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Case Report

Acute peri-operative coronary subclavian steal syndrome: A diagnostic and treatment challenge

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ABSTRACT

The coronary subclavian steal syndrome (CSSS) generally occurs during follow up after coronary surgery. The case demonstrates an immediate peri-operative CSSS followed by myocardial infarction, notwithstanding a preoperative computed tomography scan quantifying subclavian artery calcifications as non-stenosing, and a subjective patent blood flow through the transected left internal mammary artery (LIMA). Blood flow inversion in the LIMA to anterior descending artery (LAD) bypass was detected by transit time flow measurement (TTFM). Following an elective brachiocephalic bypass a complementary, emergent subclavian bypass was performed, which restored antegrade LIMA flow, as confirmed by TTFM and angiography, but the patient suffered a peri-operative myocardial infarction. Reports about elective, concomitant subclavian and coronary surgery for sub-acute CSSS, allowing diagnostic investigations, have been published; however this case demonstrates diagnostic and treatment challenges in acute CSSS and emphasizes the role of peri-operative TTFM.

<**Learning objective:** Despite a visible, pulsatile, and apparently patent antegrade flow through the left internal mammary artery, blood flow inversion through the completed bypass, creating acute myocardial ischemia, is possible. The recognition of this, potentially severe, ischemic complication during bypass surgery might not be evident without transit time flow measurement, due to poor clinical signs. The major learning objective is the fast recognition of this complication, preventing infarction and reducing operative morbidity and mortality in the future in similar settings.>

Introduction

Coronary subclavian steal syndrome (CSSS) after coronary bypass is rare, with an incidence of 0.5–2.5% [1,2]. Late postoperative coronary ischemia may result from reversal flow in a patent left internal mammary artery (LIMA) to left anterior descending artery (LAD) graft, usually secondary to subclavian stenosis [1]. Less common is an acute per-operative CSSS.

Case report

A 74-year-old female presented with new onset of dyspnea and episodic dizziness following stenting of the LAD 5 years previously. Cardiac magnetic resonance imaging revealed anterior–lateral stress-induced myocardial ischemia. Coronary angiography showed a significant severe stenosis (70–90% inner luminal narrowing) of the proximal LAD (the stent was open), the first diagonal branch, and a chronically occluded circumflex artery; already known from previous coronary angiography. Ventricular function was preserved. Medical history was marked by a severe systemic arteriosclerotic disease. The patient had an aorto-bi-iliac bypass and percutaneous angioplasties of both femoral arteries 8 years previously, and she had suffered from a stroke, which occurred 5 years previously, resulting in residual right arm paresis. Computed tomography (CT) scan revealed ascending aortic, aortic arch, main supra-aortic, and carotid

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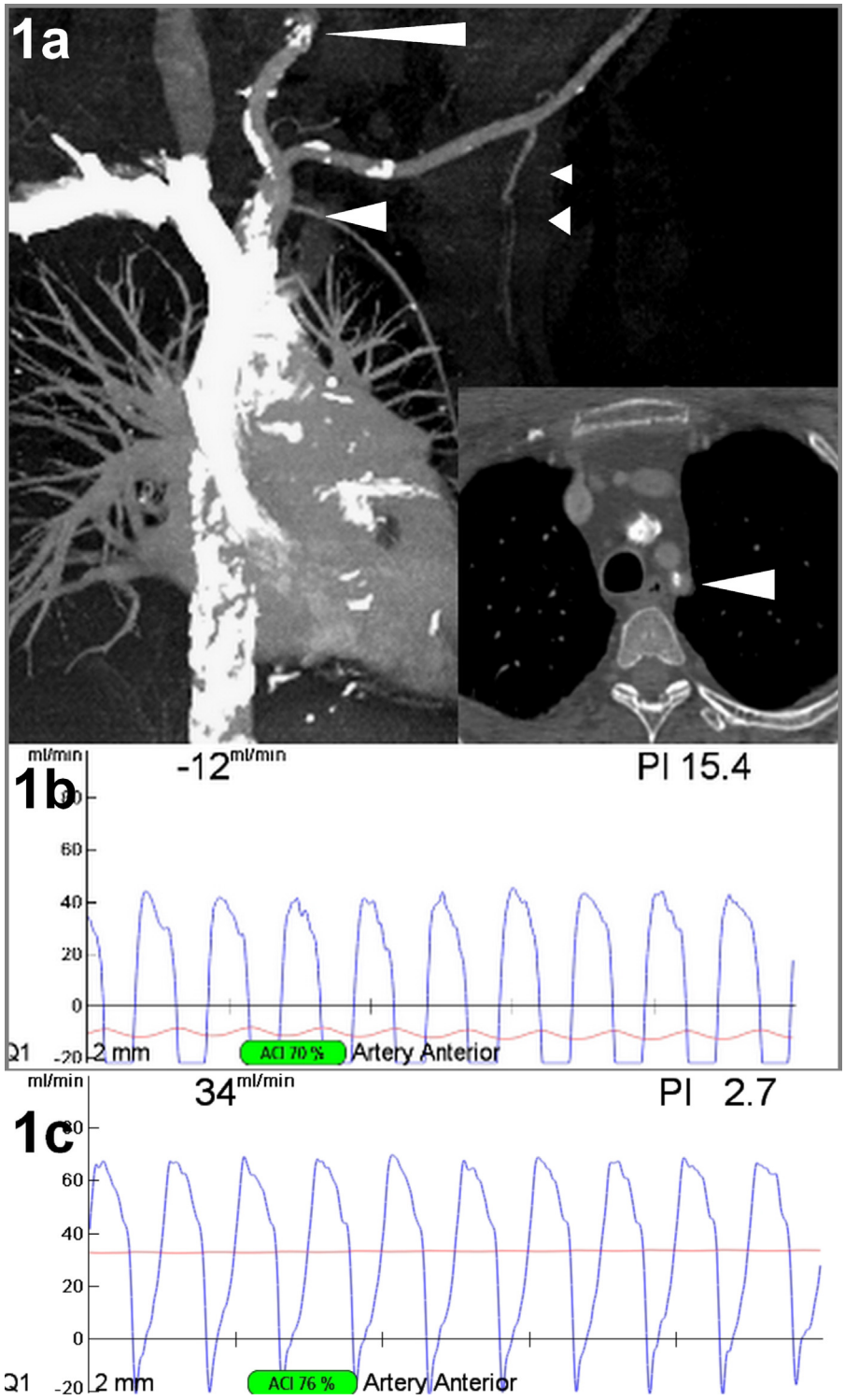

Fig. 1. (a) Computed tomography scan shows left subclavian artery calcifications (big arrows + embedded picture), perfused left internal mammary artery (short arrows), and occlusion of left carotid artery (long arrow). (b) Transit time flow measurement (TTFM) with high pulsation index and flow inversion. (c) Correct TTFM results after finishing the complementary left subclavian artery bypass.

arteriosclerosis. Concretely, the brachiocephalic trunk presented an 80% occlusion (not accessible for a percutaneous approach), the left common carotid artery was occluded, and the proximal left subclavian artery was calcified (Fig. 1a). Notably, with a less than 50% narrowing of the inner diameter, the left subclavian artery was considered to be not severely stenosed. Preoperative examination revealed a systolic blood pressure of 90 mmHg of the right arm, contrary to 110 mmHg of the left arm, according to CT scan assessment. Ankle brachial pressures indexes were in the normal range, but interpretation was limited due to the known