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Research Article

**STUDY TO KNOW THE ADVANTAGES OF ENDOVASCULAR  
TREATMENT OVER OPEN SURGICAL REPAIR FOR  
TREATMENT OF ABDOMINAL AORTIC ANEURYSM: A  
COMPARISON AND META-ANALYSIS**<sup>1</sup>Dr. Esha Mukarram, <sup>2</sup>Dr. Mohammad Qais, <sup>3</sup>Dr. Muhammad Masoom<sup>1</sup>Allama Iqbal Memorial Hospital Sialkot<sup>2</sup>Isra University Hospital Hyderabad<sup>3</sup>PIMS Hospital Islamabad**Abstract:**

**OBJECTIVE:** Endovascular repair of aortic aneurysm (EVAR) is relatively a new procedure compared to open abdominal surgery. The aim of this Research was to assess the efficacy and safety of this method in patients with abdominal aortic aneurysm (AAA).

**STUDY DESIGN:** A comparative Study.

**METHODS:** We analyzed 55 research items according to the inclusion criteria. A total of 1888 patients, 1321 OS and 567 EVAR were reported in the literature. For these patients, the results of these two procedures (endoleak, anastomosis, renal, pulmonary, cardiac, multiorganic, and cerebrovascular accidents) were comparable.

**RESULTS:** The results between two groups regarding operation time, success rates, postoperative hospital stay and intensive care unit were same. In the EVAR blood transfusion and blood loss requirements group were significantly lower. Differences in renal, cardiac, visceral and pulmonary complication rates were high in the open abdominal surgery group with 0.01 P value. In EVAR group Lower extremity ischium was more tightened with  $p < 0.05$ . At 30 days after the OS the mortality rate was higher in group than in the EVAR group ( $P < 0.05$ ).

**CONCLUSION:** For aortic aneurysm treatment EVAR is a less invasive, safe treatment and patients show rapid improvement with fewer complications.

**Key Words:** Abdominal aortic aneurysm, Endovascular repair, Open abdominal surgery.

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**INTRODUCTION:**

Abdominal aortic aneurysm (AAA) develops slowly over many years and often has no symptoms. It develops when the artery's wall weakens and stretches like a balloon. Aneurysms are usually discovered during the ultrasound examination of the abdomen, incidentally resulting in symptoms such as another cause or back pain. If the aneurysm expands rapidly, there may be tear or blood loss on the vessel wall (aortic dissection) and the symptoms suddenly develop. Since a ruptured aneurysm is extremely dangerous and can lead to life-threatening hemorrhage, aneurysms are better corrected with some intervention before this complication. Initial repair of endovascular aortic aneurysm (EVAR) for AAA Parodi et al. In the last two decades, AAA EVAR has developed rapidly and is now widely applied. Patients with an atypical structure with abdominal pain or back pain have a higher risk of rupture and intervention is recommended. In the event of aneurysm rupture, more than half of the patients die before going to the hospital. The outcome of those who come to the operating room depends on the clinical situation that occurs, but usually there is a mortality rate of about 50%. For asymptomatic AAA patients, treatment depends on the size of the aneurysm. Delayed rupture after open abdominal aortic aneurysm repair has been shown to provide better survival rates for EVAR. In some patients, treatment with EVAR has been shown to be associated with systemic inflammatory response (also called post-implantation syndrome) and prolongation of hospitalization. Contractions of aneurysms have also been reported in some studies. Spontaneous fistulization of an AAA in the inferior vena cava (IVC) is a rare complication and rarely occurs in clinical practice, but preoperative diagnosis reduces the likelihood of morbidity and mortality. The low ejection fraction (LVEF) of the left ventricle is associated with decreased survival in AAA patients under repair. In this meta-analysis, we analyzed current studies published with AAA patients treated

with OS or EVAR to compare efficacy and safety of both treatments. You can provide a reference for choosing the most appropriate treatment strategy for AAA.

**MATERIALS AND METHODS:**

We systematically analyzed 55 articles from 55 items (1986, 88, articles published in 1998-2013) in the last search made in February 2014. A few keywords were used in English to collect generalized data. All case studies and EVAR or OS results or original articles that were both reported for AAA were selected. Search was done via MEDLINE and PUBMED. The "a" and "c" options were used to identify AAA cases. The selection of makalen was made on the basis of (1) patient AAA articles containing treatment types, (2) articles containing patients with AAA receiving EVAR or OS, and (3) recent articles with the requested case. Classification articles not classified by title are excluded from the study. Standard protocol for data extraction was used. For the purposes of our analysis, we changed the standard protocol to include predefined variables related to clinical features and ceremonial data. Data extraction was done independently by all the authors, and when there was uncertainty, more discussion and consensus was reached. Statistical analysis was performed with SPSS version 16.0 and followed a standard protocol described by Eggebrecht et al. In retrograde case reports. The incident rate was calculated as the number of events according to the number of patients treated. The results are given in frequency and percentage. The two methods were compared using the chi square test (two queues). P value <0.05 was considered significant. Postoperative complications were compared in two groups.

**RESULTS:**

A total of 1888 patients, 1321 OS and 567 EVAR were reported in the literature. The mean age of the patients was  $60.43 \pm 0.29$  in OS and  $65.80 \pm 0.19$  in EVAR.

**Table 1: Comparison of patient's pre-operative characteristics**

Pre-operative Variables	OS	EVAR	P-value
	Group-Available data <sup>3,8,9,11,15-17,22,25</sup>	Group-Available data <sup>2-7,9-14,16-18,23-25</sup>	
Smoking	68/150	96/172	0.0601
Coronary heart disease	300/1008	250/875	0.5708
Hypertension	520/900	502/901	0.3918
Diabetes Mellitus	202/1050	76/712	0.000*
Renal disease	40/410	24/370	0.1178
Pain	210/610	18/36	0.0725
Aneurysm rupture	111/714	one/79	0.000*

group. Patients in OS group were younger than EVAR and age difference was significant ( $P = 0.036$ ). The two groups were similar in terms of preoperative data except diabetes mellitus and aneurysm rupture. Table 1. There was no significant difference in success rates for both procedures. Among patients treated with EVAR, endoleak was the most common complication after treatment with EVAR ( $p$  value  $<0.05$ ). Anastomotic leakage, renal complications, pulmonary complications and cardiac complications were significantly different in both groups ( $p$  value  $<0.05$ ). Stroke, multiple organ failure and procedure-related complications were not statistically different between the EVAR and OS groups ( $P$  value  $> 0.05$ ). Comparisons of complications of various studies are shown in Table 2.

**Table 2. Comparison of Complications with EVAR and OS.**

Complications	EVAR	OS	p-value
	Group <sup>2,7,9-14,16-18,23-25</sup>	Group <sup>3,8,9,11,15,17,22,25</sup>	
Endoleak	26.3%	4.8%	P<0.05
Anastomotic leak	31.2%	8.7%	
Renal complications	5.0%	33.7%	
Pulmonary complications	14.2%	7.1%	
Cardiac complications	20-40%	7-15%	
Stroke	52.3%	55.1%	P>0.05
Multiple Organ Failure	35.9%	41.8%	
Procedure Related complication	7.5%	11.0%	

In a multi-centered study; Patients treated with EVAR had fewer blood loss ( $310 \pm 19$  mL vs.  $1590 \pm 124$  mL,  $p <0.0001$ ), less homologous transfusion (32% vs 32%,  $p <0.0001$ ) and more patients It was observed. Short duration ( $2.0 \pm 0.1$  days versus  $9.8 \pm 1.4$  days,  $P <0.0001$ ). Compliance rate was 57% for open surgery, 14% ( $p <0.0001$ ); Endoleak was observed in 20% .

**Table 3: Comparison of post-operative mortality after EVAR and OS.**

Reference Study	Mortality	
	EVAR Group <sup>1,2,7,9-14,16,17,19,20,23,25</sup>	Open Surgery <sup>3,8,9,11,15,17,19-20,22,25</sup>
(Steinmetz et al, 2010) <sup>14</sup>	25%	54%
(Chahwan et al, 2007) <sup>17</sup>	40.6%	29.6%
(Prusa et al, 2013) <sup>3</sup>	6.9%	8.5%
(Wibmer et al, 2009) <sup>2</sup>	2.2%	3.7%
(Coppi et al, 2010) <sup>11</sup>	30%	
(Beeman et al, 2010) <sup>12</sup>	28.5%	38.7%
(May et al, 2004) <sup>18</sup>	2.7%	3.5%
(Park et al, 2013) <sup>19</sup>	16.6%	53.8%

Postoperative mortality was compared in EVAR and OS patients and the results are shown in Table 3.

### DISCUSSION:

By AAA The patients life is seriously in danger. Mortality In patients with ruptured aneurysm, is still high, which is why rapid diagnosis and treatment are required. Some elderly patients or others with organic dysfunction die without having any treatment because treatment risk mortality was not acceptable to them. It is difficult to choose between preoperative mortality and postoperative complication risk (with EVAR or OS) in patients with high-risk AAA. But EVAR is also the current research that suggests that ruptured AAA is associated with reduced mortality and that complications in all age groups are low. In both groups Preoperative risks outside of diabetes were similar; However, in OS compared to EVAR preoperative pulmonary disease is low. Aneurysm, bleeding, etc. Among other complications such as recurrence, endoleak may cause mortality with EVAR treated patients . EVAR is more effective in obese patients than open surgery. In this study it is proven that endoleak after EVAR is more common than OS. Endoleakin was observed to be bound to anticoagulant drugs; Warfarin (a widely used anticoagulant drug) is an independent risk factor for the development of endoleaks and for continued expansion of the sac. (PIS), a clinical entity characterized by systemic inflammation, manifested as fever and leukocytosis, a common complication in the abdominal aorta, and 35% of patients in the EVAR group. Monitoring studies show that short-term complete exclusion of the aneurysm is possible, especially in emergencies and high-risk patients, with REVA and morbidity and this procedure with low mortality. Trends show that mortality is low in EVAR compared to open surgery, but it is not statistically significant. EVAR has also been observed to reduce related aneurysm-related mortality, but post-operative morbidity, intensive

care, reduced hospital stay, and ultimately cost savings have been compared. Blood loss with EVAR is lower when compared with open surgery. In conclusion, EVAR is better than open surgery in many respects, such as reducing blood loss, reducing hospital stay, and reducing mortality.

### CONCLUSION:

For aortic aneurysm treatment EVAR is a safe and less invasive treatment which shows rapid improvement with fewer complications.

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