

Supplementary Table S1. Definitions of Organ Complications and Infection

Complication/Infection	Definition
Myocardial infarction	Electrocardiogram changes with cardiac enzyme elevation
Congestive heart failure	Clinical signs requiring medical intervention (inotropes or IV diuretics)
Respiratory failure	Requiring mechanical ventilation or reintubation
Renal failure	Requiring dialysis or serum creatinine increase $\geq 50\%$ from baseline
Ischemic colitis	Clinical symptoms confirmed by colonoscopy or surgical findings
Abdominal compartment syndrome	Requiring decompressive laparotomy
Pneumonia	Clinical symptoms with radiographic confirmation
Urinary tract infection	Positive urine culture with clinical symptoms
Wound infection	Requiring antibiotics or surgical debridement
Graft infection	Clinical signs with positive cultures or radiographic evidence
Septicemia	Positive blood cultures with systemic inflammatory response

Supplementary Table S2. Organ Complications Stratified by Fitness Status in Patients Undergoing OSR versus EVAR for Symptomatic AAA

Fitness Status	Treatment	Organ Complications			P-value
		Yes, n (%)	No, n (%)	Total, n	
Fit Patients					<0.001^a
	OSR	10 (37.0)	17 (63.0)	27	
	EVAR	1 (2.4)	41 (97.6)	42	
	Total	11 (15.9)	58 (84.1)	69	
Unfit Patients					1.000^b
	OSR	0 (0.0)	2 (100.0)	2	
	EVAR	10 (14.5)	59 (85.5)	69	
	Total	10 (14.1)	61 (85.9)	71	
Overall					0.002^a
	OSR	10 (34.5)	19 (65.5)	29	
	EVAR	11 (9.9)	100 (90.1)	111	
	Total	21 (15.0)	119 (85.0)	140	

Statistical Analysis:

- ^a Fisher's exact test (two-sided)
- ^b Comparison not meaningful due to only 2 patients in OSR unfit group

Key Findings:

- Among fit patients, EVAR was associated with a 93.5% relative risk reduction in organ complications compared to OSR (2.4% vs 37.0%, P<0.001)
- Among unfit patients, meaningful comparison was precluded by extreme selection bias (only 2 OSR patients)
- The predominance of EVAR in unfit patients (69/71, 97.2%) reflects real-world clinical practice

Abbreviations: OSR, open surgical repair; EVAR, endovascular aneurysm repair; AAA, abdominal aortic aneurysm

Note: Formal interaction testing for treatment-by-fitness effect was not performed due to insufficient sample size in the unfit OSR subgroup (n=2), which violates assumptions for reliable statistical modeling.

Supplementary Table S3. EVAR Device Specifications Used in Study (2010-2020)

Device	Manufacturer	FDA Approval	Study Usage
Endurant/Endurant II	Medtronic	2010/2012	75/111 (67.6%)
Cook Zenith Flex	Cook Medical	2003	29/111 (26.1%)
Endologix AFX2	Endologix	2013	4/111 (3.6%)
Bolton TREO	Bolton Medical	2017	2/111 (1.8%)
TriVascular Ovation	TriVascular	2012	1/111 (0.9%)

Note: All devices represent contemporary EVAR technology with established clinical performance profiles.