Renal artery embolisation for uncontrolled hypertension in ESRD
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Case report
We report the case of a 53-year-old New Zealand European woman with end stage renal disease (ESRD) from diabetic nephropathy, on thrice a week maintenance hemodialysis since three years with symptomatic, resistant hypertension requiring multiple admissions. She had a long-standing history of diabetes with autonomic dysfunction, including gastroparesis. Her other comorbidities included obstructive sleep apnoea (on CPAP), gastro-oesophageal reflux disease with propensity to frequent nausea and vomiting, bronchial asthma, multiple abdominal surgeries including a panproctocolectomy with end ileostomy in 2007, and cerebrovascular disease.

In the past three years, she had over 10 admissions for symptomatic, acute severe hypertension and posterior reversible encephalopathy syndrome (PRES), requiring intravenous anti-hypertensives. Hypertension remained poorly controlled despite aggressive ultrafiltration and optimising her goal weight. She did not have significant inter-dialytic weight gain and was fairly compliant to fluid restriction. Investigations for potential secondary causes of hypertension, including renal artery stenosis, phaeochromocytoma, Cushing's disease and hyperaldosteronism were negative. Her management was complicated by intolerance to multiple oral antihypertensives, and recurrent gastroparesis episodes. In December 2011, she had undergone renal

Figure 1: Aortic flush DSA prior to embolisation.
sympathetic denervation with minimal therapeutic benefit.

Surgical nephrectomy was considered too high risk given multiple comorbidities. So bilateral renal artery embolisation (RAE) using alcohol and coils was performed for uncontrolled hypertension despite adequate anti-hypertensive therapy. She underwent the procedure in May 2015 without major complications. Alcohol was used as liquid embolic targeting collateral supply prior to main procedure to maximise success. She developed mild post embolisation syndrome manifested as flank pain and nausea, which resolved within 48 hours. There was sustained reduction in post-procedure BP recordings (150 +/- 10mmHg systolic, and 85 +/- 8mmHg diastolic) with mean change of -14/8 mmHg (average of 10 readings). Over the subsequent nine months, she has had no admissions related to hypertension, with subjective improvement in quality of life.

**Discussion**

RAE has been utilised predominantly for renal masses, and treatment of hypertension in some cases. In a large retrospective study performed at The New...
York Presbyterian Hospital, over half of 121 patients underwent RAE for renal masses (54.5%). Only three patients (2.5%) had RAE for treatment of malignant hypertension. The authors concluded this to be a safe procedure with overall complication rate of 5%, consisting of incomplete embolisation, coil migration and groin haematoma in six patients. Post embolisation syndrome was reported in 75% of patients, most being mild and self-limited.

In one of the earliest case-series, Thompson et al reported improvement in blood pressure control in nine out of 13 patients who underwent RAE. Similarly, successful response was seen in five out of seven patients with ESRD or transplant, who underwent RAE for the treatment of hypertension. The average mean arterial pressure improved from 125mmHg to 106mmHg, and the average number of antihypertensive drugs decreased from four to two.

A randomised study in 16 haemodialysis patients suggested unilateral RAE, with the advantage of preserving residual RAE function and milder post embolisation syndrome, was as effective as bilateral RAE. This limited data on RAE stands favourably in comparison to another therapeutic option, bilateral nephrectomy, with high morbidity (up to 85%) and mortality (up to 11%). Nephrectomy was not considered an option in our case due to significant anaesthetic risks. Also, RAE carries an advantage of avoiding general anaesthesia. Though RAE could result in elimination of residual renal function that carries a survival benefit in patients with ESRD, this was not a concern in our case as she was anuric.

Conclusion
RAE could be considered as one of the interventions for refractory hypertension despite optimal antihypertensive therapy in patients with ESRD.


