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Clinical and Cost Benefits of Fenestrated/Branched Endovascular Stent Grafting for Intact Thoracoabdominal Aortic Aneurysm Repair: A Real-World Data Analysis

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Background

- Thoracoabdominal aortic aneurysms (TAAA) represent one of the most challenging cardiovascular conditions and has traditionally been treated with open aortic repair (OAR).[1,2]
- Fenestrated and/or branched endovascular aortic repair (f/bEVAR) has emerged as a minimally invasive treatment option for TAAA.[3,4]
- f/bEVAR has been shown to be safe and effective for both ruptured and intact TAAA.[2,5,6]
- Adoption of f/bEVAR has been tempered by concerns regarding higher implant cost compared to OAR. However, data on the overall cost impact of postoperative outcomes of f/bEVAR vs OAR in TAAA are not fully understood.

Objectives

This study aimed to evaluate the current **clinical outcomes** and their **cost impact** following f/bEVAR vs OAR of intact TAAA.

Methods

Study design

- Real-world, hospital-discharge data of patients undergoing intact TAAA repair in the U.S. from the PINC AI™ Healthcare Database (2020-2023) were retrospectively analyzed.

Baseline Characteristics and Outcomes

- Patients had a diagnosis of intact TAAA (ICD-10-CM codes I71.6x).
- Patients were divided into two cohorts defined by ICD-10-PCS codes: f/bEVAR and OAR.
- Patient characteristics including demographics, comorbidities (Charlson Comorbidity Index, CCI, and Elixhauser Comorbidity Index, ECI), discharge status, length-of-stay (LOS), time in the Operating Room (OR), post-anesthesia care unit (PACU) and intensive care unit (ICU) were evaluated.
- Clinical outcomes included mortality, complications and rehospitalization/reintervention.
- Total and disaggregated hospital costs (expressed as 2023 U.S. dollars) were compared.

Statistical Analyses

- Categorial and continuous variables between groups were analyzed using the Panalgo Instant Health Data (IHD) analytics platform in conjunction with the SAS Software version 9.4.

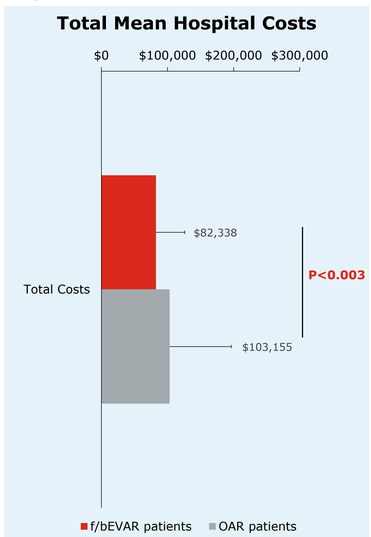
Table 1. Patient characteristics

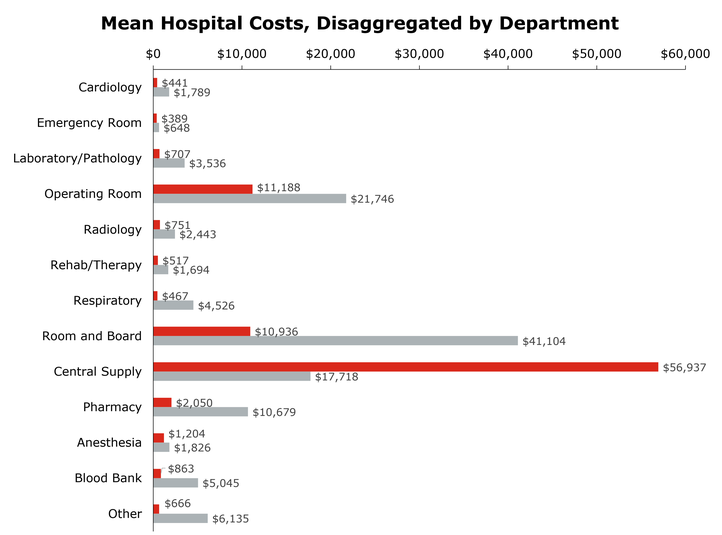
Patient Characteristics	f/bEVAR	OAR	P-value
Total patient count	160	306	
Age (years), mean (SD)	**70.5(8.4)**	**62.4(11.7)**	**<0.0001**
Sex			0.90
Female	66(41.3%)	128(41.8%)	
Male	94(58.8%)	178(58.2%)	
Race			0.34
Asian	2(1.3%)	5(1.6%)	
Black	21(13.1%)	57(18.6%)	
Caucasian	125(78.1%)	216(70.6%)	
Charlson Comorbidity Index, mean (SD)	1.8 (1.9)	1.8(1.7)	0.39
Elixhauser Comorbidity Index, mean (SD)	**5.5(2.6)**	**6.6(2.7)**	**<0.0001**
Comorbidities			
Acute renal failure	**8 (5.0%)**	**34(11.1%)**	**<0.05**
Heart failure and non-ischemic heart disease	26 (16.3%)	58 (19.0%)	0.55
Plegias	2 (1.3%)	13 (4.2%)	0.14
Ischemic heart disease	75 (46.9%)	123 (40.2%)	0.20
Myocardial infarction	0 (0.0%)	0 (0.0%)	NC
Pulmonary complications	**72(45.0%)**	**103(33.7%)**	**<0.05**
Spinal cord ischemia	2(1.3%)	5(1.6%)	NC
Stroke	0(0.0%)	1(0.3%)	NC

Table 2. Clinical outcomes

Clinical Outcomes	f/bEVAR	OAR	P-value
Death at discharge (n %)	**12(7.5%)**	**56(18.3%)**	**<0.002**
Discharged to home (n %)	**125(78.1%)**	**174(56.9%)**	**<0.0001**
Length of stay (days), mean (SD)	**5.9 (5.8)**	**18.6 (18.5)**	**<0.0001**
OR time(minutes), mean (SD)	**374.3(156.7)**	**602.5(368.6)**	**<0.0001**
PACU time (minutes), mean (SD)	138.1(93.9)	136.5(125.0)	0.40
ICU time (days), mean (SD)	**2.7(3.0)**	**10.3 (14.2)**	**<0.0001**
Reintervention (open or endovascular) admission thru 30 days post-discharge	**0(0.0%)**	**9(2.9%)**	**<0.04**
Complications, N (%)	**52(32.5%)**	**183(59.8%)**	**<0.0001**
Acute renal failure	**31(19.4%)**	**149(48.7%)**	**<0.0001**
Endoleak	3(1.9%)	1(0.3%)	NC
Heart failure and non ischemic heart disease	11(6.9%)	27(8.8%)	0.58
Hemiplegia or paraplegia	**7(4.4%)**	**31(10.1%)**	**<0.05**
Ischemic heart disease	11(6.9%)	18(5.9%)	0.83
Myocardial infarction	6(3.8%)	10(3.3%)	1.00
Pulmonary complications	**9(5.6%)**	**71(23.2%)**	**<0.0001**
Spinal cord ischemia	8(5.0%)	17(5.6%)	0.97
Stroke	**0(0.0%)**	**22(7.2%)**	**<0.002**

Figure 1. Cost outcomes





Results

Demographic and Baseline Characteristics **Table 1**

- 466 patients who underwent TAAA repairs were included: 160 f/bEVAR vs 306 OAR.
- The f/bEVAR group was 8.1 years older (P<.0001) and had more octogenarians (P<.0001).
- Both groups had low comorbidity burden (similar mean CCI score), but f/bEVAR patients presented a lower ECI score (P<.0001).

Clinical Outcomes **Table 2**

- f/bEVAR patients were 59% less likely to die during hospitalization (P<.002) and more likely to be discharged home (P<.0001). This group presented a shorter LOS by 12.7 days (P<.0001), and shorter OR time by 228 minutes (P<.0001).
- Postoperatively, f/bEVAR patients had 46% fewer complications (P<.0001), particularly acute renal failure, plegias, pulmonary complications or stroke. No f/bEVAR patients underwent reintervention through 30 days post-discharge, while 9 OAR patients did (P=.03).

Cost outcomes **Figure 1**

- Despite the higher central supply cost, f/bEVAR had nearly $21,000 (P<.003) lower overall total hospital cost compared to OAR patients.
- Aside from central supply, f/bEVAR costs were comparatively lower in all other hospital departments, with the largest cost savings attributable to room and board, operating room and laboratory.

Conclusions

Real-world adoption of f/bEVAR was associated with significantly lower postoperative mortality and complications, as well as a shorter length of stay compared to OAR. Despite higher central supply costs, f/bEVAR was linked to significantly lower total hospital costs.

With the increasing availability of dedicated f/bEVAR devices, endovascular TAAA repair presents a promising opportunity for improved patient care with potential cost savings.

References

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Notes: NC, Not calculated due to small n.. SD, standard deviation. † Due to changes made in the statistical analysis, the results presented in this poster differ slightly from those in the published study abstract.

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