

SURGICAL MANAGEMENT OF INFRARENAL AORTIC ANEURYSM - A SINGLE CENTER ONE YEAR EXPERIENCE

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REZUMAT

Introducere: A fost efectuata o analiza retrospectiva a 42 de cazuri de aneurisme aortice infrarenale care au fost operate in anul 2008 in unitatea noastra. **Material si metode:** Au fost analizate datele demografice ale pacientilor, tehnica operatorie, complicatiile potoperative, durata tratamentului pe sectia de terapie intensiva (STI), durata spitalizarii si mortalitatea perioperatorie. **Rezultate:** In grup au fost incluse 2 aneurisme rupte, 9 aneurisme simptomatice si 31 asimptomatice. In 11 cazuri tratamentul a fost endovascular (EVAR) si in 31 de cazuri operativ conventional. Marea majoritate a celor 31 de aneurisme operate conventional nu au fost din punct de vedere anatomic compatibile cu EVAR. Un caz de aneurism perforat a fost tratat cu o endoproteza aorto-monoiliacala si cu un pontaj femoro-femoral, iar cel de al doilea caz a fost operat conventional. In timp ce in grupul EVAR nu a fost inregistrat nici un deces, in grupul pacientilor operati deschis s-a inregistrat o mortalitate de 6,45%. **Concluzii:** In grupul de pacienti luati in studiu, tratamentul aneurismelor abdominale prin EVAR s-a dovedit superior operatiilor conventionale, deschise, in ce priveste rata complicatiilor postoperatorii si mortalitatea. **Cuvinte cheie:** aneurisme de aorta abdominala; reparatie aortica deschisa; tratament aortic endovascular

ABSTRACT

Background: We studied retrospectively 42 repairs for infrarenal aortic aneurysm performed during the year 2008 in our vascular surgery unit. **Material and methods:** The demographic data of the patients, the operative technique, the postoperative complications, the length of staying on ICU and in the hospital and the perioperative mortality have been retrospectively investigated. **Results:** In the whole cohort there were 2 ruptured, 9 symptomatic and 31 asymptomatic infrarenal aneurysms. Eleven of these procedures were endovascular repairs (EVAR) and 31 open repairs (OAR). The majority of all 31 OAR were anatomically not suitable for EVAR. One of the patients with a ruptured aneurysm was treated with an aorto-monoiliac endograft and with a crossover bypass. The other one underwent open surgery. In the EVAR group was no case of perioperative death, while in the OAR group there was recorded a 6.45% perioperative mortality rate. **Conclusions:** In the studied group of patients, the treatment of aortic aneurysms elective EVAR has proved itself superior to OAR in terms postoperative complications and mortality.

Key Words: abdominal aortic aneurysm; open aneurysm repair; endovascular aortic repair

BACKGROUND

The aortic surgery is one of the most interesting and challenging fields of vascular surgery with an explosive development over the last decades. Nowadays the endovascular repair of the infrarenal aortic aneurysm is a widely accepted approach modality. The preoperative evaluation and the anatomical features of the aneurysm play a very important role in patient selection for open or endovascular repair of aortic aneurysm. The aim of this study is to present our short-term results and not to debate about advantages and disadvantages of open or endovascular procedures.

We have more than 10 years experience in endovascular treatment of aortic aneurysm and the long terms result are encouraging. The decision is made individually after carefully evaluation of the patients in concordance to technical possibilities and preference of the patients. Predictors of 1-year mortality can identify patients less likely to benefit from elective AAA repair. Age, chronic obstructive pulmonary disease (COPD), renal failure, suprarenal clamping have significant impact on 1-year mortality after open AAA repair.¹ Our patients are well informed and they play an active role in making of decisions about surgical procedures. In the last years the preference of the patients for endovascular procedures is substantially higher. We are able to perform open repair or EVAR even in emergency situation 24 hours a day. EVAR is still subject of controversies in vascular surgery, but is nowadays a wide accepted treatment modality.^{2,3} Despite the actually trend for endovascular procedures, we recorded over last year an increased number of complex aneurysm with short aortic neck length and tortuous or sclerotic iliac arteries, which lead to an almost three times higher proportion of open repairs in our patients group.

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MATERIAL AND METHODS

We performed a retrospective study of 42 repairs for infrarenal aortic aneurysms which were treated during 2008 in our vascular surgery unit. Suprarenal and thoracic aortic aneurysms were excluded. All patient records and the data from quality control programme of the German Society of Vascular Surgery were evaluated. We investigated retrospectively the demographic data of the patients, the operative technique, the postoperative complications, the length of staying on ICU and in the hospital and the perioperative mortality. We divided these collectively in two groups, one for open repair and one for endovascular procedures. In the whole cohort were 2 ruptured, 9 symptomatic and 31 asymptomatic infrarenal aneurysms. 11 of these procedures were endovascular repairs (EVAR) and 31 conventional open operations. To assess the associated diseases we used the ASA score.

OPEN ANEURYSM REPAIR GROUP

Thirty-one cases of open surgery for infrarenal aortic aneurysm have been performed in our unit in year 2008. The median age was 68.5 years (range 51:85) and there were 3 females (9,67%) and 28 male patients (90,32%) in these group. There were 1 ruptured, 7 symptomatic and 23 elective aortic aneurysms. The median diameter of the aneurysms was 60.2 mm (range 50-120 mm). In one case the diameter was not determined because the patient underwent surgery due to a rupture before a CT-scan could have been done. The great majority of open repaired AAA's were anatomically not suitable for EVAR. The main limitation was the short proximal aortic neck. In 3 patients a suprarenal aortic cross clamping was necessary. With one exception all patients underwent CT-scan and angiography. In conformity with the ASA Score there were 5 ASA I patients (16.20%), 18 ASA II patients (58.06%) and 8 ASA III patients (25%). Ten patients had no heart diseases (32.25%). Twenty-one of them (67.74%) had a stable coronary heart disease with an ejection fraction (EF) > 35%. Almost one half of this cohort (48.38%, n= 15) had a mild form of COPD and only one patient (3.20%) had a severe COPD. The renal function was normal (serum creatinine < 2 mg/dl) in 93.54% (n=29). The median duration of the open aneurysm repair was 166.45 minutes (range 90:270 minutes). As graft material synthetic Dacron prosthesis was used. The configuration of the reconstruction was determined by the possibilities of the distal anastomosis. We replaced

the infrarenal aorta in more than a half of the patients with a Dacron "tube" graft with the distal anastomosis above or on the aortic bifurcation. (Table 1) In 7 patients aorto-biiliac reconstruction with a bifurcated Dacron graft was performed. In another 3 cases bifurcated grafts were connected on one side with the iliac artery and on the other side with the femoral artery. Two patients were treated with an aorto-bifemoral bypass. In this study arm 3 patients underwent further surgery for complications. We recorded one case of bowel ischemia, one relevant postoperative bleeding and one obstruction of the prosthetic graft. Another 4 patients developed after surgery cardiac, renal and pulmonary complications. The median length of staying on ICU was 4.74 days (range 1:18) and the median duration of hospitalisation was 21.70 (range 5:75 days). We recorded 2 cases of postoperative death (6.45%), both in symptomatic patients with an ASA 3 score.

Table 1. Types of reconstruction of the AAA in open surgery.

Graft type	n	%
Tubegraft	19	61.2%
Aorto-biiliac-Bypass	7	22.58%
Aorto-ilio-femoral Bypass	3	9.67%
Aorto-bifemoral Bypass	2	6.45%

EVAR GROUP

We performed EVAR for infrarenal aortic aneurysms in 11 patients, all males, with a median age 77.36 years (range 56-86). Six patients were octogenarians, 9 individuals had an ASA III Score and 2 of them an ASA II score. Regarding the comorbidities, 8 patients (72.72%) showed a stable coronary heart disease with an EF >35% and a moderate COPD. The median diameter of the aneurysms was 62mm (range 42-86 mm). In nine patients we repaired the aneurysms with a bifurcated aorto-biiliac modular endografts, in one patient with a tube endograft. One hybrid repair with an aorto-monoiliac endograft and femoro-femoral crossover bypass for a ruptured aneurysm in the 85 years old patient was performed with a very good result. Despite a type I endoleak (Fig. 2, 3) we couldn't identify an expansion of the aneurysm and the patient is actually in a good clinical condition. In EVAR arm of this study, the length of staying on ICU was 3.27 days and the duration of staying in hospital was in average 11 days. In the EVAR group a conversion operation due to secondary aneurysm expansion was necessary and there was no case of perioperative death in this cohort.

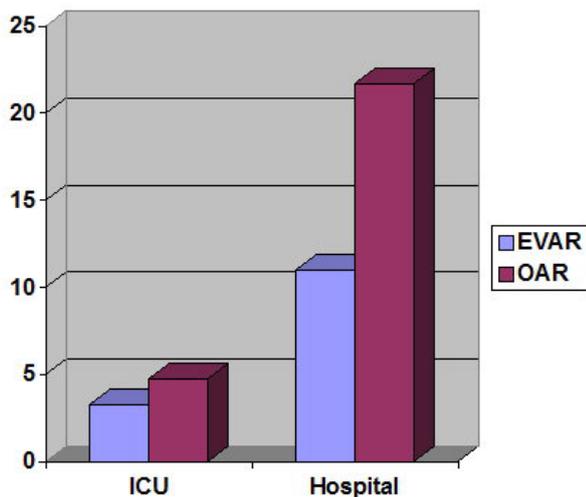


Figure 1. Comparison between duration of treatment on ICU and overall length of staying in hospital for OAR and EVAR Group.

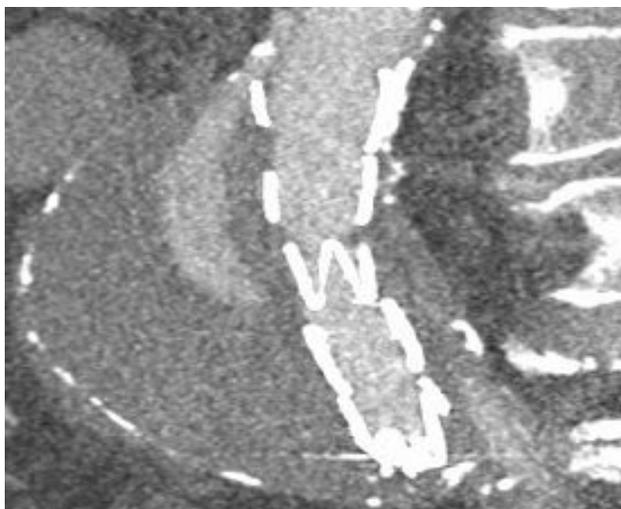


Figure 2. Sagittal aspect of an endoleak type IA in an 85 year old patient with a ruptured aortic aneurysm.

DISCUSSION

After careful evaluation and in accordance with the preferences of the patients we chose individually the conventionally open or endovascular procedures for infrarenal aortic aneurysm. Due to our more than a decade experience in endovascular procedures and good middle term results, we consider EVAR a reliable approach in selected patients. In all symptomatic patients we perform surgery as soon as possible. In patients with asymptomatic AAA a careful interdisciplinary evaluation was performed in order to assess the perioperative risk. The strong association between atherosclerosis risk factors and abdominal aortic aneurysms was in our patients also obvious.⁴ We do not use any score systems to predict the outcome of the patients, systems which are in the contemporary literature controversial.^{1,5}



Figure 3. The contrast enhanced CT Scan with a transversal view of the same patient a type IA endoleak after EVAR for rAAA.

When an asymptomatic AAA must be operated remains controversial. The early operation for patients with small AAA seems to show no immediate benefit due to early postoperative complications. In long term analysis there is no significant survival differences for surgery between small (40-55mm) and big (>55mm) AAA.⁶ The small AAA's in our study are mainly symptomatic. Due to the increasing use of endovascular techniques in the territory, we recorded a change in the quality of aneurysm referred to our unit. A great part of these AAA's were complex and not compatible with the endovascular techniques. The preoperative mortality for open repairs of 6.45% is due to the small size of these study statistically insignificant and must be analysed in the future in a greater context. The main limitation for the endovascular procedure remains the proximal aneurysm neck which must be minimum 15 mm long. The last generation of devices are more flexible and allow the placement through tortuous iliac arteries. Angulations of the iliac arteries of more than 90 degree are generally a contraindication for EVAR. Patients who undergo elective EVAR had substantially lower postoperative complications and there was no case of perioperative death in this group, even in ruptured aneurysms. These patients, with a median age of over 77 years, most of them octogenarians, almost reached the average life expectancy in West Europe and benefit immediately from a minimal invasive procedure and a low rate of perioperative complications. Anyway more evidence is needed on the long-term outcome after EVAR in larger samples in order to assess the durability of this less invasive procedure.⁷ Some publications report a lower

mortality after EVAR for rAAA than for open repair of rAAA⁸, the evidence level remains controversial. The significance of the endoleaks, especially of type II must be critically evaluated. The presence of a type I or a type II endoleak during EVAR significantly increases the likelihood of a postoperative endoleak and should prompt a high degree of suspicion during follow-up.⁹

CONCLUSIONS

This study represents a retrospective analysis of one year experience in the surgical treatment of AAA in our unit. We recorded over the 12 month period of these study an increased number of infrarenal AAA which were not suitable for EVAR. Due to the increasing use of endovascular techniques, a greater part of open repairs are more complex, which leads consecutively to a higher complications rate. Patients who undergo elective EVAR had substantially lower postoperative complications. There was no case of perioperative death in the EVAR group, even for ruptured aneurysms. Our results in the endovascular treatment of ruptured AAA are encouraging, especially in elderly patients at high operative risk.

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