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Our experience in hybrid surgical treatment of thoracic aortic aneurysm

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Aims

Rapid development of transcatheter endovascular methods in treatment of the thoracic aorta, as well as hybrid operations, leads to reduction of postoperative complications associated with open surgery.

The purpose of our work was to assess the mid-term results of various types of debranching in hybrid surgery of the thoracic and thoracoabdominal aorta.

Methods

A total of 29 patients with various abnormalities of the arch and descending thoracic aorta, requiring a hybrid operation, were treated: two with type I dissection, three of type IIIa and 14 with IIIb by ME De Bakey, as well as eight true descending thoracic aortic aneurysms and one mega aorta. All patients underwent pre- and postoperative multislice CT angiography. To create a fixation zone, the following operations were performed: visceral debranching (1) for zone IV; transposition of left subclavian artery (LSA) in left common carotid artery (LCCA [7]), LSA-LCCA prosthetic bypass for zone II (2); right subclavian artery (RSA)-to-LSA-to-LCCA bypass (8) and RCCA-to-LCCA-to-LSA bypass (5) for zone I; total debranching of the aortic arch (1); supracoronary prosthesis with hemiarch (2); prosthetics of the ascending aorta with debranching (2); frozen elephant trunk and visceral debranching (1) for zone 0.

Results

The technical success was 100%. The average time of debranching was 200.4±70.4minutes, clamping time of the carotid artery during debranching was 8±3.8minutes and temporary bypass was required in six cases. The interval between operations was 24.9±19.6days for chronic dissection, and one day for an acute. The mean time of thoracic endovascular aortic repair (TEVAR) is 179.2±60.7minutes. In eight patients with type B dissection, after TEVAR, the blood flow remained in the distal false lumen. The TEVAR procedure was performed in 19 patients (65%), TEVAR-

EVAR in 10 (35%). Cases of paraplegia were not observed. Early postoperative complications: two (40%) cases with the recurrent nerve neuropathy in group with common carotid artery to common carotid artery bypass; three (37%) cases with the diaphragmatic nerve neuropathy in the group with sub-an/sub-an bypass; two (33%) cases with revision of anastomosis for bleeding. One patient had thrombosis of prosthetic branch without stroke developing. Another patient had a stroke occurred during the stent graft installation in the thoracic aorta. Endoleak type I was observed in five cases (17%): in four patients with reconstruction of zone I, in one zone 0; type II in two (7%): visceral debranching in cone IV, reconstruction of zone I; type III in the one (3%) in zone 0. A year later, on the CT control in four patients, endoleaks were still diagnosable, although they did not manifest clinically. One patient after seven months from total debranching of aortic arch its proximal neck has dissected and enlarged, a type I endoleak has developed, which required a prosthetic repair. One patient who underwent TEVAR for the treatment of subacute type IIIa dissection died from sepsis. The cumulative survival rate was 96.5%.

Conclusions

Hybrid operations on the arch and descending thoracic aorta are a safe and effective method of treatment.

Mid-term results of hybrid operations in multilevel peripheral arterial disease

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Aims

To assess the operational trauma, timing and effectiveness of hybrid intervention in multilevel lesions of the aorta and lower limb arteries in patients with type C and D lesion by TASC II classification.

Methods

From 2013 to 2017, under epidural anaesthesia, 54 hybrid vascular reconstructions were performed for multilevel peripheral arterial disease treatment. Among patients were nine women and 45 men, the average age was 65.8±7.9years. Of these, 31 patients h chronic arterial insufficiency IIB stage, 14-IIIst, and 9-IVst according to Fontain-Pokrovsky. Type of lesion for TASC II for aortofemoral segment (AFS) was A/B=35, C/D=19; for femorotibial segment (FTS) A/B=16, C/D=38. The main entry point to perform a hybrid operation on the peripheral arteries is the bifurcation zone of the common femoral artery (CFA). We distinguished three main types of hybrid interventions: type 1—hybrid reconstruction of the AFS (open reconstruction of the CFA bifurcation and revascularisation of the iliac arteries (n=18)); type 2—FTS (open reconstruction of CFA with balloon angioplasty of FTS (n = 6), type 3—hybrid reconstructions of both segments (n= 30). Chronic occlusions with a length of more than 10–15cm in the external iliac and superficial femoral arteries were eliminated by open method with the use of semi-closed loop endarterectomy, which reduced the time and complexity of the endovascular stage. When performing the reconstruction of the CFA bifurcation, an autovenous patch with a "trunk" was used, which would be the "entry point" for the endovascular stage. This method makes possible to exclude the need for artery clamping or additional puncture of CFA during endovascular angioplasty, and also make possible to change the direction of an introducer in the distal and proximal direction with as much time as surgeon need.

Results

Technical success was 95%. The average duration of operation was 224.2±88.5 minutes (type I 182.4±60.7min, type 2 120±40 minutes, type 3 227.9±96.2 minutes; $p<0.05$). Open stage was 102.5±58.5 minutes and endovascular was 97.8±60.4 minutes. The blood loss averaged 224.4±141.4ml. No cases of death were observed within 30 days after the operation. Reintervention required in four (7%) of the patient during the first seven days in groups one and two of the hybrid operation. In the group with type 2 operations, no complications were observed. Primary patency in 12 months was 90.2% in all groups, and limb save in patients with critical limb ischaemia was 92.6%.

Conclusions

Hybrid surgery of multilevel peripheral arterial disease with using of loop endarterectomy as method for open stage and subsequent endovascular angioplasty is effective, reduces the time, traumatic intervention and improves its results. The minimal blood loss makes hybrid operations less traumatic and rises up the rehabilitation potential of the patient.