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Case Report / Olgu Sunumu

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High brachial arterial cannulation is safe for cardiac surgery

Yüksek brakiyal arter kanülasyonu kardiyak cerrahi için güvenlidir

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ABSTRACT

A 70-year-old male patient was operated for severe mitral insufficiency, aortic valve stenosis, ascending aorta aneurysm, and coronary artery disease. Upper brachial arterial cannulation was performed to establish cardiopulmonary bypass. Aortic and mitral valves replaced with prosthetic mechanical valves and a 30-mm synthetic graft was interposed to the ascending aorta. Finally, five distal anastomoses were performed for multivessel coronary artery disease over a total 118-min cross-clamp time. After an uneventful recovery, the patient was discharged in the postoperative sixth day without any complication. In conclusion, we believe that high brachial arterial cannulation to establish antegrade selective cerebral perfusion seems to be a safe alternative method.

Keywords: Antegrade selective cerebral perfusion, axillary artery, brachial artery.

ÖZ

Yetmiş yaşında erkek hasta ciddi mitral yetmezlik, aort kapak darlığı, çıkan aort anevrizması ve koroner arter hastalığı nedeniyle ameliyat edildi. Kardiyopulmoner baypasa girmek amacıyla yüksek brakiyal arter kanülasyonu uygulandı. Aortik ve mitral kapaklar protez mekanik kapaklar ile değiştirildi ve çıkan aorta 30 mm'lik sentetik greft interpoziyonu uygulandı. Son olarak toplam 118 dakikalık kros klemp süresince çoklu damar koroner arter hastalığına yönelik olarak beş distal koroner arter anastomozu yapıldı. Sorunsuz bir ameliyat sonrası iyileşmenin ardından hasta herhangi bir komplikasyon olmaksızın altıncı günde taburcu edildi. Sonuç olarak, antegrad selektif serebral perfüzyonda yüksek brakiyal arter kanülasyonunun güvenli bir alternatif olduğu kanısındayız.

Anahtar sözcükler: Antegrad selektif serebral perfüzyon, aksiller arter, brakiyal arter.

The antegrade cerebral perfusion (ACP) technique is a widely accepted physiological solution for brain protection during aortic arch repair, and upper brachial or axillary artery is the preferred access for arterial cannulation. Herein, we report a case who underwent upper brachial arterial cannulation in the light of literature data.

CASE REPORT

A 70-year-old male patient was admitted with palpitation and dyspnea (New York Heart Association class 3). Severe mitral insufficiency and aortic valve stenosis with a peak 51 mmHg gradient was shown by echocardiography. Systolic pulmonary arterial pressure

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was 60 mmHg and the ascending aorta was dilated to 4.8 cm in diameter. Coronary angiography revealed multivessel coronary artery disease with critical stenosis. We decided to operate the patient for the ascending aorta, valvular disease, and coronary artery disease. A written informed consent was obtained from the patient.

Our operative technique was described in detail previously.[1] Dissection and cannulation of the right high brachial artery was performed prior to median sternotomy. Following standard median sternotomy, venous cannulation was done via right atrium to vena cava superior and vena cava inferior. After initiating cardiopulmonary bypass (CPB), cardiac arrest was established by cold crystalloid antegrade/retrograde cardioplegia with the aortic cross-clamping. Distal anastomoses were performed diagonally-obtuse margine coronary arteries sequentially, and right coronary posterior descending - posterior lateral sequentially by using saphenous vein bypass grafts. The left atrium was opened, and the mitral valve was not found to be appropriate to repair. Therefore, the mitral valve resected and replaced with a No. 29 metallic valve (St. Jude Medical, St. Paul, MN, USA). The aorta was dissected through the supracoronary transversal approach and the aortic valve was resected and a No. 23 metallic valve (St. Jude Medical, St. Paul, MN, USA) was implanted. Then, a 30-mm collagen-coated (Jotec GmbH Hechingen, Germany) vascular graft was used for the proximal anastomosis. The flow was decreased to 500 to 600 mL/min (8 to 10 mL/kg per min) at 28°C rectal temperature. The brachiocephalic and left common carotid arteries were clamped with soft vascular clamps. Distal anastomosis was performed with open aortic anastomosis technique, while low-flow perfusion through the brachial artery continued. During open aortic anastomosis, electroencephalography was used to evaluate contralateral hemisphere functions. After terminating the distal repair, the flow through the brachial artery cannula was increased gradually, as the soft clamps on the vessels were released and the aorta was cross-clamped distally to the graft. Left internal thoracic artery-to-left anterior descending coronary artery bypass grafting (CABG) and proximal anastomosis of the saphenous vein grafts were performed. After releasing the cross-clamp, spontaneous heart beating began. Cardiopulmonary bypass was terminated without any difficulty. The total CPB time was 180 min, the aortic cross-clamp time was 118 min, and duration of low-flow selective ACP through the right upper brachial artery was 27 min. After decannulation and closure of the sternum, the patient was discharged to the intensive care unit. Postoperatively, the patient started to wake up at seven hour and was extubated at 15 h. He was discharged to the ward in the postoperative second day and to home in the postoperative sixth day without any complication.

DISCUSSION

The ACP technique enables satisfactory brain protection during aortic surgery, even in longer durations of cardioplegic arrest.[2] Most of the critics about the concept of unilateral selective cerebral perfusion are based on the patency of the circle of Willis for the perfusion of the contralateral hemisphere. However, it seems to provide adequate perfusion for both right and left cerebral hemispheres.[3] In particular, in patients with extensive aortic and peripheral vascular diseases, brachial artery cannulation seems to be an alternative.[4] In this case, all major operations of adult cardiac surgery (CABG, valve surgery, and ascending aortic surgery) were performed via upper brachial artery cannulation in a single session without any problem. The use of upper brachial artery provided more comfort during the operation, particularly for the ascending aortic replacement. Although the operation was terminated over a 118-min cross-clamp time and 27-min selective ACP time, no neurological complication occurred during and after the operation.

In conclusion, based on these findings and our experience, we believe that the upper brachial artery cannulation is safe for initiating and maintaining the cardiopulmonary bypass.

Declaration of conflicting interests

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