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How to do it

Thoracodorsal artery as a free graft for coronary artery bypass grafting

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Abstract

Arterial myocardial revascularization using different arterial conduits as mammary, radial, gastroepiploic, subscapular and epigastric arteries are well documented. This report describes a preparation and use of thoracodorsal artery as a free graft for coronary artery bypass grafting. The preparation and removal of thoracodorsal artery were performed through right axilla. The artery was used as a free conduit for left anterior descending artery (LAD) in a 58-year-old female for the second revascularization. The saphenous veins, mammary arteries, right radial artery and epigastric artery were not available. The perioperative course was uneventful and we can recommend the graft as an alternative for such cases. © 1999 Elsevier Science B.V. All rights reserved.

Keywords: Thoracodorsal artery; Coronary artery bypass grafting

1. Introduction

Complete coronary revascularization using arterial grafts has lately been increased because of its good patency rate in the long term[1]. In recent years, the need for repeated bypass surgery has become more frequent and it starts to become difficult to find other adequate conduits.

The experience regarding mammary arteries, gastroepiploic artery, epigastric, subscapular and radial artery, for revascularization are well documented [2–4].

We present the use of thoracodorsal artery as a free arterial conduit.

2. Anatomy

The subscapular artery is the most distal and largest of all branches of the axillary artery. It emerges from the last third of the axillary artery and descends in the posterior and inferior direction. The external diameter is about 4 mm. The average length is 2–3 cm. It gives two branches. One is the circumflex scapular artery (CSA) and the other is the thoracodorsal artery. Coursing posteriorly, the circumflex scapular artery enters the triangular foramen and branches into the infraspinatus fossa. The length of this branch is about 5 cm. The diameter of CSA is 3–4 mm at the bifurcation. and is narrower more distally (about 2 mm). The thoracodorsal artery is, in fact, the continuation of the subscapular artery (75%), but it could also be a direct branch from the axillary artery in 25% [5,6]. The mean length is reported to be about 128 mm and the proximal-distal diameter ratio is about 3.44–1.49 [7,8].

The thoracodorsal artery descends lateroinferiorly towards the posterior aspect of the latissimus dorsi muscle (LD). It pierces the muscle where it terminates, dividing into several muscular branches. If additional length is required, then one of the branches for the serratus muscle is dissected together with this graft. The serratus branch is narrower (about 1.5–2 mm in diameter). This branch is situated on the surface of the serratus anterior. All of these arteries are followed with two commitant veins. The thoracodorsal artery is accompanied by the thoracodorsal nerve, a branch of the supraclavicular part of the brachial plexus.

3. Positioning of the patient and dissection of the vessels

The patient is positioned in the lateral decubitus position with the arm abducted at the shoulder and elbow flexed at 90° (Fig. 1). The forearm is suspended in the drape bar. It is important not to stretch the shoulder because brachial plexus injury could result. The proximal third of forearm, axilla and thorax are prepared and draped. A zig-zag incision is placed in the axilla with a short incision, following the posterior border of the latissimus dorsi muscle. First, the most distal part of thoracodorsal artery is identified which is encountered after elevating the lateral border of the LD muscle. It is then traced in the depth of the axillary space for about 10

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Fig. 1. Approach via axilla and skin incision.

cm. The artery is accompanied with two commitant veins and the thoracodorsal nerve. After identifying the circumflex scapular artery entering the triangular foramen, it can be legated or harvested if a y-graft is needed. The triangular foramen is retracted and additional length can be obtained. The subscapular artery continues the direction of the thoracodorsal artery (Fig. 2) [6]. After dissection of the arteries and proper hemostasis is performed, the wound is closed with suction drainage which is placed for a minimum of 5 days. If seroma is formed afterwards, a needle aspiration is performed for evacuation.

4. Case report

A 58-year-old female with unstable angina was referred for repeated cardiologic evaluation. Six years before she underwent myocardial revascularization for the same disease, with left mammary artery for LAD and saphenous vein for marginal branch.

The angiocardiography showed occlusion of the vein graft for marginal branch, mammary artery stenosis on anastomosis level, proximal occlusion of native LAD, 90% stenosis of circumflex artery (RCX), and 95% stenosis of the right coronary artery (RCA). The left ventricular function was slightly compromised.

The right saphenous vein was completely used up for the first operation. After clinical examination, remaining parts of saphenous veins (great and small saphenous vein on the left leg and small saphenous vein on the right leg) were excluded, because of extreme varicosity. After Allen's test and photoplethismography, only the left radial artery was suitable to be used as a free graft. Due to a gastric operation done 10 years previously, the gastroepiploic artery was not available for grafting.

The strategy of the operation was based on the fact that at least two conduits should be available prior to sternotomy. As the thoracodorsal artery can only be removed in lateral decubitus position, that artery was to be prepared first. The thoracodorsal artery, as a free graft, had 14 cm of length, the internal diameter was about 2.5 mm, and the artery wall had better consistency than the mammary artery. After closing the wound, patient was positioned in supine position, and harvesting of the radial artery started. After obtaining second conduit, chest opening proceeded. During harvesting, right internal mammary artery had been dissected, therefore being unsuitable to be utilized as conduit. The patient underwent the second myocardial revascularization with the thoracodorsal artery for LAD and radial artery for RCA. The thoracodorsal artery was easy for handling and we performed problem-free distal and proximal anastomosis.

The postoperative course was uneventful. The patient was discharged from hospital on the 14th postoperative day for further rehabilitation.

5. Comments

Complete myocardial revascularization using arterial conduits has been performed because of its improved patency rates [1]. In recent years, the need for reoperation has become more frequent, and the selection of grafts can be difficult.

Noel Mills first reported use of the subscapular artery as an alternative conduit for coronary bypass [4]. Moro et al. have documented that the thoracodorsal artery has a similar histological finding as other arterial grafts and they recommended the artery as a coronary arterial graft [7,9].

Regarding the anatomical constellation, the thoracodorsal artery is a branch from the subscapular artery (75%) and after preparation and the removal may be even used, with the circumflex scapular artery, as a y-graft for LAD and first diagonal branch.

In this report, we have found that a preparation, removal and operative handling was problem-free, and we recom-

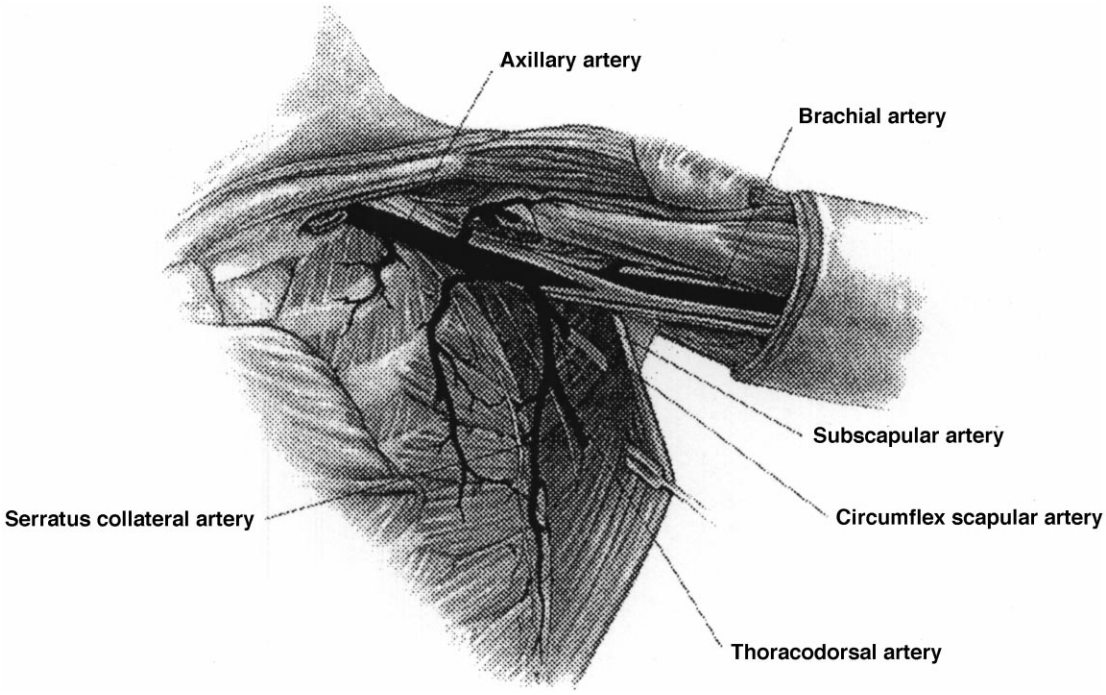

Fig. 2. Anatomical correlation of the thoracodorsal artery.

mend the thoracodorsal artery as an alternative graft for such operations.

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