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A surgical case for pregnancy-related spontaneous coronary artery dissection

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A surgical case for pregnancy-related spontaneous coronary artery dissection

Running head: surgical case for coronary dissection

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Abstract

The efficacy of coronary artery bypass grafting (CABG) for pregnancy-related spontaneous coronary artery dissection (SCAD) is controversial, as graft occlusion due to SCAD lesion healing has been reported. Only 24 grafts in 14 cases of CABG for SCAD have been reported. While 8 of the 9 arterial grafts were occluded, 9 of the 15 vein grafts were patent. We encountered a case of CABG with left internal thoracic artery to the left antero-descending branch due to pregnancy-related SCAD. Her graft revealed good patency immediately postoperatively but string signs seven months later due to healing of SCAD lesions.

Introduction

The incidence of pregnancy-related spontaneous coronary artery dissection (SCAD) remains uncertain. A recent analysis of the United State administrative database found that 1.81 SCADs occurred per 100,000 pregnancies between conception and 6 weeks postpartum. Due to its rarity, efficacy of coronary artery bypass grafting (CABG) for SCAD has not been clarified, especially for pregnancy-related cases. Recently, several reports have described graft occlusion due to healing of SCAD lesions.

We herein report a surgical case of pregnancy-related SCAD. CABG was performed, and her arterial graft revealed string signs in the mid-term period despite good patency in the early postoperative period.

Case reports

A 37-year-old woman (gravida 3, para 2) was admitted to the emergency department with the sudden onset of chest pain at day 9 postpartum. She gave birth uneventful via vaginal delivery at her 38th week of pregnancy. Her physical examination findings were unremarkable. A laboratory investigation showed a high troponin I level (32 pg/ml) and slightly elevated cardiac enzymes (AST 46U/L, CK307U/L). An electrocardiogram showed ST elevation through leads V1 to V3. Echocardiography showed hypokinesis from the mid-septal wall to the apex region. Chest-X-ray revealed a 48% cardio-thoracic ratio without pleural effusion.

Acute coronary syndrome was suspected, and emergent coronary angiography (CAG) was performed. CAG revealed double-lumen findings of the proximal to mid portion of the left antero-descending branch (LAD), and 75% stenosis of the true lumen at these portions of the LAD (Fig. 1). An intravascular ultrasound revealed no dissection at the left main trunk (LMT) but did show intramural hematoma compressing the true lumen, which extended from the proximal to mid portion of the LAD (Fig. 1).

We diagnosed her with pregnancy-related SCAD. Her vital signs were stable, and her chest pain vanished, with her electrocardiogram findings returning to normal during CAG. While she had a long, dissected lesion from the proximal to mid LAD, we selected conservative management because we wanted to minimize the use of antiplatelet therapy for percutaneous coronary intervention (PCI) or CABG, as she was breast feeding. However, despite medical treatment with heparin and nitrate, she experienced recurrent chest pain eight hours after CAG. An electrocardiogram showed re-elevation of the ST segment through V2 to V5. We applied intra-aortic balloon pumping and decided to perform emergent CABG because PCI for the long, dissected LAD lesion was deemed technically risky. Off-pump CABG was performed via median sternotomy with anastomosis of the left internal thoracic artery (LITA) to the LAD. We confirmed the true lumen using a 1-mm-diameter probe because of the poor blood flow (Fig. 2). The graft blood flow revealed 23 ml/min with a pulsatile index of 4.0. Cardiac enzymes enhanced after operation (AST235 U/L CK2804 U/L CKMB172.5 U/L), while they had already increased before surgery (AST 70U/L, CK773U/L).

Her postoperative course was uneventful. She started and continued taking 100mg of aspirin from the operation day with concomitant heparinization for a day. At eight days after the surgery, coronary computed tomographic angiography showed a patent LITA graft and thrombosed false lumen of the LAD. However, follow-up coronary computed tomographic angiography at seven months after surgery showed string sign of the LITA with normal findings of the LAD (Fig. 3). Her left ventricular ejection fraction recovered to 47% at this time, while it was 37% with hypokinesis on antero-septal region after surgery.

Comment

SCAD is the most common cause of pregnancy-associated myocardial infarction (43%)[1]. Women with pregnancy-associated SCAD seem to have a poorer prognosis than those with SCAD unrelated to pregnancy. This is partly because the LMT or LAD is mainly affected in pregnancy-associated SCAD.[1,2]

The most appropriate management approach for SCAD remains unclear. Conservative therapy is generally the preferred strategy in patients who are clinically stable and lack objective evidence of ongoing ischemia, and such cases have generally been associated with favorable outcomes.[3]

No comprehensive prospective studies have routinely re-performed angiographic studies after SCAD, but observational data have indicated angiographic healing of SCAD lesions in the majority of patients (70%–97%) who were selectively restudied weeks to months after conservative management[2].

Early complications of recurrent myocardial infarction may develop in 5% to 10% of patients who were managed conservatively, mostly due to extension of coronary artery dissection within the first seven days after an acute episode.[2,4] For such cases, urgent intervention with PCI or CABG should be considered, especially in those with persistent coronary ischemia, hemodynamic instability or LMT dissection. Conversely, PCI for SCAD has been associated with a lower technical success and higher rate of complications than PCI for atherosclerotic disease.[2] Published evidence of CABG for SCAD, especially for pregnancy-related SCAD, is also limited. Although CABG is useful as a temporary strategy for managing a life-threatening condition, several papers have reported graft occlusion due to healing of SCAD lesions. A total of 116 cases of CABG for SCAD were identified on PubMed Central; however, only 24 grafts among 14 cases had available results of angiography performed again after surgery.[2,5-8] Fourteen of those 24 grafts (58%) were found to be occluded. The details were as follows: the LITA-LAD was occluded in 7 of 8 grafts, the RITA-right coronary artery was occluded in 1 of 1 graft, and vein grafts were occluded in 6 of 15 grafts. The patency rate of arterial grafts (11%) was dismal compared to that of vein grafts (60%). In the present case, the LITA to LAD graft showed string signs at seven months after the operation due to healing of SCAD lesions, despite showing excellent patency just after surgery.

Given the above, the use of vein grafts may be acceptable, as healing of SCAD lesions can be expected, in addition to an increased graft failure rate of arterial grafts for SCAD lesions.

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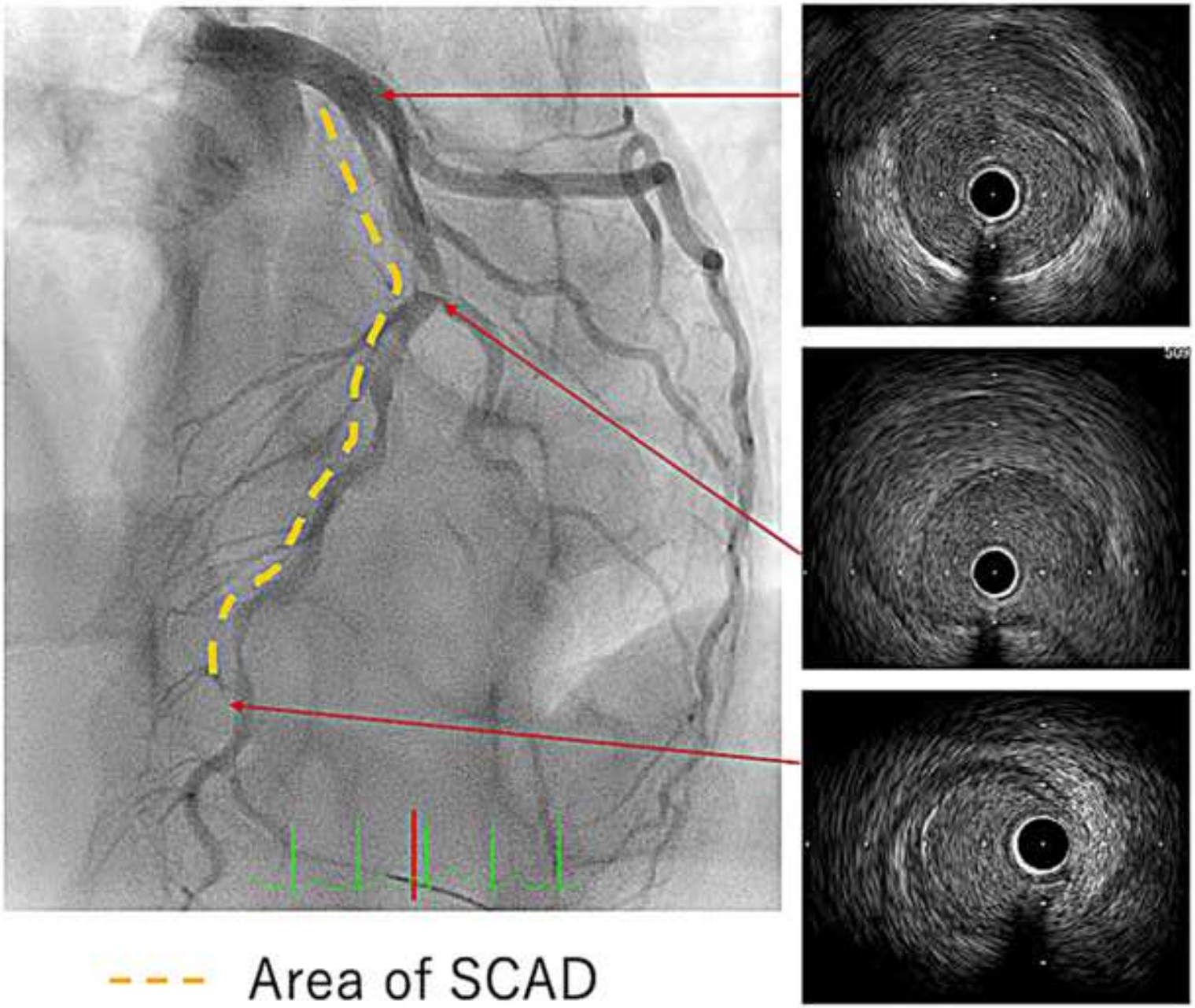
Figure Legends

Figure 1. CAG revealed double-lumen findings of the proximal to mid-left antero-descending branch (LAD) and stenosis of the true lumen of the LAD (Fig. 1). Intravascular ultrasound showed no dissection at the left main trunk but did show intramural hematoma compressing the true lumen, which extended from the proximal to mid-LAD. The dotted line shows the area of coronary artery dissection.

Figure 2. The dotted line shows the area of coronary artery dissection, where the color of the LAD changed to black.

Figure 3. Coronary computed tomographic angiography (CTA) after the operation. A: CTA eight days after surgery with a patent LITA graft. B: CTA eight days after surgery with a thrombosed false lumen of the LAD. C: CTA seven months after surgery with stenosis of the LITA graft. D: CTA seven months after surgery showing a nearly normal LAD.

Figure1



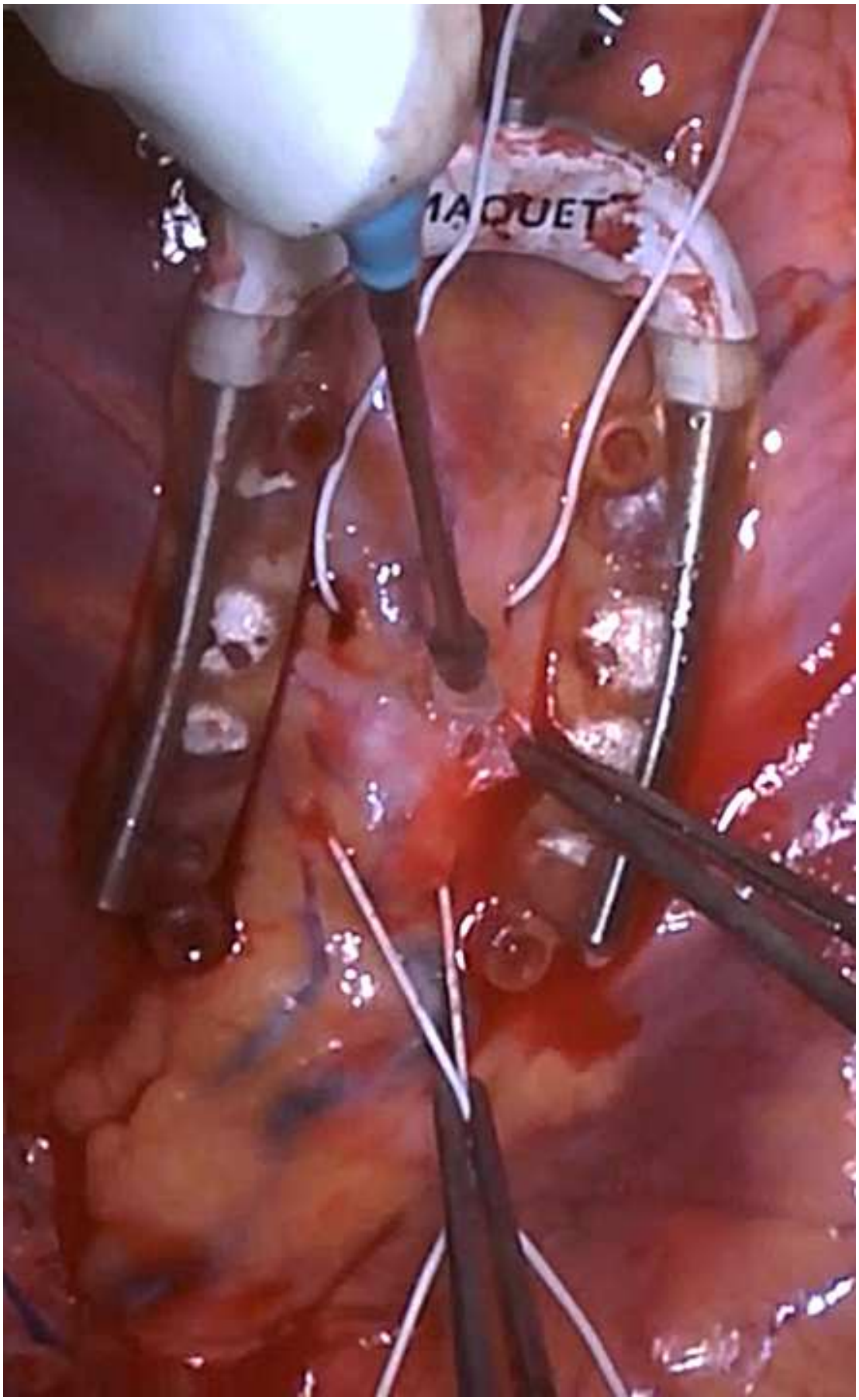


Figure2

Figure3