCA stent with displacement of 3.4 mm between the proximal and distal part of fractured stent [fig. 2]. There was lobulated contrast opacified pseudoaneurysm seen at the site of fracture measuring approximately 19.1×12.6 mm in size. Distal RCA stent was patent.

After confirmation of diagnosis patient posted for surgical revascularization .Off pump coronary artery bypass grafting (OP CAB) × 3 was done. Intra operatively heart was normal size, inferior area showed hyperemia and echymosis .There was moderate inferolateral hypokinesia present. Pedicled left internal mammary artery (LIMA) grafted to left anterior descending artery (LAD) which was 1.75 mm in size. Reversed saphenous vein was grafted to Posterior descending artery (PDA) 1.5 mm and diagonal (D1) 1.75mm. All were diffusely diseased vessels with visible plaquing seen upto distal most ends. In view of non critical left main and circumflex coronary artery obtuse marginal (OM) graft was avoided. Pseudoaneurysm was left intact and we surgically bypass that territory by putting reversed saphenous vein graft to posterior descending artery (PDA).Post operative recovery was uneventful and patient discharged on 6th post operative day. After 1 month follow up patient was perfectly alright.



Fig 1: Coronary angiogram showing stent fracture with pseudoaneurysm formation in right coronary artery.

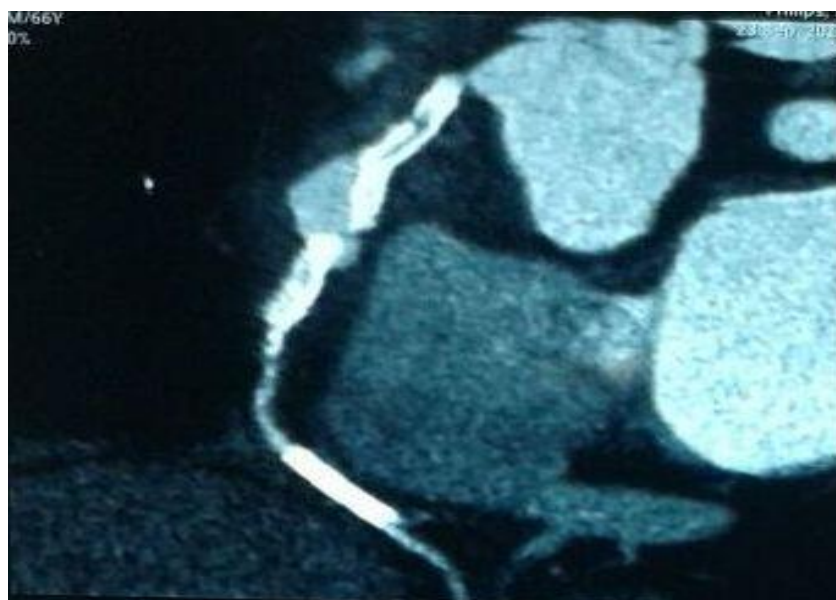


Fig 2: Computed Tomography Coronary angiography showing complete type V stent fracture in proximal Right coronary artery stent.

III. Discussion

There is comparatively little literature on coronary stent fracture (SF) since it is an uncommon and late complication of stent implantation. Its incidence varies markedly in published reports, ranging from less than 1% to 8%. In a study by **Lee *et al.***, [4] the median time interval from stent implantation to detection of fracture at repeat angiography was more than 7 months. Our patient presented with unstable angina after 3 months of stent placement for that repeat coronary angiography done which revealed stent fracture which is quite earlier than reported series. In a study by **Park *et al.***, [5] 50% of stent fracture were of type 1, and overall, types 1, 2, and 3 represented 96.1% of all cases, while type 4 represented only 3.9% and there were **no type V fractures**. Our patient had type V fracture which is quite rare.

Anatomic and pathologic factors for stent fracture are tortuous and highly angulated vessel, Long lesions, Complex lesions, and Stent location. Stent fracture is more common in right coronary artery (RCA) and saphenous graft locations as these vessels are dynamic during cardiac contractions [6].

According to Nakazawa et al. [3] (radiographic classification for stent fracture) is **type I stent fracture**—Single strut fracture, **type II stent fracture**— ≤ 2 fractured struts, **type III stent fracture**— ≤ 2 fractured struts with deformation, **type IV stent fracture**—Strut fractures with transection without gap, **type V stent fracture**—Strut fractures with gap within stent body. In our patient there was fracture of proximal RCA stent with displacement of 3.4 mm between the proximal and distal part of fractured stent suggestive of type V stent fracture.

Another complication of Stent fracture includes pseudoaneurysm formation. Coronary pseudoaneurysm after coronary intervention is rare, with a reported incidence of 0.3% to 6% in various studies. A majority of isolated strut fractures goes unnoticed, as the patients remain asymptomatic, and it may only be an incidental finding on repeat angiography. It is usually the cases of stent fracture that present with adverse pathologic events, such as stent thrombosis, ISR, coronary aneurysm formation, and total occlusion of the coronary artery, which result in adverse cardiac events that result in a diagnosis of stent fracture.

Diagnostic modalities are conventional fluoroscopy, intra venous ultra sound (IVUS) and multidetector computed tomography (MDCT). Pang et al.[7] concluded that Computed tomography has a high accuracy when used to evaluate coronary Stent Fracture. The management of stent fracture depends on the clinical consequences it leads to and whether the patient is symptomatic. Stent fracture related restenosis can be treated with repeat stenting at the fracture site but Surgery may be required in some cases where it is not possible to cross the lesion having broken struts and higher grade stent fracture. In our patient we decided to perform surgical revascularization. Reasons for that were presentation of patient with unstable angina, in stent restenosis (ISR), grade V stent fracture and presence of pseudoaneurysm at the fractured site. Pseudoaneurysm was left intact and we surgically bypass that territory by putting reversed saphenous vein graft to posterior descending artery (PDA).

IV. Conclusion

This case report described a rare case of complete coronary stent fracture (type V) that presents to us after three months of stent placement. We managed successfully by surgical revascularization by off pump coronary artery bypass surgery.

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