



## CORONARY ARTERY STENT INFECTIONS

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**ABSTRACT** Coronary artery stent infections are infrequent, but associated with a high mortality rate. Coronary stents were inaugurated in 1987 but, only 16 cases of infection have been reported so far. We report a new case in a 53-year-old man presented to our hospital with complaints of fatigue and weight loss for one month. He presented with chest pain one month ago at a local hospital and upon investigation with a coronary angiogram was diagnosed to have significant double vessel disease. Angioplasty was done coupled with eluting stent in the left anterior descending artery (LAD) and the patient was discharged after a few days on oral medication. Blood culture detected *Pseudomonas aeruginosa* and was treated with antibiotics to which the fever subsided. Current troponin I was elevated and ECGs showed dynamic ST changes in anterior chest leads indicating a possible anterior myocardial involvement. Echocardiogram showed regional wall motion abnormalities with mid, apical septum and anterior segment hyperkinesia and an ejection fraction of 40%. No vegetations or pericardial effusion were seen, other vessels had no significant findings. Angiogram was done through the right radial artery which showed a patent stent with a large aneurysm spanning over the proximal and middle zone of the stented segment. This was inferred to be possibly mycotic in origin due to the 10 days history of *pseudomonas* infection after angioplasty. Another small aneurysm was seen distal to the stent on the LAD. Cardiothoracic surgery opinion was taken and the patient underwent a successful bypass surgery. The patient is on regular follow-up.

**KEYWORDS :** *Pseudomonas aeruginosa*, Left anterior descending artery (LAD), Coronary angioplasty, Coronary stent infection

## INTRODUCTION

A coronary angioplasty is a therapeutic procedure to treat the stenotic coronary arteries of the heart found in coronary heart disease (1)

A stent may be inserted at the time of ballooning to ensure the vessel remains open, and the balloon is then deflated and withdrawn (2)

These stenotic segments of the coronary arteries arise due to the buildup of cholesterol-laden plaques that form in a condition known as atherosclerosis (3)

Percutaneous coronary intervention( PCI) for stable coronary disease has been shown to significantly relieve symptoms such as angina, or chest pain, thereby improving functional limitations and quality of life (4)

Often, peripheral angioplasty is used in conjunction with guide wire, peripheral stenting and an atherectomy (5)

Angioplasty can be used to treat advanced peripheral artery disease to relieve the claudication, or leg pain, that is classically associated with the condition.(6)

Coronary angioplasty is an effective mode of treatment in acute coronary syndrome. Stent placement can be done to reduce the risk of restenosis. The bare metal stent is seldom used as the drug eluting stents have proven to be superior in most patients. A rare complication of coronary stent placement is a localized infection in and around the stent area. This may weaken the vessel walls leading to an aneurysm formation which if left untreated can have a devastating prognosis. Here we present a case in which a patient with coronary angioplasty presented with mycotic aneurysms after an early stent infection, thereby requiring further surgical management.

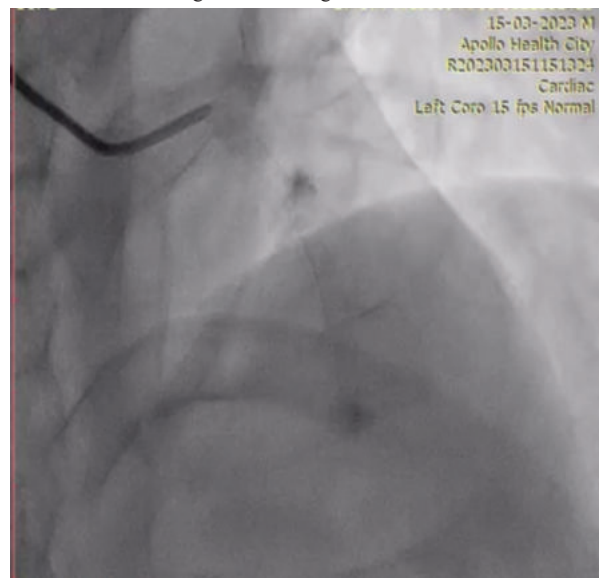
## Background

Coronary stent infection (CSI) is the rarest complication associated with the percutaneous coronary intervention, occurring in less than 0.1% of cases. So far, all reported instances are limited to case reports. CSI presents itself in various, often confusing, ways in clinical settings. Therefore, the current systematic review summarizes reports of CSI's clinical presentations, causative pathogens, diagnoses and treatments.

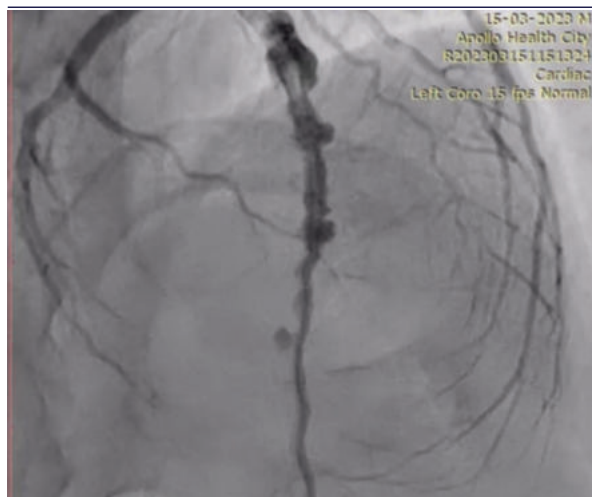
## Case Report

53 year old male presented to our hospital with complaints of fatigue

and weight loss for one month. He also complained of intermittent chest pain associated with sweating for the past 3 days. He presented with chest pain one month ago at a local hospital in Jabalpur and upon investigation with a coronary angiogram was diagnosed to have significant double vessel disease. Angioplasty was done coupled with placement of a 2.75x48 mm Xiene Alphiene Evorolimus eluting stent in the left anterior descending artery (LAD) and the patient was discharged after a few days on oral medication. The patient developed fever on day 3 of stent placement which persisted for 10 days. Blood culture detected *Pseudomonas aeruginosa* and was treated with antibiotics to which the fever subsided. Current troponin I was elevated and ECGs showed dynamic ST changes in anterior chest leads indicating a possible anterior myocardial involvement. Echocardiogram showed regional wall motion abnormalities with mid, apical septum and anterior segment hypokinesia and an ejection fraction of 40%. No vegetations or pericardial effusion were seen, other vessels had no significant findings.



**Figure 1:** Coronary angiogram video done in our hospital showing both the proximal larger aneurysm and distal smaller one.



**Figure 2:** Photo during the coronary angiogram done in our hospital clearly showing aneurysms in left anterior descending artery upon dye passage.

Angiogram was done through the right radial artery which showed a patent stent with a large aneurysm spanning over the proximal and middle zone of the stented segment. This was inferred to be possibly mycotic in origin due to the 10 days history of pseudomonas infection after angioplasty. Another small aneurysm was seen distal to the stent on the LAD. Cardiothoracic surgery opinion was taken and the patient underwent a successful bypass surgery. The whole LAD artery was excised and the left main coronary artery tied (as the stent was placed from the ostium of left main coronary into the LAD). The resulting block in left circumflex was dealt with by grafting the obtuse marginal branch of left circumflex. This was done to allow complete removal of the large aneurysm. Patient was put on aspirin, ticagrelor, rosuvastatin, ivabradine and nicorandil after the operation. He was admitted in the hospital for a total of 17 days and was discharged after complete recovery in a stable hemodynamic state. He was advised to look out for episodes of fever, new onset chest pain, difficulty breathing or local bleeding from surgical wound site and asked to report immediately to the nearest hospital in any of these cases. He was enrolled in the cardiac rehabilitation program which ensured faster recovery.

## DISCUSSION

Coronary stent infections are one of the rarest complications associated with the procedure with a prevalence of 0.1%<sup>1</sup>. The most common presenting symptoms were chest pain and fever<sup>7</sup>.

A more common cause of mycotic aneurysm formation after coronary angioplasty is local spread from coexisting infective endocarditis. Development of mycotic aneurysms in cases without antecedent infective endocarditis is much more rarer<sup>8</sup>.

A possible mechanism suggested was the role of Sirolimus from the drug eluting stents acting as a predisposing factor. Evorolimus (a derivative of Sirolimus) through its antiproliferative action on smooth muscle cells, fibroblasts and endothelial cells may inhibit the local healing process. This may contribute to development of an aneurysm by impairing the healing required for repair after minor vessel trauma caused during the angioplasty procedure<sup>9</sup>.

The investigation of choice for detection of these aneurysms is the coronary angiogram<sup>10</sup>.

Stent infections can be classified as early and late with 10 days being the cut off. Staphylococcus aureus was the most frequently identified organism with methicillin sensitive staphylococcal predominance in early stent infections. Pseudomonas has been isolated and was also associated with early onset stent infections<sup>7</sup>. Drug eluting stent related infections can be hard to treat.

Almost all untreated infected aneurysms eventually lead to rupture. Mycotic aneurysms that rupture can cause devastating sequelae such as cardiac tamponade and sudden cardiac death<sup>10</sup>.

Early infections are usually amenable to medical treatment and have a better outcome. A combination of surgical and medical therapy has

shown to give the best outcomes. Late stent infections on the other hand need surgical treatment as soon as possible. Prolonged antibiotic use for a minimum of 4 weeks along with complete stent removal is preferred.

In cases where stent removal is difficult, antibiotics should be given for longer durations. Strict sterile precautions while placing the stent coupled with early removal of arterial sheath and avoiding repeated procedures through the same sheath help in reducing stent related infections as these were the proposed risk factors<sup>11</sup>.

The mortality rate in coronary stent infections is high and was estimated to be 26.47%<sup>1</sup> in one study while other estimates are even higher at 40-55% in medically treated patients and 35% in patients who underwent surgery<sup>12,13,14</sup>.

## CONCLUSION

Coronary artery stent infections though rare can have high mortality rates especially if left untreated. Clinicians should be extremely wary of symptoms such as fever or return of chest pain particularly in the first 4 weeks after the procedure. Early detection, a full course of antibiotics and prompt surgical removal of the aneurysms can help reduce mortality in these cases. Most reports on risk factors for development of these infections are age old and are primarily based on case report studies. Therefore, through our case report we want to emphasize the need for active research in determining risk factors for development of this devastating complication and thereby help reduce it as much as possible as coronary artery stenting has grown to become one of the most common interventional cardiology procedures done in modern times.

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