THE OPERATION OF SYMPTOMATIC ANEURYSM OF THE LEFT SUBCLAVIAN ARTERY WITH SUPRACLAVICULAR ACCESS

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The study presented a case of a 64-year-old woman with symptomatic aneurysm of the left subclavian artery. Because of comorbid diseases, the thoracic operation was associated with a high risk of complications. CT analyses enabled the surgeons to appropriately plan and perform a supraclavicular access operation, avoid possible complications, and shorten the length of hospitalization.

Key words: subclavian artery aneurysm, subclavian artery, vascular surgery

Subclavian artery aneurysm is extremely rare (1, 2). A true aneurysm occurs because of artery wall degeneration during atherosclerosis, hypertension and thoracic outlet syndrome or a false aneurysm secondary to trauma or iatrogenic causes. Generally, the aneurysm is asymptomatic. The diagnosis is based on patient’s anamnesis and clinical examination completed by a Doppler ultrasonography and spiral computer tomography. The operation, preceded quite often by anticoagulant or thrombolytic therapy, is recommended in symptomatic cases or when the aneurysmal diameter is greater than 2.5 cm.

CASE REPORT

The female patient, M.H. 64 (history number 16753/05) was hospitalized with a pulsating tumor in the left supraclavicular area. No other signs or symptoms were associated with the tumor except for pulsation and palpational tenderness. No pain, swelling, paresthesia or blood supply shortage was experienced in the limb. However, 4 months earlier, the patient had an emboli of the superior left limb, which was removed through emergency access to the brachial artery. The patient has coexisting diseases, specifically, arterial hypertension, diabetes, abdominal aorta aneurysm, stable coronary disease and obesity. After Doppler ultrasonography, the “tumor” was diagnosed as a 5 cm in diameter subclavian aneurysm, with preserved blood flow but with significant thrombotic burden. Angio CT was performed to visualize other anatomic structures (fig. 1).

Fig. 1. Computer angiotomography of the thorax – aneurysm of the left subclavian artery
After assessing issues specific to this case such as favourable anatomic conditions as depicted by CT and the possibility of general complications after thoracotomy, we elected to pursue supraclavicular access. The patient was operated on with general anaesthesia, in typical situs. A thoracotomy set and a clavicle cutting or resection set were prepared. The skin was cut along the upper margin of the clavicle. The clavicular insertion of the sternocleidomastoïd and anterior scalene muscles were detached. The phrenic nerve, thoracic duct and subclavian vein were insured. The aneurysm was reached, and the subclavian artery was prepared centrally and peripherally. The thyro-cervical and costo-cervical stems were ligated and cut. After administering heparin, the vessels were clamped and the aneurysm was removed. Additionally, within the limits of the operational wound, the stumps of the subclavian artery were prepared allowing for an end to end anastomosis with no need for graft use. The wound was stitched leaving a drain, which was removed after 24 hours. The postoperative period was complicated by subfebrile states, which disappeared on postoperative day two. Up to the second day after the operation, the patient experienced paresthesias of the digits, which spontaneously resolved. The patient was discharged from the hospital in a generally good condition, with an appropriately healing wound and a perceptible pulse on the antebrachial arteries. The stitches were removed and the patient was ambulatory two weeks after the operation.

DISCUSSION

Subclavian aneurysms are rare such that the review of the published articles is comprised of only 277 cases (1). Main causes of their genesis are compressing symptom complex and post-traumatic states (3, 4). In the above mentioned case, the authors accepted, at the beginning, the possibility of iatrogenic etiology – the appearance of pseudoaneurysm after a previous embolectomy of the superior left limb. However, the results of the CT images, showed the existence of a real aneurysm. It is most likely that the aneurysm caused limb embolism, so it was classified as symptomatic. Most authors recommend operation with thoracic access in such cases (1, 2, 5).

However, a few descriptions concerning supraclavicular access connected with the partial resection of clavicle were found (6, 7). Spiral tomography indicated favourable conditions for this kind of surgery. CT analysis showed that the proximal part of subclavian artery was long enough, oriented upwards, approximately 3 cm above the clavicle margin (fig. 1). It is probable that the aneurysm “pushed” the subclavian artery from the thorax above the clavicle. The described anatomic conditions enabled us to plan the most favourable operative method for the patient. The alternative operative method allowed us to avoid possible complications associated with thoracotomy, and shortened hospitalization and accelerated postoperative rehabilitation.

REFERENCES

True subclavian artery aneurysms, especially the size of the presented case are rarely observed. The Authors used a rare approach and operative technique in the above-mentioned case. Considering the presented case, the size and localization of the aneurysm enabled the surgeons to utilize a supraclavicular approach. The above-mentioned approach is inconvenient, due to the small operative field. Even the incision of the muscles does not increase the operative field. Additionally, the subclavian artery is only mobilized on a short segment of the artery, even after incision of the thyrocervical and costocervical trunks. The remaining two branches: internal thoracic and vertebral arteries cannot be cut. Such a condition might significantly hinder the operation. One should not forget that the safety of the procedure is determined by the possibility of clamping the subclavian artery from the aortic arch with a simultaneous long stump left for possible reconstruction. Inadvertent removal of the vascular clamp from the proximal stump of the subclavian artery with simultaneous back movement towards the mediastinum is associated with the possibility of difficult to control massive hemorrhage. Surgery in such cases would prove difficult, since the aneurysm is localized to the supraclavicular fossa.

Favorable anatomical conditions enabled the surgeons to reconstruct the continuity of the subclavian artery following “end-to-end” stump anastomoses. The above-mentioned technique is extremely difficult. This model of reconstruction is hemodynamically perfect and does not require the use of artificial prostheses, which would eliminate the possibility of significant complications (inflammation, recurrent stenoses at the site of the anastomoses).

The percentage of complications after subclavian artery aneurysm operations using the above-mentioned approach, as well as the thoracic approach is significant, ranging between several and 20%. The following complications have been observed: cerebral stroke, inflammation and thrombosis of vascular prostheses, postoperative wound bleeding, vocal cord and diaphragm palsy. The amount of complications decreased with the introduction of intravascular techniques enabling safe and effective elimination of the aneurysm from circulation. Percutaneous stent, stentgraft or covered stent implantations are costly procedures, however, they are being used more frequently. One should not forget that percutaneous procedures are technically and anatomically limited. Absence of a properly shaped column of the aneurysm hindering stent fixation, and risk of vertebral artery ostium closure, are significant limitations of the method. Additionally, stent implantation does not eliminate symptoms connected with aneurysmal compression of neighboring anatomical structures (recurrent laryngeal nerve palsy). The above-mentioned issues should be considered when planning this type of surgical procedure.

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