INTRODUCTION

Acute type A aortic dissection, especially the one interesting the aortic arch, bears a high mortality (10-20%) and morbidity. The incidence of postoperative neurological complications remains high (5-70%) due to the advanced cerebral protection techniques: deep hypothermia with circulatory arrest, antegrade or retrograde cerebral perfusion.

CASE REPORT

A 53-year old female patient was admitted in our hospital with shock due to acute type A aortic dissection, diagnosed at a local hospital by CT scan. (Fig. 1)

Emergency cardiac echography revealed acute type A dissection that involved the aortic arch, the first 3 cm of the brachiocephalic trunk and of the left common carotid artery, who underwent successful surgical correction.
An emergency operation was undertaken under general anesthesia and through a median sternotomy. Cardiopulmonary bypass was established via cannulation of the right femoral artery and of the right atrium and 500 ml of blood were evacuated from the pericardium; the aortic cross-clamp was applied and the dissected ascending aorta opened. The coronary ostia were also circumferentially dissected.

Giving the fact that the aortic root dissection involved also the coronary ostia and was associated with severe aortic regurgitation, Bentall reconstruction of the aorta was chosen (an intraoperatively-made composite valve graft conduit - mechanical 21 Carbomedics bileaflet valve and 26 Dacron graft was used), associated with reimplantation of the coronary arteries by interposing short 8 mm Dacron grafts (Mills technique).

Using deep hypothermia (15°C) and antegrade cerebral perfusion via direct cannulation of the brachiocephalic trunk (at a flow rate of 350-400 ml and a perfusion pressure of 60-70 mm Hg), the aortic arch was opened: an intimal tear was found at the origin of the brachiocephalic trunk, which extend on the 2/3 aortic arch and on the first 3 cm of the brachiocephalic trunk and the origin of the left common carotid artery.

Therefore, the replacement of the aortic arch, up to the origin of the left subclavian artery was necessary (using the same 26 mm Dacron graft) and the distal anastomosis site was reinforced with Teflon felt strips using Prolene 3/0. The brachiocephalic trunk and the left common carotid artery were reconnected to the aortic graft using the interposition of 8 mm Dacron grafts. (Figs. 2,3)

Afterwards, the cardiopulmonary by-pass was reinstituted, the patient rewarmed, and the course of the operation was uneventful. The total extracorporeal circulation time was 4h 58 min, the aortic cross-clamp time was 2h 50min and the cardio-circulatory arrest time was 53 min.

Extubation was possible only during the 6th postoperative day, due to an acute respiratory distress syndrome (ARDS), without neurological deficit.

Postoperatively, on the 14th day, the patient required evacuation of a sero-sanguinolent pericardic effusion through a subxiphoidal incision. The postoperative course was uneventful and the patient was discharged 19 days after the main surgical procedure.

At the 3-month follow-up the angio CT scan shows no obstruction/stenosis of the grafts, and no dissection on the descending aorta; the patient remained free of symptoms. (Fig 4)
Figure 3. Intraoperative view showing the replacement of the aortic valve, replacement of the ascending aorta and of the 2/3 of the aortic arch, associated with reconnection of the coronary arteries, the brachiocephalic trunk and the left common carotid artery to the aortic graft using also prosthetic grafts.

Figure 4. Angio-CT at 3 months follow-up show no obstruction/stenosis of the grafts, and no dissection on the descending aorta.

DISCUSSIONS

Despite advances in operative techniques and postoperative care, repair of aortic dissection involving the aortic arch remains a challenging and high-risk procedure.

The success of the surgical intervention depends on a prompt and accurate diagnosis, emergency operation submission together with two extremely important surgical factors:

1. Correct evaluation of the lesion, removal of the entry point of the dissection and an aggressive replacement of as much dissected artery as possible; total arch replacement for acute type A aortic dissection may decrease the risk of late complications related to the false lumen and lead to excellent long term survival.8-11

2. Cerebral protection and a short circulatory arrest time (30-40 min); cerebral blood flow during the period of circulatory arrest may be delivered in either a retrograde or antegrade technique. The antegrade cerebral perfusion is considered more efficient and allows the surgeon a longer “safe” time to complete the anastomosis on the aortic arch.3,4,12

In our case we dealt with a complex lesion: ascending aortic dissection involving the proximal 2/3 of the aortic arch, the origin of the innominate artery, left common carotid artery, coronary ostia and severe aortic regurgitation. This lead to performing the Bentall procedure using the Mills technique: reimplantation of the coronary arteries by interposing short 8 mm Dacron grafts (this allowed for less anastomotic tension, and a more precise suture).

Cerebral protection was ensured by direct cannulation of the innominate artery, distally to the dissection area, associated with profound hypothermia during the cardio-circulatory arrest. The efficiency of these methods was verified by cerebral transcranian pulse-oximetry, and by the presence of blood reflow in the left common carotid artery.

CONCLUSIONS

We chose to present this case in order to describe the successfully used technique for cerebral protection and due to the types of surgical techniques combined (Bentall procedure modified by Mills, aortic arch replacement with brachiocephalic trunk and left common carotid artery implantation using interposition grafts).

Although we resolved that case successfully, we must note that the operative mortality for acute aortic dissection in our hospital in 2010 remains high (around 37%).
REFERENCES