Case Report

Coronary Artery Perforation

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Coronary artery perforation is a rare but dreadful complication; overall incidence is around 0.5-0.9%. This complication can result in potentially life threatening cardiac tamponade and cardiac arrest. Perforation was caused by coronary wire, oversizing or ruptured balloon and stent, especially in the advance of interventional devices and use of antithrombins and antiplatelets. Non-surgical management is successful in most cases, but may required surgical intervention in some cases with pericardial patch.

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Coronary artery perforation is one of the most serious and important complications of percutaneous coronary intervention (PCI) and associated with significant morbidity and mortality. Prompt management is therefore critically important.

Case Report

A 54 years old male was admitted to the hospital for coronary angiogram (CAG) because of typical anginal pectoris. His coronary risk factors included hypertension and current smoking.

Echocardiography showed normal left ventricular function, no chamber enlargement and no valvular heart disease.

His coronary angiogram demonstrated triple vessel disease.

LM (Left Main Artery): Normal.

LAD (Left anterior descending artery): 75% stenosis proximal LAD.

LCX (Left circumflex artery): CTO (complete total occlusion) at mid LCX, and received collateral from LAD.

RCA (Right coronary artery): CTO at proximal RCA and received collateral from LAD, dominant vessel.

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The patient was advised for Coronary artery bypass graft (CABG), but he strongly refused. The strategy for percutaneous coronary intervention (PCI) to RCA CTO first with intention to do LAD lesion in case of successful RCA lesion was discussed with the patient. Patient was agreeable, so PCI was attempted to proximal RCA lesion.

Procedure

PCI was done via right femoral artery with AL1 guiding catheter after being anticoagulated with heparin. The lesion was passed with Conquest Pro 12. After balloon pre-dilatation, the lesion was stented with bare metal stent (BMS) 4.0 x 28 and 2.5 x 23 mm. from proximal to mid RCA. Post dilatation was done with high pressure balloon 4.5 x 15 mm.

Subsequent coronary angiogram demonstrated coronary rupture with large leakage. Immediate re-inflation with low pressure balloon was done and anticoagulation was reversed with protamine sulfate 50 mg. Emergency echocardiography was done in the catheterization laboratory which showed small pericardial effusion without cardiac tamponade, cardiac surgeon was informed for possible emergency CABG.

Leakage continued after prolonged balloon inflation, Drug eluting stent (DES) was deployed (Sandwich Technique) across the leak in an attempt to seal it. Leakage continued despite double stent, decision was made to place JOMED cover stent graft.

Final coronary angiogram showed good results without extravasations of contrast and good flow to distal RCA.

Discussion

Coronary artery perforation is a rare but serious and important complication from percutaneous coronary intervention and associated with significant morbidity and mortality. This complication can result in bleeding into surrounding tissue and potentially life threatening cardiac tamponade. Prompt management is therefore critically important. Overall incidence is around 0.5-0.9% especially in the advance of interventional era, devices, technique and use of antithrombins and antiplatelets[1,2].

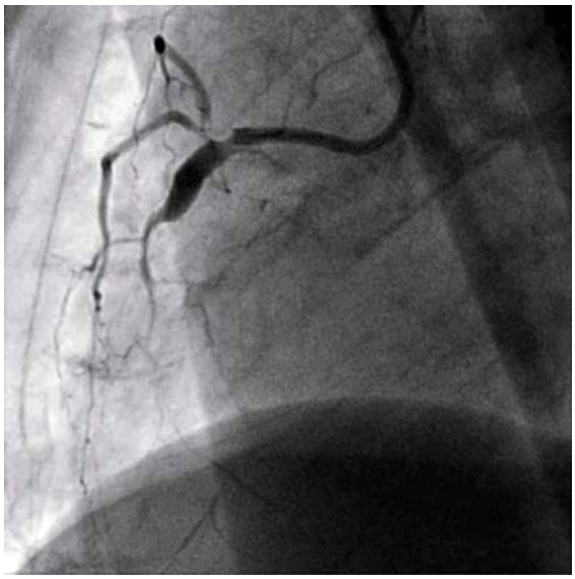

Fig. 1 CTO at proximal RCA

Perforation was caused by coronary wire especially hydrophilic and stiff wire, over sizing or ruptured balloon and stent[2]. Risk factors of coronary perforation were complex lesion, severely stenotic and calcified lesion, chronic total occlusion, small and diffuse diseased vessel[3]. Chronic renal insufficiency and severity of perforation predict mortality especially in women and the elderly[1,4].

Classification based on angiographic appearance of perforation into 3 types:
Type I: extraluminal crater without extravasation,
Type II: myocardial blushing without contrast jet extravasation,
Type III: extravasation through frank perforation > 1 mm[4].

Management should be done immediately with prolonged balloon inflation at low pressure, 2-6 atm for 10-30 minutes. Reversal of anticoagulation was done by protamine and GP IIb/IIIa should be stopped. Echocardiography should be done to rule out

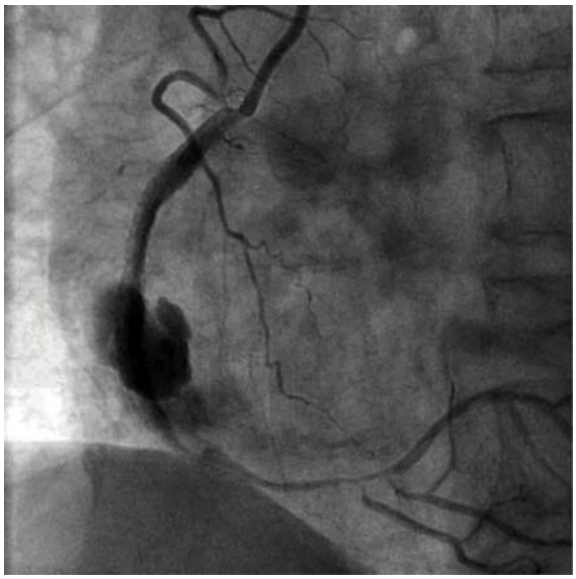

Fig. 2 Coronary perforation with extravasation of contrast at mid RCA after high pressure balloon dilatation

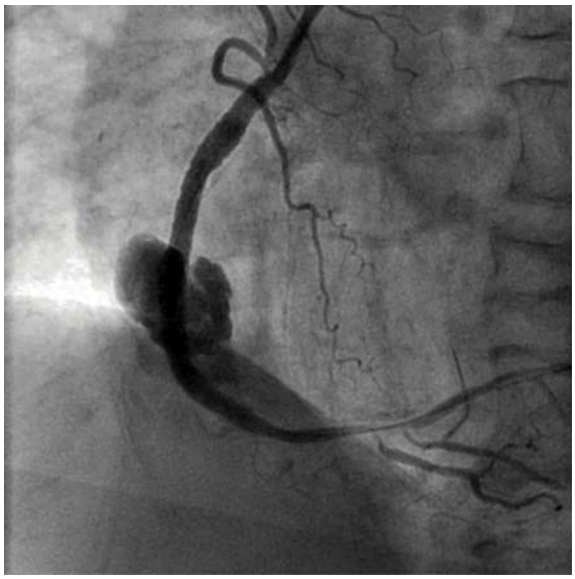

Fig. 3 Leakage sealed after stent graft placement with appearance of good distal flow

pericardial effusion and cardiac tamponade. Cardiac tamponade can de delayed up to 24 hours despite the absence of coronary perforation at the time of procedure. Stent sandwich technique is another option to seal the perforation[5]. Stent graft represent interesting concept and has benefit in severe case, but long-term patency rate is an issue. JOSTENT coronary stent graft is composed of PTFE (polytetrafluoroethylene) layer sandwiched between two stainless steel stents. The minimum expansion pressure is 14 atm in order to achieve optimal opposition to the vessel wall. The use of IVUS is strongly recommended. Cardiothoracic surgeon should be consulted. Non-surgical management is success in most cases[6] but may require surgical intervention in some cases with pericardial patch[7].

Serious complication composed of pericardial tamponade 12.2%, cardiogenic shock 9.8% and cardiac arrest 2.4%[8].

This patient illustrated type III perforation, most likely from over sizing post dilatation ballooning. We tried stent sandwich technique but unsuccessfully. JOSTENT coronary stent graft was deployed with success to seal the leakage and appearance of good distal flow. The problem about which we are concerned is the long-term outcome after the use of stent graft techniques, which is not well known.

He had an uneventful recovery and was scheduled back for PCI to LAD in the next 4 weeks.

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ภาวะหลอดเลือดแดงแตก

สุรเชษฐ์ เลิศถิรพันธุ์

หลอดเลือดหัวใจทะลุเป็นภาวะที่พบไม่บ่อยแต่เป็นอันตรายอย่างมาก สามารถทำให้เกิดเลือดคั่งในช่องเยื่อหุ้มหัวใจและหัวใจหยุดเต้น อุบัติการณ์ประมาณร้อยละ 0.5-0.9 หลอดเลือดหัวใจทะลุเกิดจากขดลวดและบอลลูนที่ใช้ในการรักษาโรคหลอดเลือดหัวใจอุดตัน โดยเฉพาะการใช้ยาละลายลิ่มเลือดและยาต้านเกล็ดเลือดที่เพิ่มมากขึ้นด้วย ส่วนใหญ่สามารถแก้ไขได้โดยไม่ต้องผ่าตัด มีผู้ป่วยเพียงบางรายเท่านั้นที่ต้องเข้ารับการผ่าตัดฉุกเฉิน
