Incidence and Clinical Significance of Renal Infarct After Fenestrated Endovascular Aortic Aneurysm Repair

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70th ESCVS
International congress of the European Society for Cardiovascular and Endovascular Surgery

7th IMAD meeting

Conflicts of interest

Unrestricted research grants from Cook & Terumo Aortic

Intraoperative / early renal infarction

Accessory renal artery coverage

Branch coverage

Dissection

Embolisation (particulate/air)

Failure to cannulate

Cannulation of an accessory


LEFT

Impact of intentional accessory renal artery coverage on renal outcomes after fenestrated-branched endovascular aortic repair

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ARTICLE HIGHLIGHTS

- **Type of Research:** Retrospective review of patients enrolled in a prospective nonrandomized physician-sponsored investigational device exemption study
- **Key Findings:** Of 254 fenestrated-branched endovascular aortic repair (FB-EVAR) patients, 56 (22%) had intentional accessory renal artery (ARA) coverage and 198 were controls, of whom 16 had ARA preservation. Patients with ARA coverage had more major adverse events (32% vs 19%; $P = .04$) because of higher incidence of acute kidney injury (AKI; 21% vs 9%; $P = .02$). At 3 years, freedom from renal function deterioration (RFD) was lower for patients who had ARA coverage compared with controls (55% ± 9% vs 76% ± 5%; log-rank, $P = .02$). By multivariate analysis, ARA coverage was an independent predictor of AKI and RFD.
- **Take Home Message:** Intentional ARA coverage during FB-EVAR was associated with threefold higher incidence of AKI, with a significantly lower freedom from RFD. Incorporation of ARAs during FB-EVAR, when it is technically feasible, helps decrease risk of AKI and RFD.

Clinical effect of accessory renal artery coverage after endovascular repair of aneurysms in abdominal and thoracoabdominal aorta

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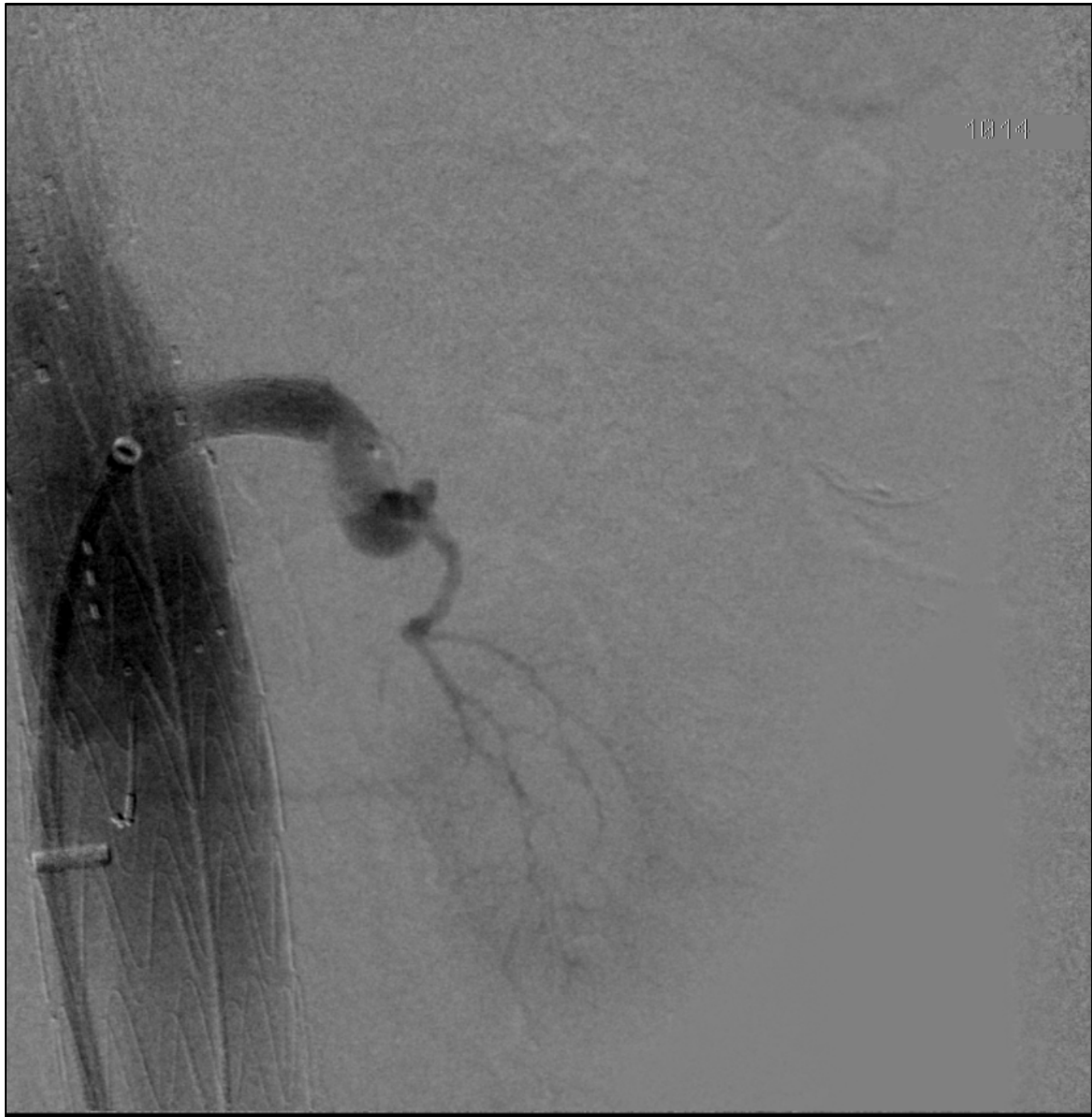
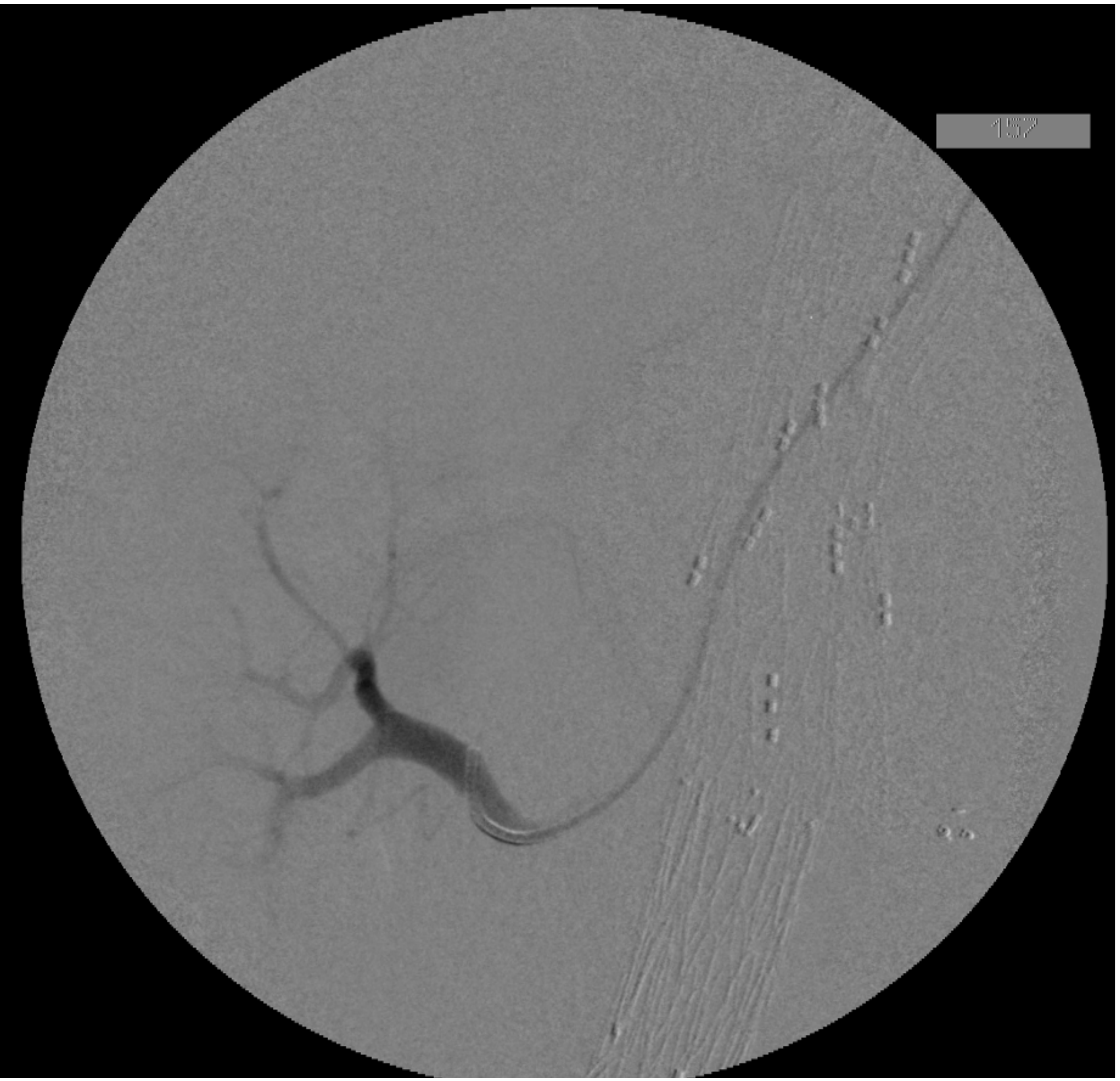
Results: Ten retrospective, nonrandomized, control studies were included in the systematic review reporting on 1014 patients (302 with a covered ARA vs 712 without an ARA or without ARA coverage). In six studies, the mean diameter of the covered ARA was <4 mm (range, 2.7-3.4 mm). The mean follow-up was 22.74 months (range, 1-42 months). In the standard EVAR subgroup, the risk of AKI (odds ratio [OR], 0.72; 95% confidence interval [CI], 0.21-2.51; $I^2 = 0\%$] in the early period, and CRF (OR, 4.44; 95% CI, 0.46-42.61; $I^2 = 87\%$) and death (OR, 0.91; 95% CI, 0.36-2.31; $I^2 = 0\%$) during follow-up were similar between groups 1 and 2. Only the risk of renal infarction was greater in group 1 than in group 2 (OR, 93.3; 95% CI, 1.48-5869; $I^2 = 92\%$). In the complex aneurysm repair subgroup, the risk of AKI (OR, 1.85; 95% CI, 0.61-5.64; $I^2 = 42\%$) in early period and CRF (OR, 1.64; 95% CI, 0.88-3.07; I^2 = not applicable) and death (OR, 3.63; 95% CI, 0.14-96.29; $I^2 = 56\%$) during follow-up were similar between groups 1 and 2. Only the risk of renal infarction was greater for group 1 compared with group 2 (OR, 8.58; 95% CI, 4.59-16.04; $I^2 = 0\%$).

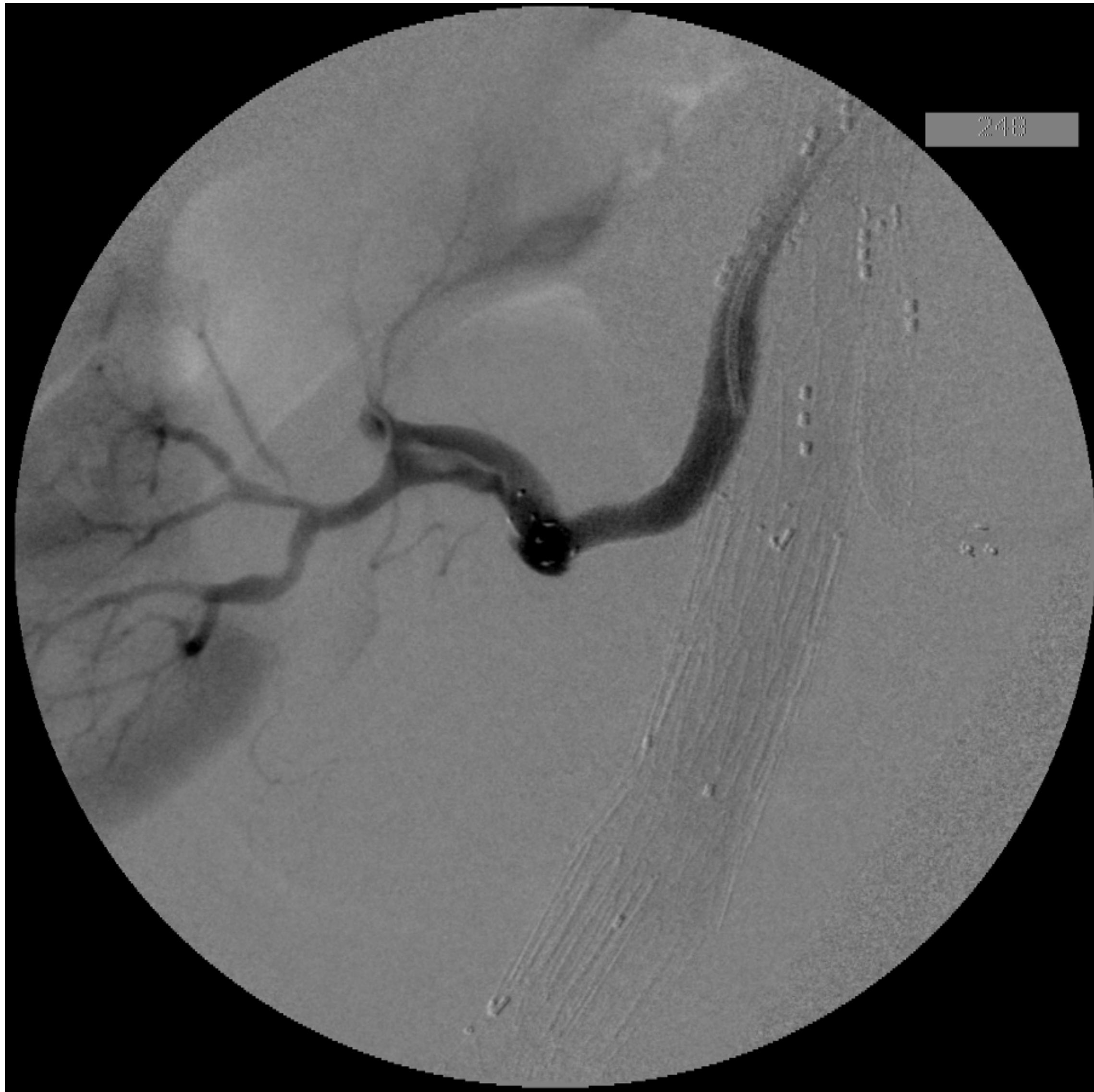
Covering a branch



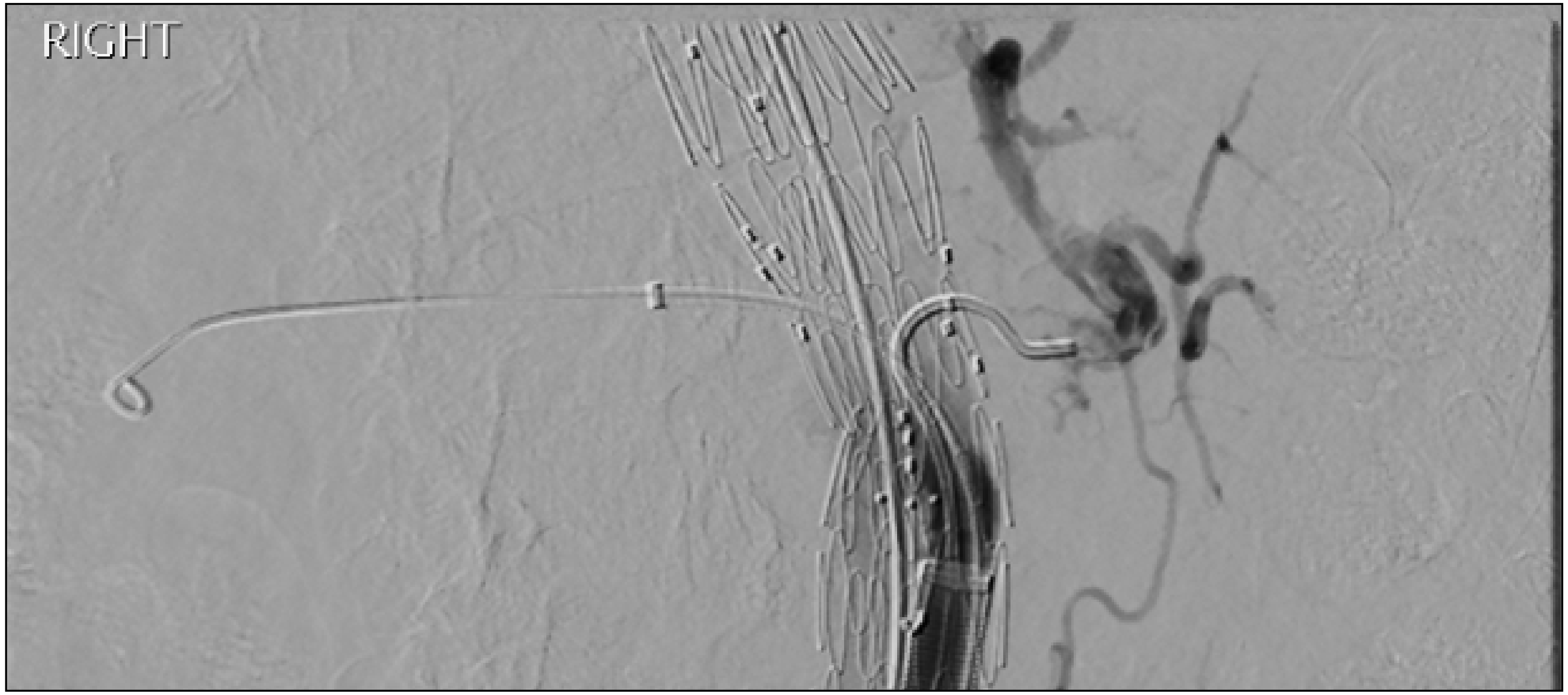
Dissection from wire

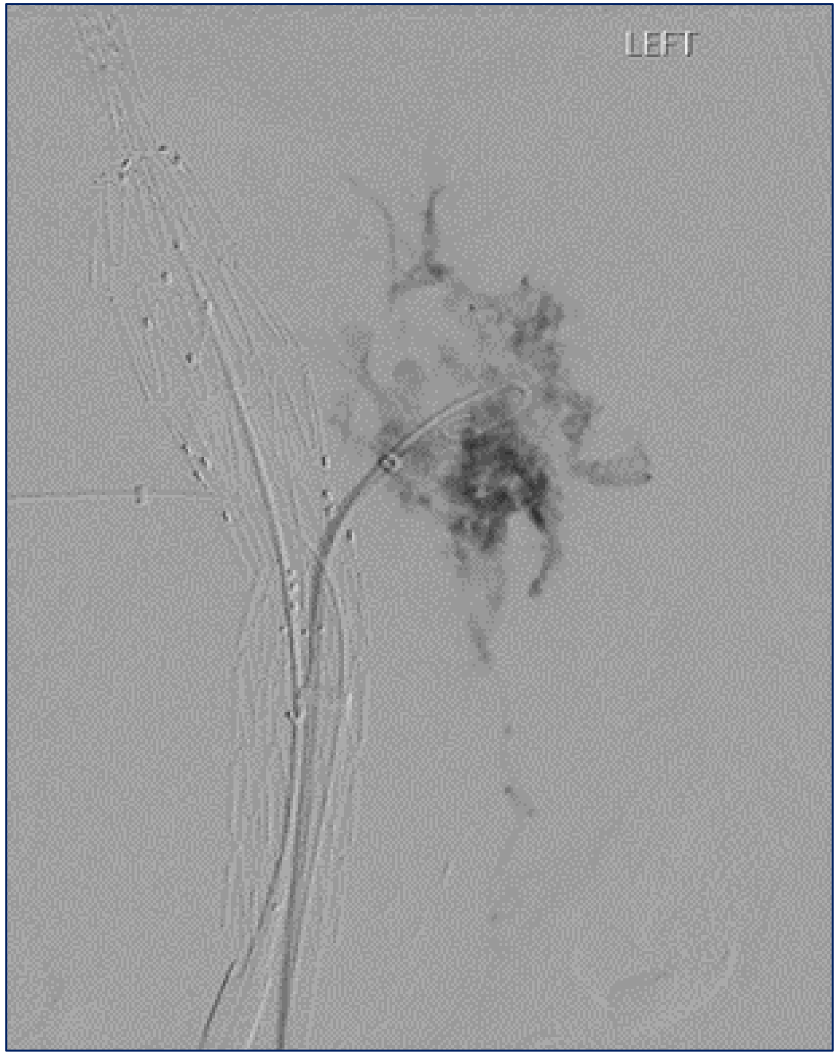
Covering a branch





Dissection from stent

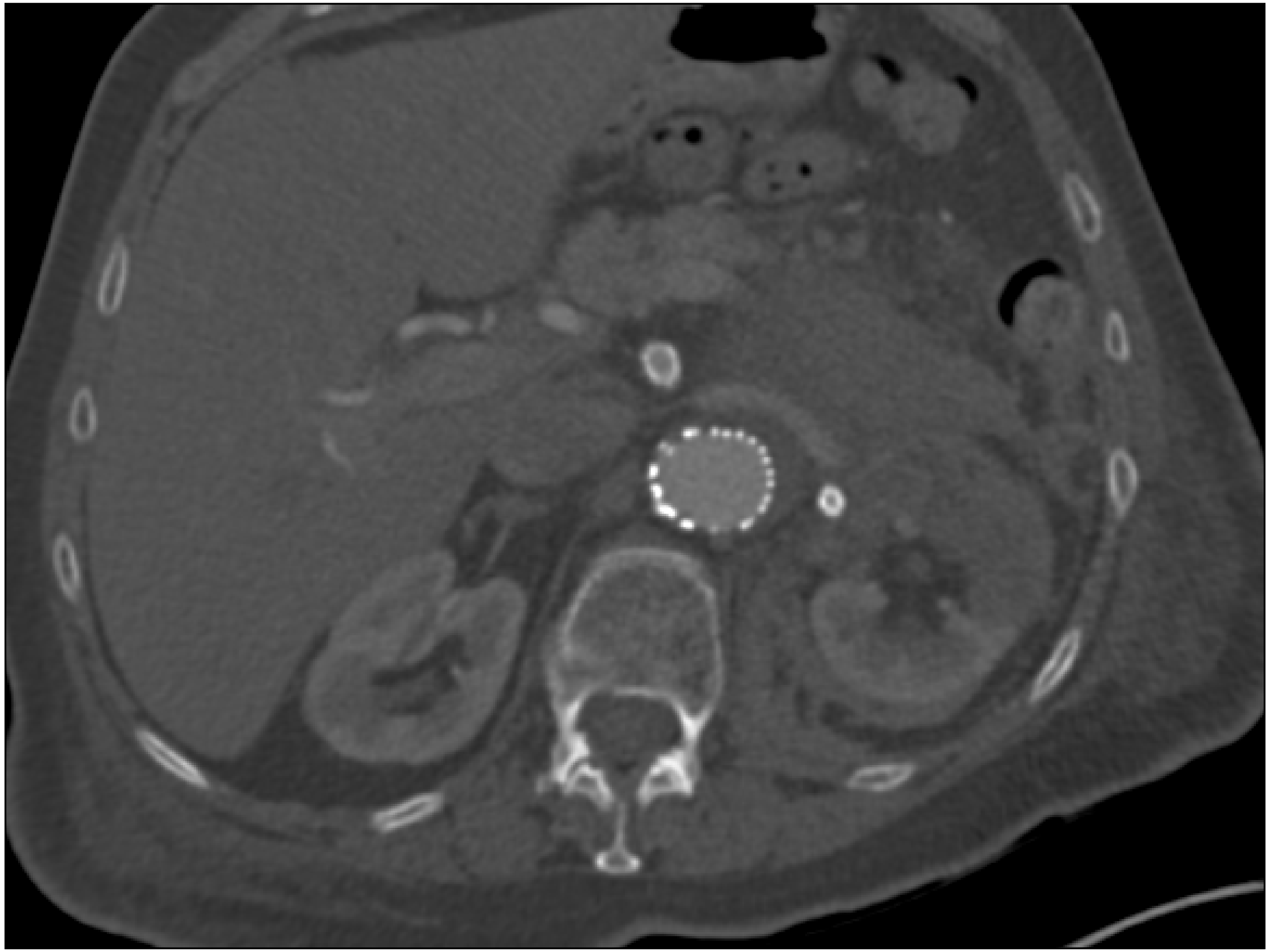




Rupture

Covering a branch

Follow-up



Decoy

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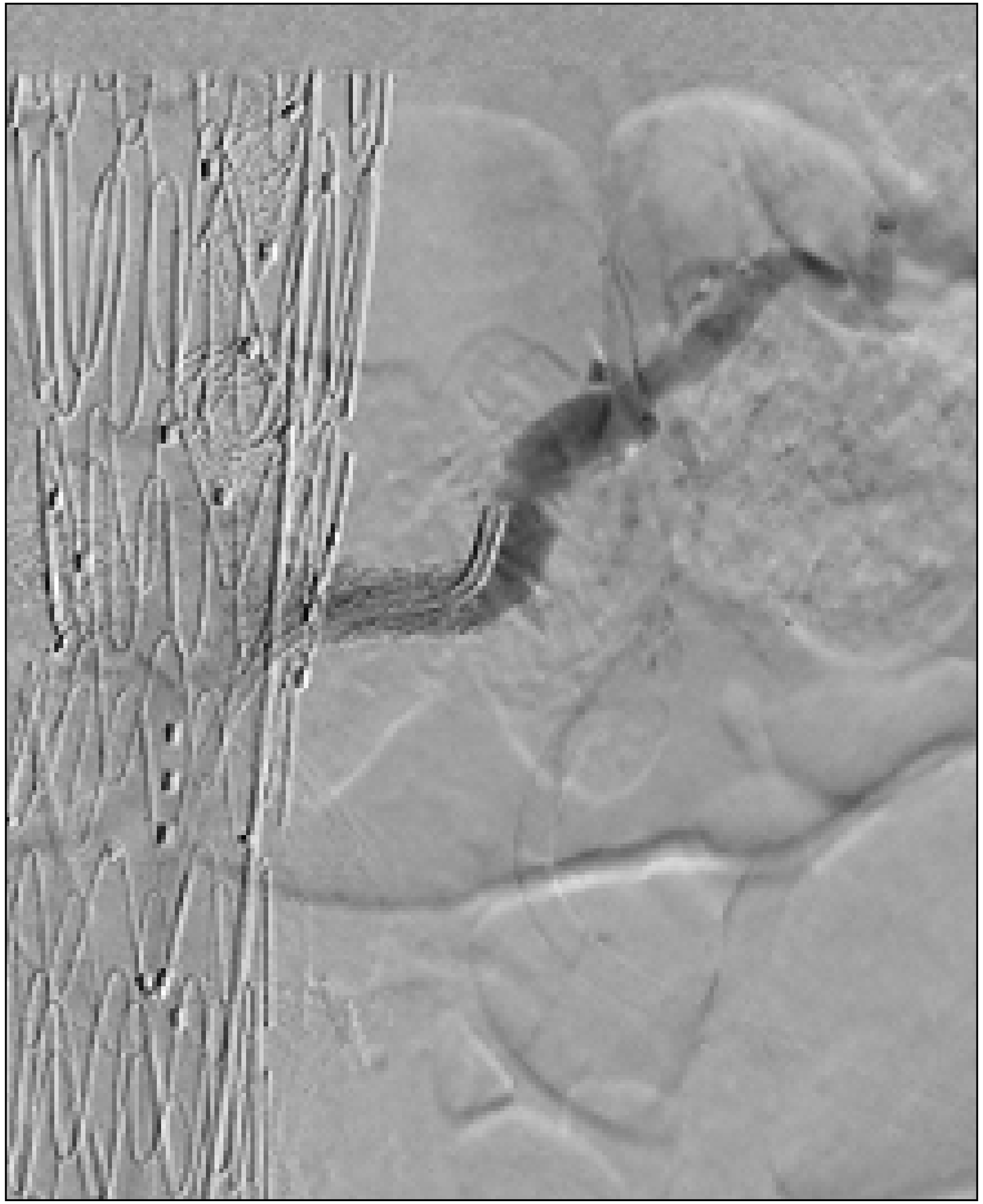
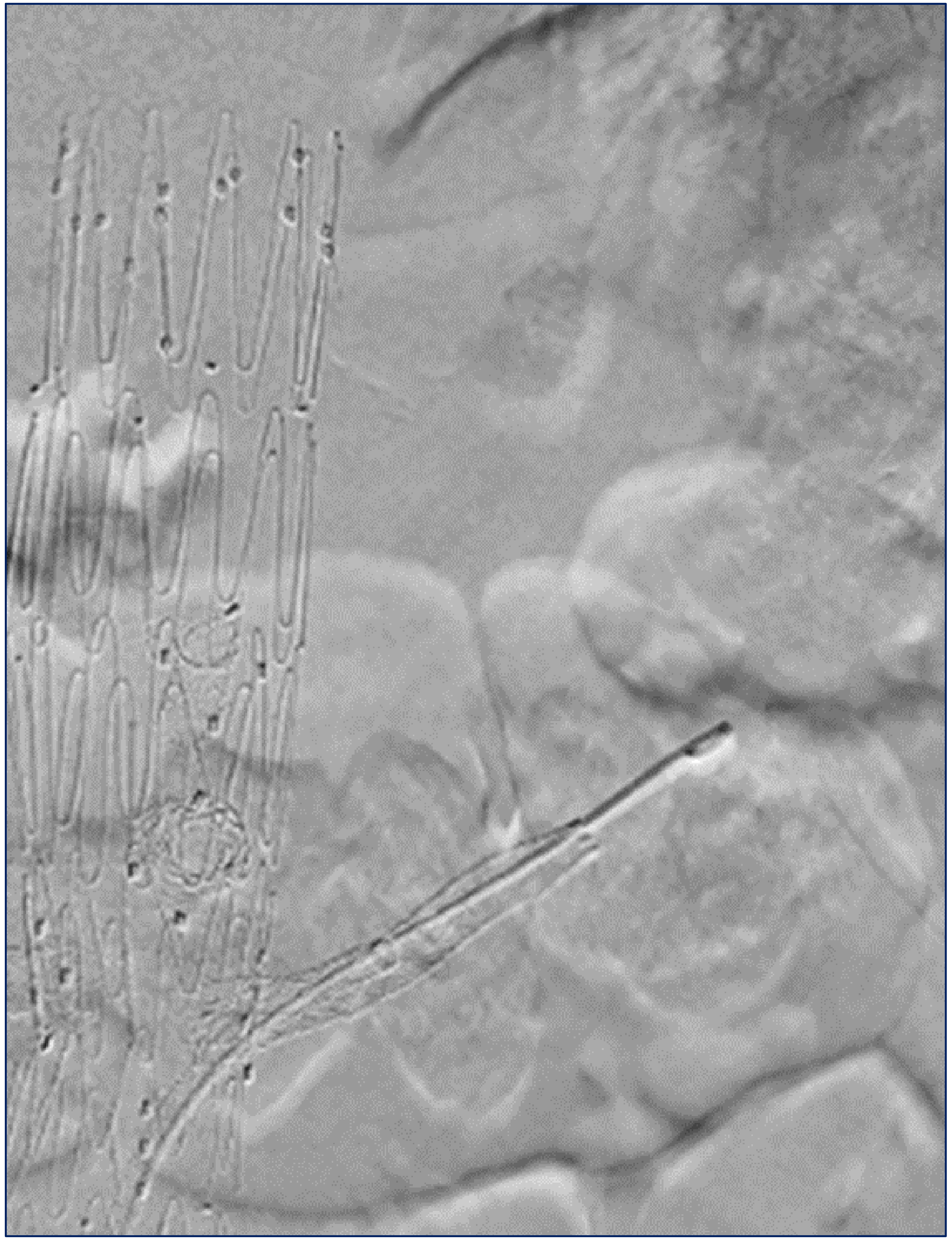
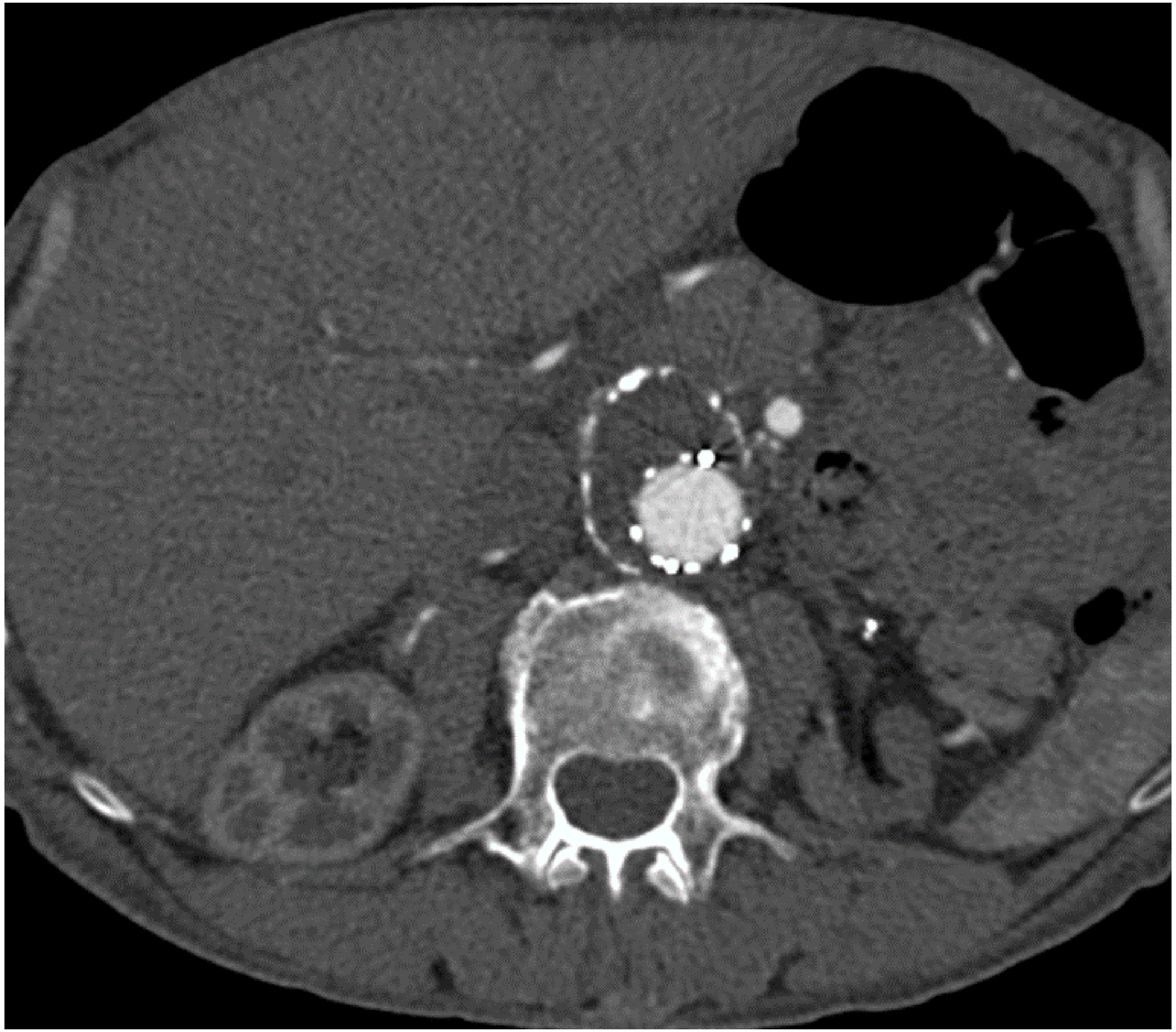
Does not appear to have much long-term consequence

Total loss of a kidney





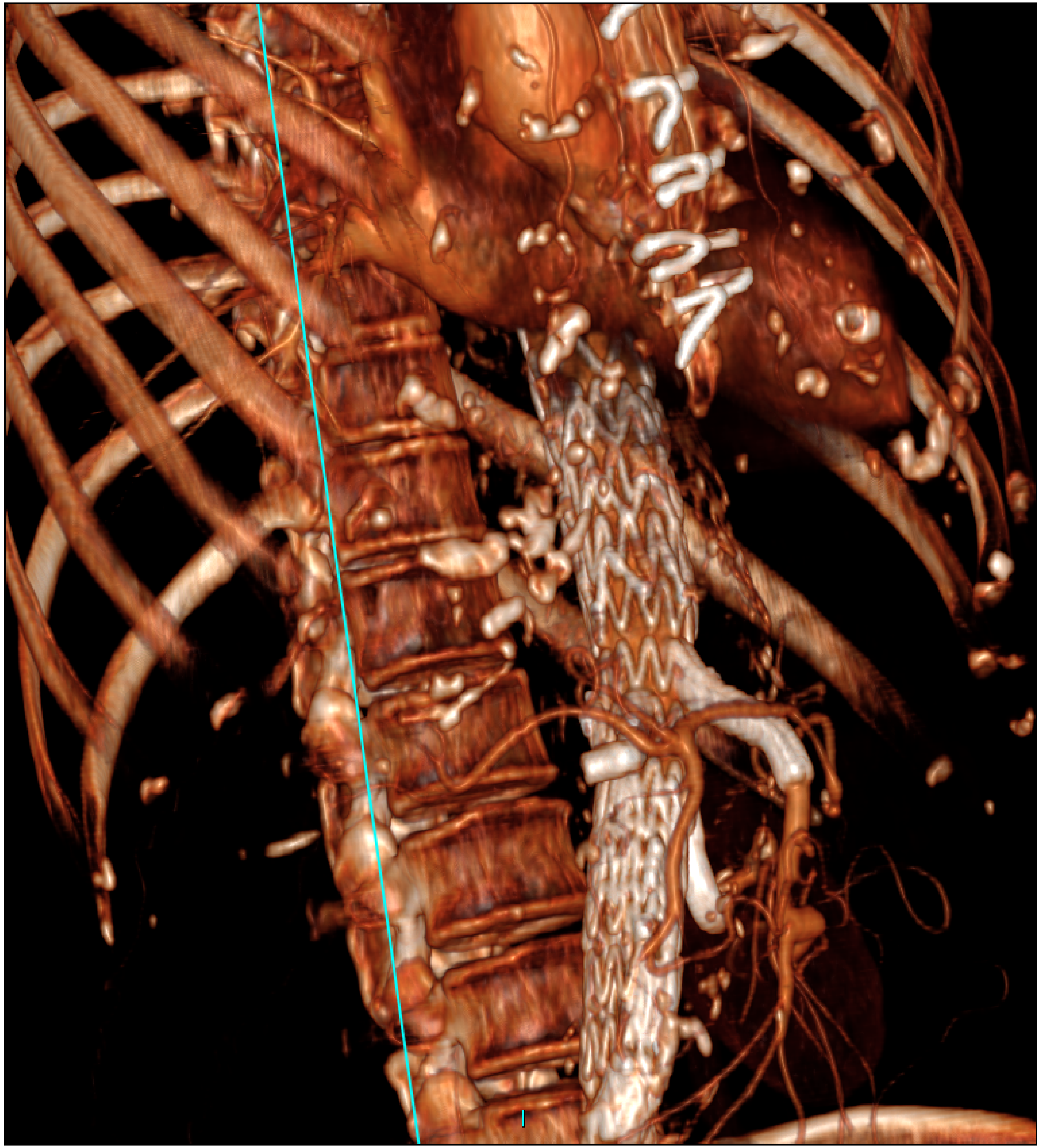


Late renal loss

Stent distortion / fracture

Stent dislocation

Unclear – intimal hyperplasia

Outcomes of fenestrated and branched endovascular repair of complex abdominal and thoracoabdominal aortic aneurysms

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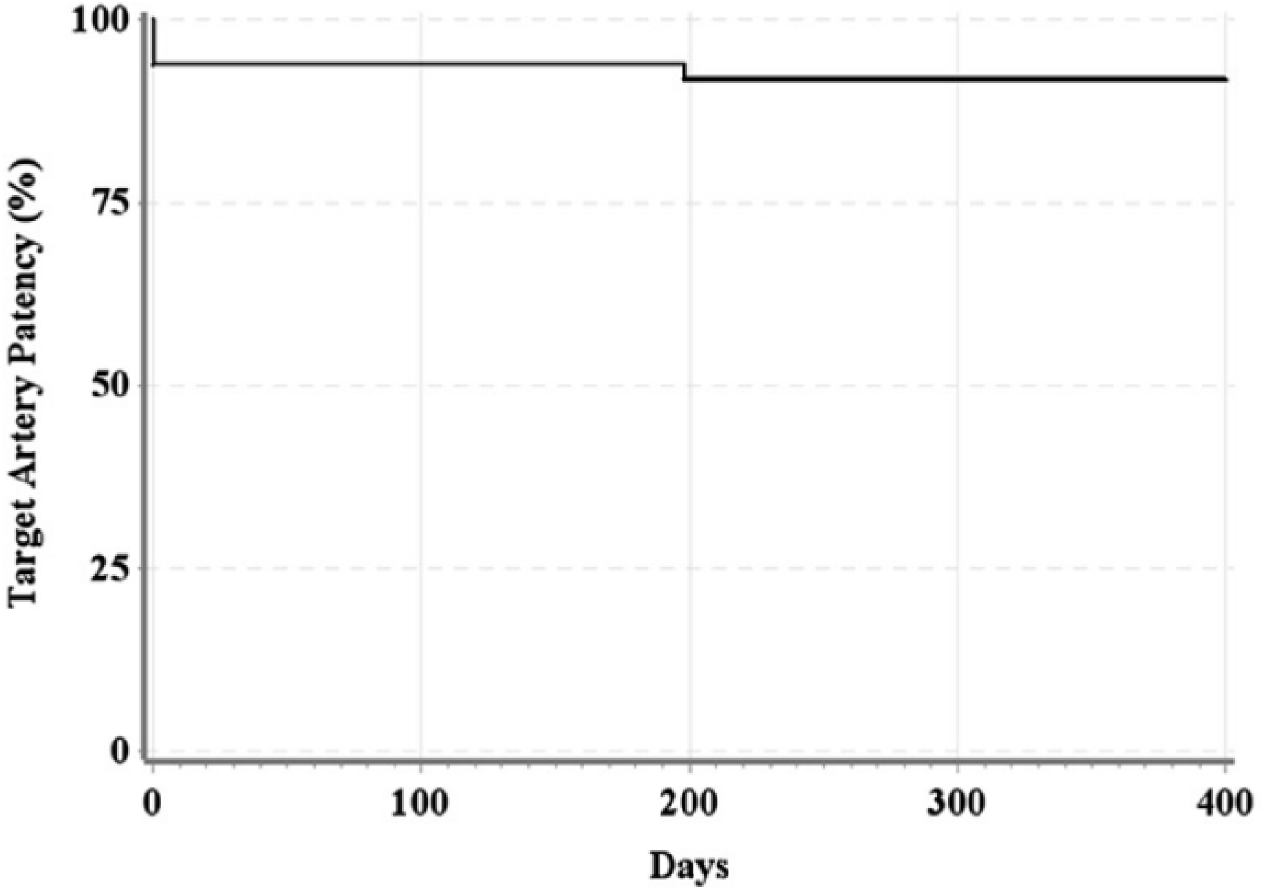


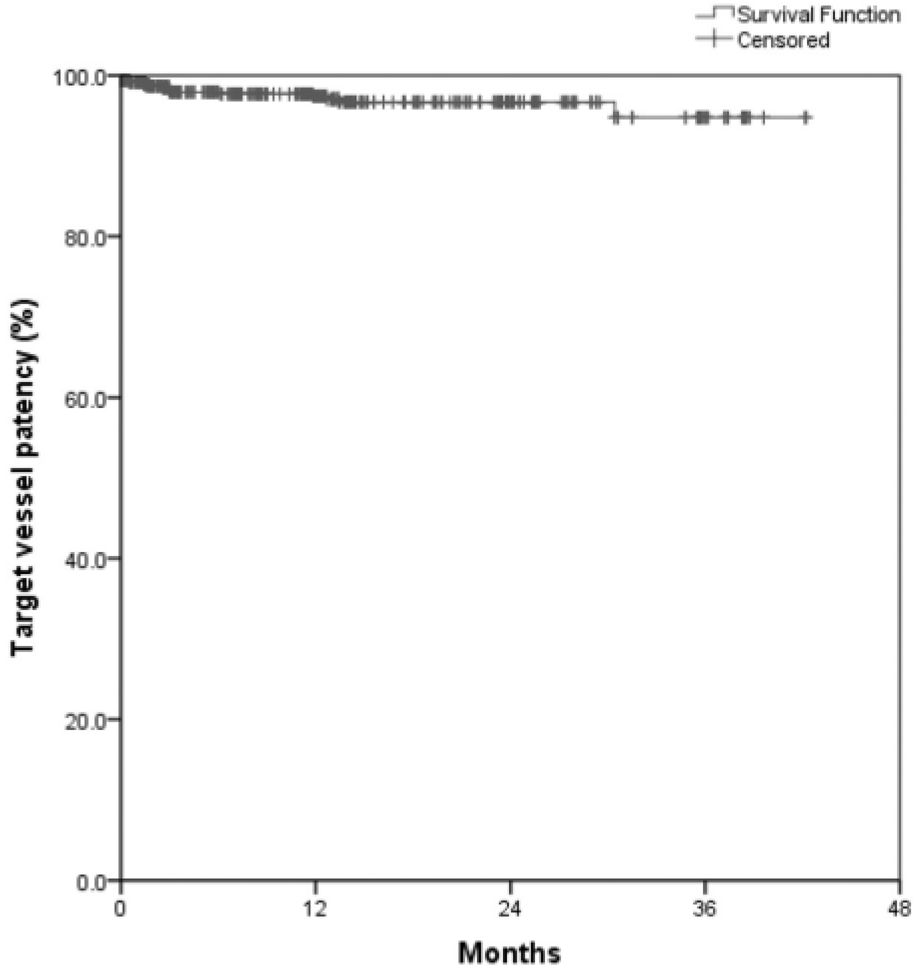
Days:	0	100	200	300	400
# at risk:	100	47	43	39	26
SE:	0	0.024	0.031	0.031	0.031

The cumulative rate of target artery patency over 400 days is 92%.

Among the 7 patients with target artery occlusion, there was 1 celiac, 3 right renal, and 3 left renal.

Early Results of Fenestrated Endovascular Repair of Juxtarenal Aortic Aneurysms in the United Kingdom

On behalf of the British Society for Endovascular Therapy and the Global Collaborators on Advanced Stent-Graft Techniques for Aneurysm Repair (GLOBALSTAR) Registry



Time (months)	0	3	6	12	24	36	42
n (TV) at risk	889	573	472	365	149	40	3
Cum Survival (%)	99	98	98	97	97	95	95
Std err (Cum.surv.)	0.00	0.00	0.01	0.01	0.01	0.02	0.02

Target vessel loss: 11 RA (2 CA, 1 SMA)

1-4 m: 9 patients
(LRA = 2; CA +LRA = 1, RRA = 3, L&R RA 1, other n= 2).

4- 9 m: 1 (SMA)

9-18 m: 3 (LRA = 3)

18-30 m: 1 (unstented renal artery)

30 - 43 m: 1 (unspecified)

Final 5-year results of the United States Zenith Fenestrated prospective multicenter study for juxtarenal abdominal aortic aneurysms

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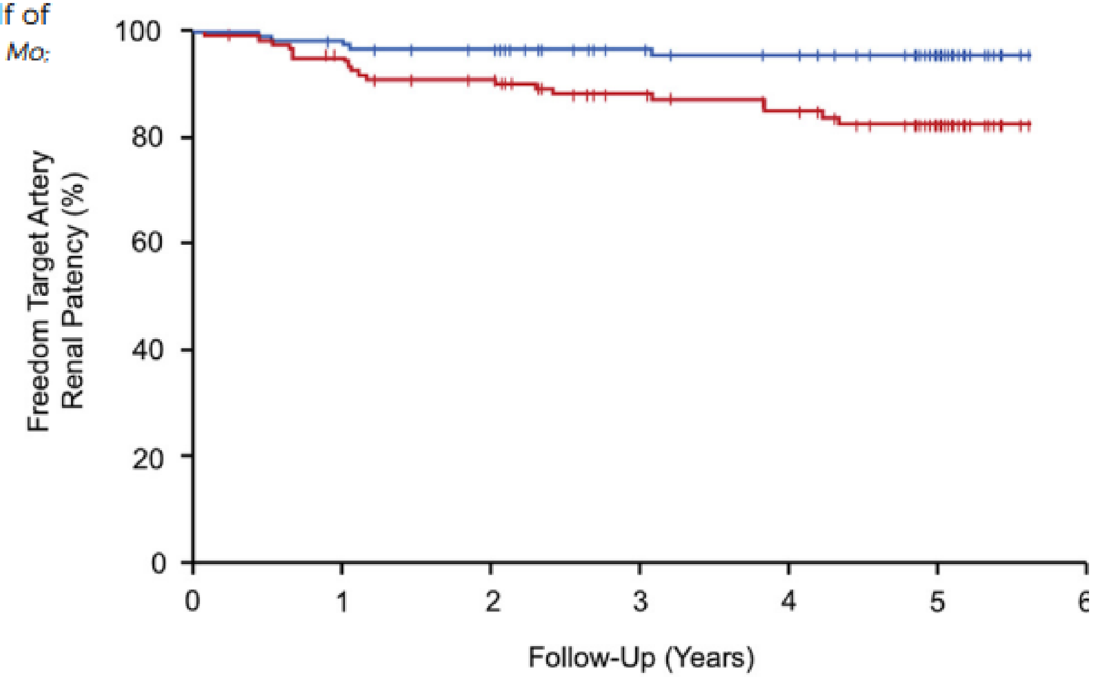

		0	1	2	3	4	5
Primary renal patency	No. at Risk	129	117	106	85	76	49
	Cumulative events	0	6	11	14	14	19
	Cumulative censored	0	6	12	30	36	61
	Kaplan-Meier estimate (%)	100	95.2	91.1	88.4	85.1	82.7
	Standard error	–	1.9	2.6	3.1	3.7	4.1
Secondary renal patency	No. at Risk	129	121	113	92	85	53
	Cumulative events	0	2	4	4	5	5
	Cumulative censored	0	6	12	33	39	71
	Kaplan-Meier estimate (%)	100	98.4	96.8	96.8	95.7	95.7
	Standard error	–	1.1	1.6	1.6	2.1	2.1

Summary

- Intraoperative / early segmental infarctions occur frequently
- Consequence appears mild or none
- Secondary interventions are undertaken to preserve kidneys
- There is a low rate of loss of a renal vessel (< 1% vessels annually) and even lower rate of bilateral loss (< 1% patients annually)