

7. Late Failure Following Open Surgical Aneurysm Repair: Is the Cause the Disease or Initial Treatment Strategy

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OBJECTIVE: In contrast to EVAR, the absence of rigorous imaging follow-up after open surgical repair (OSR) has rendered late failure (LF) to be considered rare. Better understanding of associated factors with LF will help define follow-up paradigms and alter initial repair strategy. The aim of this study is to evaluate aspects of LF requiring intervention after OSR.

METHODS: From 1998 to 2008, data was collected prospectively on 1097 patients who underwent an aortic endovascular repair. Patients undergoing intervention for aneurysm or pseudo-aneurysm contiguous with prior OSR were subjected to further analysis. The indication was a maximal diameter >60 mm. Univariable and multivariable linear regression models were used to compare patients and disease variables with time to LF.

RESULTS: LF was identified in 104 (9.5%) patients. Mean aneurysm diameter was 72mm (see table for additional information). Mean age at first repair and time between the two repairs were 61.4 ± 10.0 and 10.8 ± 6.0 years respectively. Patients operated for LF were significantly younger at the time of their first repair (61.4 ± 10.0 vs. 74.1 ± 9.6 years; $p < 0.00001$), had more family history of aneurysms (20 vs. 7%; $p = 0.001$) and more atherosclerotic complications when compared to the 993 patients whose EVAR was their primary repair. On multivariable analysis, patients with an incomplete OSR, more extensive aneurysms (descending thoracic/thoracoabdominal), and older patients experienced earlier LF ($p < 0.00001$; 0.002 and 0.001 respectively). Although we were incapable of determining the incidence of LF after OSR, 34% of LF patients were regional to our center.

CONCLUSION: Aneurysmal disease is an ongoing process involving the entire aorta. Segments that appear normal during OSR may be vulnerable to LF. Early LF was related to an incomplete OSR, more extensive initial disease and age. However, the threshold for reintervention for LF is dependent upon the stability of a surgically constructed anastomosis, while an endovascular seal may dictate a need for earlier treatment. Therefore, patients at risk for LF must undergo treatment with a strategy optimizing any later interventions, and require meticulous follow-up for extended periods of time.

Table: Association of Patients, Diseases and Repairs Variables with Time to LF.

Patient characteristics		N (%)	Time to 2nd repair in years [mean (SD)]	p value
Demographics	Female gender	18 (17)	9.3 (5.8)	0.6 (vs male)
	Smoking	89 (86)	11.2 (5.8)	0.7 (vs non smoking)
	Hypertension	85 (82)	11.3 (6.0)	0.4 (vs no hypertension)
	Family history	21 (20)	12.1 (5.6)	0.3 (vs no family history)
Etiology	Dissection	12 (12)	5.3 (3.3)	0,2 (vs. non-dissected)
First repair	Incomplete	16 (15)	3.6 (2.6)	<0.00001 (vs. complete)
	DTA/TAAA disease	30 (29)	6.5 (4.6)	0.002 (vs. AAA)
	Age	-	-	0.001 (per 5 years increase)

NOTES