HUGE RUPTURED ANEURYSM OF ABDOMINAL AORTA

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ABSTRACT

Ruptured aneurysms of the abdominal aorta are the greatest challenge in modern vascular surgery. The emergency of the situation, comorbidities, variations in the anatomy of the abdominal organs due to the large amount of blood in the abdomen in the development of AAA, as well as difficulties caused by the surgical access coupled with damage to the cardiovascular and urinary systems result in mortality rate of about 50% as reported by various authors. Open surgery in this scenario is superior to endovascular treatment EVAR (endovascular aneurysm repair) with prosthetic graft, since the latter does not provide adequate options to drain the retroperitoneal space, which is associated with a higher mortality rate. A clinical case is presented of a patient admitted and operated on 24.06.2013 in „St. Marina“ Hospital in Varna with Dg. Ruptured Aneurysm of the abdominal aorta with hemorrhagic shock.

Keywords: aneurysm of the abdominal aorta, rupture, bispinal incision

A clinical case is presented, D.D.D., 58., admitted on 06.24.2013 at ER of University Hospital „St. Marina“ in Varna with ruptured aneurysm of the abdominal aorta and hemorrhagic shock.

Patient history, clinical and imaging data were enough leads to the diagnosis ruptured aneurysm of the abdominal aorta, which had been developing for several hours prior to hospitalization. The patient was in shock, unresponsive and inadequate. No abnormal signs from the respiratory system. Blood pressure 60/20, HR – 140/min. On palpation the abdominal wall appeared soft, slightly painful, with a large mass

around the navel, pulsating synchronously with the heartbeat. Auscultation showed physiological peristalsis. Succusio renalis – negative on both sides. No spontaneous diuresis.

The angiological examination found pulsations on the palpation sites of femoral arteries bilaterally, in a significantly larger area on the left side (due to aneurysm of the left femoral artery) and no distal pulsations, resulting of the low blood pressure and centralization of blood circulation, with purple skin spots, acrocyanosis and cold extremities.

RADIOLOGIC STUDIES

CT scans of the chest and abdomen showed no pleural and pericardial effusions. No pathological signs in the lung parenchyma bilaterally. Small reticular hypoventilation areas and parenchymal thickenings bilaterally in the dorso-basal aspect. Aortopulmonary window lymph nodes up to 23/10mm, subcranial LN - 18/9mm (Fig. 1).

Dimensions of the aortic intraluminal diameters as measured in 3D reconstructions:

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- ❖ at the sinus of Valsalva level – diameter 45/45mm
- ❖ ascending aorta diameter 42/43mm
- ❖ aortic arch diameter at the level tr. brachiocephalicus - 34mm
- ❖ descending aorta at the level of the diaphragm - 32/30mm
- ❖ abdominal aorta at the level of truncus coeliacus diameter 32/25mm, followed by kinking and fusiform aneurysm with a maximal diameter up to 94/86mm, and diameter of contrasted lumen at the same level 63/50mm.

Fig. 1. Radiological findings of huge ruptured AAA preoperatively

Aneurysmal changes reached the bifurcation distally, and at that level the aorta measured 67/45mm.

Right common iliac artery diameter up to 20mm and kinking, left common iliac artery diameter up to 21 mm.

Aneurysm of the left common femoral artery up to 34 mm.

Truncus coeliacus and superior mesenteric artery (SMA) – no significant stenosis, normal flow.

Renal arteries – no significant stenosis bilaterally, normal morphology. Kidneys – with normal localization, clear contrast.

Left retroperitoneum was covered by a hypodense mass with native postcontrast density of 50HU, suggesting haemoperitoneum.

Liver, spleen, pancreas, adrenals and pelvis appeared normal.

LABORATORY TESTS

Hb - 133, 112, 104; Hct - 0.40, 0.314, 0.305; Leuc - 8.7, 7.92, 5.7; Ery - 4.59, 3.35, 3.41; Thr - 231, 103, 102; Glu - 7.9; Crea - 84, 138, 97; Urea - 6.1, 9.3, 10.4; Na - 136, 144; K - 4.2, 3.9; Cl - 102, 108; CRP - 9.59, 284.54; OB - 67.7, Alb. - 41;

Coagulation – PTA 68%, 52%; INR 1.26, 1.55; APTT 23“, 30“.

CLINICAL DISCUSSION

Decision was made after appropriate reanimation and assessing the patient's overall condition, CT scans, laboratory studies, in favor of emergency operation.

OPERATION

Under general anesthesia a bispinal incision was made. Haemoperitoneum about 200 ml of blood in the abdominal cavity. Cell-saver was used for aspiration and reinfusion of blood. Retroperitoneum was distended by a huge haematoma around throbbing aneurysm of the abdominal aorta. After dissection of the bag (Fig. 2) an AAA was found, 20 cm length and 10 cm width, with dense whitish walls. Aneurysmal neck was not found below renal arteries that required dissection of the aorta proximal up to the superior mesenteric artery SMA.

Fig. 2. Intraoperative findings of AAA. Very big, inflamed aneurysmal sac.

Just above the renal vessels clamping of the aorta. Aneurysmal sac was opened and a huge amount of clots evacuated, which also engaged the opening for the lower mesenteric artery. Aortobifemoral vascular prosthesis 20/10 mm was mounted and end to end proximal anastomosis performed. Iliac arteries were ligated. The left femoral artery was dilated by a large aneurysm – 34 mm diameter, which was excised and end to end distal anastomoses performed. After declamping good ripple appeared in all arteries.

Abdominal cavity was drained by two drains – intraperitoneal and retroperitoneal. Breast retroperitoneal hematoma, and two inguinal drainage in Redon.

Multi-layer closure of the abdomen. Postoperative course was normal, on the third day the patient recovered to a condition to be transferred from ICU. Walking with elastic abdominal belt, primary operative wounds healed. Normal arterial pulsations in pedal arteries, bilaterally restored hemodynamics without residual limb ischemic symptoms.

DISCUSSION

Ruptured aneurysms of the abdominal aorta are the greatest challenge in modern vascular surgery. (4,10). The emergency of the situation, comorbidities, variations in the anatomy of the abdominal organs due to the large amount of blood in the abdomen in the development of AAA, as well as difficulties caused by the surgical access coupled with damage to the cardiovascular and urinary systems result in mortality rate of about 50% as reported by various authors. At the Vascular surgery Dept. of the University Hospital „St. Marina“ – Varna in recent years mortality was significantly reduced and now is < 50% (11,13).

In order to achieve a favorable outcome it is necessary to consider several key points:

- ❖ trained surgical team;
- ❖ supply of blood and biological products;
- ❖ adequate reanimation - providing one central and two peripheral IV lines;
- ❖ infusion of optimal amount of liquids (saline) to prevent cardiac failure;
- ❖ cardiotonics due to heart failure (dopamine assessed by intensivists);
- ❖ save time prior to operation – minimize the studies performed;
- ❖ assess urine excretion after catheterization of bladder;
- ❖ surgical treatment in 3 to 6 hours after hospitalization.

All these considerations and adequate surgery provide a positive end result – patient's survival. Major role in postoperative care have the heart/lung complex support and maintenance of diuresis (2,3).

Crucial for a favorable outcome and especially for the recovery of renal function is the drainage of the abdominal cavity and retroperitoneum (7,9).

Using cell saver in cases of large ruptured aneurysms is mandatory, as the urgent supply of large amounts of blood (2-3 liters or sometimes more) in the operating theatre is virtually impossible in such a short period of time. Patient's blood reinfusion definitely saves his life (1,6).

Unique in this case was the clamping of the aorta above the renal arteries, which results in warm ischemia of both kidneys. Thanks to the professionalism of the operating team, the clampage time was reduced to 20 minutes, sufficient to perform the proximal anastomosis.

The clamping of the aorta was performed through a rarely used surgical access – bisplinal incision of the abdominal wall, which is quite traumatic, but allows management of visceral branches of the abdominal aorta – truncus coeliacus, superior mesenteric artery and aa. renales. It provides good access for clamping and reduces the time of intervention on the neck of the AAA (5,8).

Open surgery in this type of rupture is superior to endovascular treatment EVAR (endovascular aneurysm repair) with a prosthetic graft, since the latter does not provide adequate drainage of the retroperitoneum, which is associated with a higher mortality rate (12,14).

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