

CASE REPORT

Surgical management of left main coronary artery aneurysm

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Abstract: Aneurysmal dilatation of coronary arteries is characterized by abnormal dilatation of a localized or diffuse segment of the coronary arterial tree. Left main coronary artery aneurysms are rare coronary anatomic abnormalities. They rarely involve the left main coronary artery. Different strategies have been adopted, where the coronary artery aneurysms have been left as such, resected partially, isolated, reconstructed, ligated with a simultaneous bypass with internal mammary artery, or treated with vein grafts. We report a case of a successful ligation of aneurysm of the left main coronary artery and three simultaneous coronary artery bypass procedures (Fig. 1, Ref. 15). Full Text in PDF www.ellis.sk.

Key words: coronary artery aneurysm, left main coronary artery aneurysm.

Aneurysmal dilatation of coronary arteries is characterized by abnormal dilatation of a localized or diffuse segment of the coronary arterial tree. Aneurysmal disease coexists with coronary atherosclerosis and has raised the question of whether aneurysmal disease is a variant of atherosclerotic coronary disease or a distinct entity. The presence of dilated coronary segments, even in the absence of obstructive disease, is believed to result in alterations in blood flow and stasis predisposing these patients to myocardial ischemia and infarction.

Left main coronary artery aneurysm (LMCAA) is a rare coronary anatomic abnormality. Coronary artery aneurysms (CAAs) are noted in 0.15 % to 4.9 % of patients undergoing coronary angiography (1). They rarely involve the left main coronary artery (LMCA). According to Lenihan and coworkers, CAAs in patients younger than 33 years are congenital (2). In most patients older than 33 years and in all patients older than 56 years, CAAs are caused by atherosclerosis (2). The main complication is the myocardial ischemia or infarction, and distal embolization, as well as aneurysm rupture which can albeit rarely occur. Because of the rarity of LMCA aneurysms, it is difficult to standardize the treatment.

Different strategies have been adopted, where the CAA has been left as such, resected partially, isolated, reconstructed, ligated with a simultaneous bypass with internal mammary artery, or treated with vein grafts (2–6). In addition to bypass grafting, CAAs can be isolated to prevent the thromboembolic complications, which are the main indication for surgery. We report a case of a successful ligation of aneurysm of LMCA and three simultaneous coronary artery bypass procedures with uneventful outcome.

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Case report

A 49-year-old man with a history of angina pectoris of one month duration was admitted to hospital due to progressive increase in anginal symptoms. Physical examination of the patient was normal. The electrocardiogram showed normal sinus rhythm. The chest radiograph and M-mode echocardiograms showed no abnormalities. Coronary angiography demonstrated an aneurysm of LMCA and significant stenosis of the diagonal coronary artery. There was no evidence suggestive of thrombus or dissection. The aneurysm was calculated to be of 22.14 x 41.08 mm in diameter (Fig. 1). Left ventricular cineangiography were within normal limits. After preoperative preparation, the patient was operated on with the aid of cardiopulmonary bypass

The left internal thoracic artery was used to bypass the left anterior descending artery. Saphenous vein grafts were placed to a marginal branch of the circumflex artery and the diagonal branch. The bypass grafts were put on the left anterior descending artery with left internal thoracic artery and diagonal artery, with saphenous vein grafts. After the ascending aorta had been opened, orifice of the left coronary artery oversewn and closed with 4-0 polypropylene, the distal portion of the left main coronary was ligated.

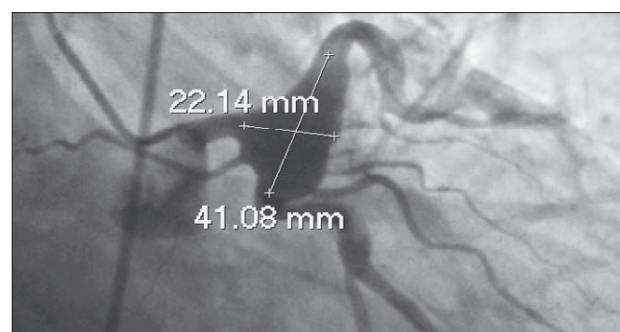


Fig. 1. Left main coronary artery aneurysm (LMCAA).

The aortic crossclamp duration was 82 minutes, and the cardiopulmonary bypass duration was 100 minutes.

The patient was free of symptoms with preserved left ventricular function four weeks after the operation without inducible ischemia on non-invasive evaluation.

Discussion

CAA is defined as the presence of a segment of coronary artery with a diameter greater than 1.5-fold the adjacent normal section (7). Morphologically, these aneurysms may be saccular or fusiform, single or multiple. CAAs are more frequently located in the right coronary artery and circumflex artery than in the left anterior descending artery, whereas that of the left main coronary artery is extremely uncommon (8).

The reported incidence of CAA is between 0.15–4.9% among all patients who underwent coronary angiography (1). The highest rate of incidence was reported in CASS (Coronary Artery Surgery Study), which found that 4.9% of the total population of the register had aneurysmatic dilatation (1). The etiology of reported cases of LMCAA include atherosclerosis, congenital Kawasaki disease, systemic lupus erythematosus, Takayasu arteritis, neurofibromatosis, Marfan syndrome, scleroderma, Ehlers-Danlos syndrome, Behcet disease, polyarteritis nodosa, bacterial infection, syphilis, septic embolism, as well as traumatic and unknown causes. No familial cases of coronary aneurysm have been reported (2, 3, 9, 10). Atherosclerosis is the most common cause in these reports. In atherosclerosis, the destruction of media layer gradually leads to dilatation. No unique cluster of symptoms or risk-factor profile has been ascribed to CAAs, and patients typically present with signs and symptoms indicative of coronary artery disease.

Natural history and progression of this condition is undetermined and not known. The main complication is myocardial ischemia or infarction (1) but aneurysm rupture can also occur, albeit rarely (11). Battler, Har-Zahav, and Rath reported that occlusion of aneurysmal nonstenotic coronary artery caused infarction in all five of their patients on follow-up (12). These findings indicate that surgical treatment for aneurysm of the left main coronary artery is recommended.

The rarity of CAA makes it difficult to standardize the treatment or firmly establish the guidelines supporting medical versus surgical management. The conservative treatment consists of attempts to prevent the thromboembolic complications by anticoagulants or antiplatelet drugs. Surgical modalities are isolation, resection, reconstruction, or ligation of LMCA with concomitant myocardial revascularization to eliminate the risk of aneurysm rupture and coronary thrombosis (13). Early cases of LMCAA were treated by bypass grafting alone without exclusion of aneurysm from the coronary circulation and later by isolating the aneurysm with ligatures or resecting the aneurysm and performing simultaneously the necessary bypass grafts (6, 14).

We performed the coronary artery bypass grafting to the left anterior descending artery, marginal branch of the circumflex artery and diagonal artery followed by the exclusion of aneurysm. We consider that ligation and isolation or resection of aneurysms are necessary to avoid rupture or embolization. In some patients, the ligation of aneu-

rysm may be difficult if the aneurysm is located just behind the main pulmonary artery. Fukaya et al (6) reported a ligation of left main coronary artery aneurysm under a temporary transection of the main pulmonary artery, but they did not directly approach the aneurysm. Instead, the orifice of the left main coronary artery was oversewn from the inside of the ascending aorta. Lentini et al (15) reported the same method for a large and calcified aneurysm. In our case, the aneurysm was excluded completely by adding ligation of the distal portion of the left main coronary artery from outside. We are of the opinion that this should be the preferred method of ligating and isolating the CAA.

In conclusion, LMCA aneurysms are rare and their etiology, treatment, and prognosis remain obscure. Depending on pooled data from literature, the coronary artery by-pass grafting with ligation of aneurysm seems to be an ideal surgical treatment for LMCAA.

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