

Endovascular Thoracic Aortic Aneurysm Repair in Patients with Functioning Renal Transplant

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BACKGROUND

As renal transplant recipients live longer, more patients are at risk for aortic degeneration which can lead to dissection, aneurysm and rupture. Thoracic endovascular aneurysm repair (TEVAR) has emerged as the first-line of surgical treatment for thoracic aortic aneurysm (TAA) and dissections. We report on the largest series to date on outcomes of renal transplant recipients undergoing TEVAR.

Methods

The Vascular Quality Initiative (VQI) registry identified 14261 patients treated with TEVAR from 2012 to 2021, including 42 with functioning renal transplant. We analyzed TEVAR outcomes in this cohort per the Society for Vascular Surgery (SVS) reporting standards.

Results

A total of 42 renal transplant recipients (RTR) received TEVAR. The median age was 68 years olds. 28 (66.7%) of patients were male. Further patient demographics and comorbidities are listed within Table 1.

13 (33.3%) patients presented asymptomatic, while 28 (66.7%) patients had symptomatic disease. 9 (21.4%) patients had prior aortic surgery: including open AAA repairs (1), open TAA repairs,(3) TEVARs (4) and open thoracoabdominal aortic aneurysm repairs(1). Further anatomical and operative characteristics are listed within Table 2.

The most important post operative complications are listed in Table 3. In addition, there were 3 (7.1%) endoleaks discovered in the peri-operative period. There was also 1(2.4%) conversion to open repair. Early clinical success was achieved in 38 (71.4%) patients. Follow up was available for 30 (71.4%) of patients at median time of 390 days. During the follow up period, there was one additional endoleak discovered. However there were no re-interventions performed and 5 additional mortalities.

Table 1: Patient characteristics

Characteristics of RTRs	N = 42
Ethnicity	
White	28 (67%)
Black	8 (19%)
Other	6 (14%)
Comorbidities	
Hypertension	36 (92%)
Coronary artery disease	30 (24%)
History of smoking	26 (62%)
Current smoker	7 (17%)
Insulin-dependent diabetic	3 (7.1%)
Congestive heart failure	6 (14%)
COPD	8 (19%)
Preop serum creatinine, mg/dL	1.46 (1.0-3.7)
Home medications	
Aspirin	21 (50%)
ACE inhibitor	8 (19%)
P2Y12 inhibitor	1 (2.4%)
Statins	22 (52%)
Anticoagulant	13 (31%)

Table 2: Aneurysm anatomy and operative characteristics

Characteristics of RTRs	N = 42
Acute	9 (21%)
Distal aortic dissection extent	
Arch (zones 1-2)	0 (0%)
Descending (zones 3-5)	17 (45%)
Abdominal (zone 6-9)	15 (39%)
Iliac (zones 10-11)	6 (16%)
Unknown	4 (9.5%)
Elective	29 (69%)
IVUS use	20 (48%)
Proximal aortic dissection extent	
Ascending	0 (0%)
Arch (zones 1-2)	9 (27%)
Descending (zones 3-5)	24 (73%)
Unknown	9 (27%)
Number of aortic devices used	
1	13 (31%)
2-3	26 (62%)
4-6	3 (7.1%)
Aortic device used, No. (Mean)	2.07
Crystalloid, mL	1,977
Contrast, mL	101 ± 69
Fluoroscopy time, minutes	31 ± 29
Operative time, minutes	190 ± 143
Blood loss, mL	218 ± 331

Table 3: Postoperative outcomes

Characteristics of RTRs	N = 42
Death	3 (7.1%)
AKI	13 (31%)
Aortic-related re-intervention	0
MACE (major adverse cardiac event)	6 (14%)
Respiratory distress	3 (7.1%)
Lower extremity ischemia	0
Intestinal ischemia	1 (2.4%)
Stroke	1 (2.4%)
Postoperative highest creatinine, mg/dL	1.76 (1.45-2.01)

CONCLUSIONS

The number of functioning RTRs who underwent successful TEVAR remains small. The most common post-operative complication among the RTRs is acute kidney injury (AKI). TEVAR for renal transplant recipient is highly feasible, and can be performed safely with excellent short-term and mid-term results. However more robust long-term follow-up is needed. And there needs to be protocols to help optimize these patients pre-operatively and support them post-operatively as they recover from AKI.

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