

Mini Review on Anatomical Variation before Aortic Surgery in a Patient

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ABSTRACT

Objective of this study was to evaluate the short-term results of surgical treatment in patients with acute aortic dissection patients and methods

The main risk factor for acute aortic dissection is the diameter of the aorta exceeding 4 cm (diagnosed in 73.7% of cases). The main postoperative complications are bleeding (42.1%), injuries of central nervous system (23.7%), and cardiogenic shock (18.4%).

Key Words: Aortic Surgery; Celiacomesenteric trunk; Thrombectomies; Polymorphism

INTRODUCTION

The objective of this study was to evaluate the short-term results of surgical treatment in patients with acute aortic dissection patients and methods. A retrospective analysis of 38 patients with acute type A aortic dissection who were surgically treated at the Clinic of Cardiac, Thoracic, and Vascular Surgery, Hospital of Kaunas University of Medicine, from January 2004 to December 2007 was conducted. The diagnosis of aortic dissection was confirmed by employing special techniques. Two-dimensional transthoracic echocardiography was performed in 34 (89.5%) patients; Trans esophageal echocardiography, in 24 (63.1%); computed tomography, in 29 (76.3%); coronagraphy and angiography, in 20 (52.6%). Preoperative shock was reported in 3 (7.9%) and cardiac tamponade in 18 (47.4%) cases. More than half (57.9%) of patients were operated on within the first 24 hours after admission. In the majority of cases (73.7%), the diameter of the aorta exceeded 4 cm. In the presence of type A aortic dissection, all patients underwent surgery on cardiopulmonary bypass; its duration varied from 20 to 485 min, with a mean of 214.6±102.9 min. The mean aortic cross-clamp time was 114.5±62.7 min. complete circulatory arrest was needed in the majority of cases (86.8%), and it lasted 2 to 97 min (mean, 27.4±18.6 min). During cardiopulmonary bypass, body temperature was decreased to 17–28°C (mean, 18.9±1.95°C). The duration of surgery ranged from 1 to 14 hours, with a mean of 6.1±2.49 hours. During the early postoperative period, 12 (31.6%) patients died. Postoperative bleeding was seen in 16 (42.1%) patients, and 6 of them died later. Due to prolonged bleeding, 4 (10.5%) patients were left with an open sternum after surgery. Resternotomy was performed in 9 patients; 3 of them died due to multiorgan injury. During postoperative period, cardiogenic shock of various degrees was seen in 7 (18.4%) patients. Central nervous system injury occurred in 9 (23.7%) patients. A 50-year-old man was admitted as an emergency for acute left-leg ischemia. He was a smoker and had undergone aortobifemoral bypass for atheroma 2 years earlier without re-implantation of the inferior mesenteric artery (IMA). Computed tomography (CT) angiography revealed thrombosis of the left leg of the graft as well as a superior mesenteric artery (SMA) and a common hepato spleno gastric trunk arising from a celiacomesenteric trunk [1-2]. Successful thrombectomy was performed. Twenty-four hours later, he presented an acute abdominal pain with haemodynamic instability and elevated lactate (4 times the normal value) and transaminases (6 N). A new CT scan showed thrombosis of this celiacomesenteric trunk, with a lack of enhancement of the bowel wall after contrast media injection and diffuse peritoneal liquid, indicating mesenteric ischemia. Emergent laparotomy confirmed these radiological findings, with an ischemic liver and necrosis of the colon, the ileum and the gall-bladder. Despite an aggressive approach (thrombectomy of the SMA and Hepatic artery, total colectomy, enterectomy of 1 meter, cholecystectomy), the patient died 12 hours later [3].

The celiac trunk commonly arises at the level of twelfth thoracic vertebra and comprises the left gastric artery, the common hepatic artery and the splenic

artery. The superior mesenteric artery arises 1 cm below, at the level of L1. In embryonic development, the abdominal visceral arteries arise from the primitive dorsal abdominal aorta through four roots: the left gastric artery, the hepatic artery, the splenic artery and the superior mesenteric artery. These roots are joined together by a longitudinal ventral anastomosis. Normally, a cleft forms in this anastomosis between the third and fourth roots thus isolating the celiac trunk from the superior mesenteric artery. The common celiacomesenteric trunk is a rare variation (0.5%) of the anterior branches of the abdominal aorta. It is usually asymptomatic and may be discovered incidentally during vascular explorations or during cadaver's dissection. Rarely, it may cause symptoms including unspecific abdominal pain to real abdominal angina when associated to atherosclerosis. It was classified [4].

It is widely agreed that two visceral arteries are sufficient for digestive functions. The absence of the IMA explains the cataclysmic presentation of the thrombosis of the celiacomesenteric trunk in this case. This kind of vascular variation has to be known by surgeons and radiologists because it may change the management of abdominal aneurysms and atherosclerosis, and indicate for example the re-implantation of the IMA during aortobifemoral bypass [5]. The infection of aortic root is not common pathology; however, it is a complicated disease. Esophageal echocardiography is an informative method while diagnosing aortic root abscesses. The in hospital mortality is increased by the heart failure persisting after the operation and sepsis. The long-term survival is decreased by preoperative infective endocarditis of the prosthesis and heart failure. The mortality rate of patients older than 50 years is 3-fold higher than mortality rate of younger ones in hospital mortality rate was 14.3%. The causes of death included sustained heart failure and sepsis. All these patients were in NYHA functional class IV preoperatively; one of these patients had culture positive for *Staphylococcus aureus*. In hospital survival was 85.7% one-year postoperative survival – 80.9%, and both five-year and ten-year survivals were 76.0%. The long-term survival was negatively influenced by recurrent infective endocarditis, heart failure, and age. Death occurred in 1 patient (11.1%) of the 9 patients who at the time of surgery were younger than 50 years and 4 patients (33.3%) of the 12 who were older than 50 years at the time of operation [6-7].

Three peripherals are cannulated before the operation patient's arteries (right and left radial artery her and femoral artery) to measure BP. In addition, ponies central and peripheral intravenous fluids for infusions. The chest is opened during the procedure median sternotomy. Assessing the aortic dissection the nature of the infection, the location of its cannulation is chosen, and 4 (10.5%) patients had to cannulate their thighs artery. Two of them had to do it after the aorta delamination of the standard coronal connection during the holding operation. The third patient has this artery cannulated after diagnosing a huge ruptured ascending aneurysm of the aorta, and the fourth one during the suspension to aortic surgery after previous Cabrioli surgery- for whom the iliac artery is prepared before the sternotomy 24 (63.1%) cannulated aorta in the area of the arch patients, but

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directly into the lumen of the opened aorta (eye under control) a cannula was inserted in 10 (26.3%) patients. Myocardial protection was performed in a standard way. An increased number of 5A alleles leads to high expression of MMP-3. Thus, objective of the study was to determine whether the 5A/6A polymorphism in the promoter region of MMP-3 gene is associated with the development of dilatative pathology of ascending thoracic aorta. We studied 76 patients (age ranged from 31 to 81 years; median age, 64 years) who underwent aortic reconstruction surgery due to dilatative pathology of ascending thoracic aorta and a random sample of the population (n=604) aged 25-64 years, all from Lithuania [8-10]. DNA was analyzed by using real-time polymerase chain reaction to genotype polymorphism 5A/6A at a position - 1171 of the MMP3 gene promoter. The prevalence of MMP-3 genotypes was similar in the group of dilatative pathology of ascending thoracic aorta and random sample of population. The frequency of 5A allele did not differ significantly between both groups and was 0.506 and 0.514, respectively. Male carriers of 5A/5A genotype were significantly younger compared with those with the 6A/6A genotype [11-13]. In conclusion, the frequency of MMP-3 promoter 5A/6A genotypes did not differ between the group of patients with dilatative pathology of ascending thoracic aorta and the random sample of population, but the males with dilatative pathology of ascending thoracic aorta and 5A/5A genotype required aortic reconstruction surgery at the younger age than the males carrying 6A/6A genotype in the MMP-3 promoter region. DNA quality and concentration were estimated by spectrophotometrical analysis and by ethidium bromide stained agarose gel under ultraviolet light. The latter method was used to evaluate DNA degradation level in the samples from paraffin-embedded aortic tissue [14-15].

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