Late Changes in a Bovine Graft

—A Case Report—

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ABSTRACT: We treated a Japanese man with aneurysmal dilatation of the bovine graft transplanted for femorofemoral bypass. The reconstruction was performed successfully by the replacement with a Dacron graft 29 months after the first operation. Aneurysmal dilatation was observed over the entire length of the graft, and the wall of the graft was fragile. Disruption of collagen fibers and bleeding into the graft wall from the arteries which had been newly formed in abundance were extensive. The histological findings suggested that bovine grafts should be used for only a short period or for the replacement of small arteries.

KEY WORDS: bovine graft, histological change, vascular reconstruction, synthetic graft.

INTRODUCTION

A bovine graft or a glutaraldehyde-stabilized umbilical cord has been widely used for many years and successful results have been reported. However, deterioration and aneurysmal dilatation of the grafts do occur.

In this report, histological changes in a bovine graft 29 months after the implantation were studied, and discussions were made of the advantages or disadvantages of a bovine graft vs. a synthetic graft.

CASE REPORT

A 68 year old Japanese man was admitted to Owari hospital on October 20, 1980, with complaints of a pulsative mass in the lower abdominal region and recurrent claudication of one month duration. He had felt fatigue in his left leg for 10 years. Coldness and claudication within the range of 1 km had become apparent in the left lower leg shortly before the first operation. As a segmental occlusion of the left iliac artery associated with a segmental tandem occlusion of the left superficial femoral artery was detected by preoperative arteriography, a femorofemoral bypass was performed with a tanned bovine graft on May 19, 1978. The postoperative course was uneventful. A physical examination at the second admission revealed a well developed man with a blood pressure reading of 170/80 mmHg. Pale color and coldness were observed on the left lower leg and toes. Pulsation was nil below the left popliteal artery. The pressure index (ankle pressure/brachial pressure) was 0.61 on the right and 0.36 on the left. A pulsative mass was detected in the left lower
abdominal and inguinal region. Laboratory data remained within the normal limits except for a one second forced expiratory volume rate of 55.5 per cent, left ventricular hypertrophy, and triglyceride levels of 168 mg/dl. Arteriography revealed multiple aneurysms of the graft and stenosis at the distal anastomosis (Fig. 1).

Resection of the graft and replacement with a Dacron graft from the right to the left femoral artery were carried out on October 24, 1980. The maximum diameter of the aneurysm was over 5 cm. Fibrosis around the graft was so severe that the distal graft could not be isolated from the surrounding tissues. The proximal 2/3 of the graft was resected and an anastomosis was carried out at the proximal site of the right femoral artery while a distal anastomosis to the left femoral artery was performed from the inner side of the bovine graft (Fig. 2). Six months after the operation, the bypass graft was functioning well, but the pressure index remained unchanged at 0.36 because of a tandem occlusion of the left superficial femoral artery.

The histological examination showed an intimal thickening which easily peeled off the outer coat. The lipid deposition was localized and the graft wall itself was fragile. The entire coat was abundant in the arteries that had newly sprouted from the surrounding tissue. Architecture of the collagen fibers was well preserved, however, disruption of these fibers was evident in the dilated region and bleeding into these areas from the arteries was noted in the wall. Thus,