Objective(s): Transplant renal stenosis (TRAS) is a serious complication associated with graft loss. Selective carbon dioxide angiography allows for effective diagnosis and therapeutic treatment with the use of minimal to no contrast agent. This study sought to evaluate the efficacy of the adjunctive use of carbon dioxide angiography in the evaluation and treatment of TRAS.

Methods: Patients undergoing endovascular therapy (percutaneous transluminal angioplasty with or without stent) for TRAS between the years 2012 and 2017 at a single tertiary care academic medical center were studied. Outcomes of interest included technical success, improvement in creatinine, and improvement in renal ultrasound hemodynamic parameters.

Results: Of the 37 patients who underwent angiography for TRAS during the study period, 34 underwent a therapeutic intervention. Of those, 24 patients (70.6%) underwent adjunctive carbon dioxide angiography vs. a control group of 10 patients (29.4%) who underwent standard contrast angiography. In the overall cohort, patients had similar comorbidities (Charlson comorbidity index 4.4 ± 2.4) and were on average 4.5 months out from renal transplant. Baseline characteristics between the carbon dioxide angiography and traditional angiography groups were similar. Patients undergoing carbon dioxide angiography received less contrast than patients undergoing traditional angiography [9.5 ml (IQR 2-19.5) vs. 19.5 ml (IQR 15-30); p =0.03] and maintained equivalent technical success rates (92.2% vs. 91.7%, p=0.9). In the carbon dioxide angiography group, patients experienced a significant reduction in creatinine (p=0.03), peak systolic velocity (p=0.03), and renal/iliac ratio (p=0.003).

Conclusions: The adjunctive use of carbon dioxide angiography allows for significantly less contrast administration compared to standard angiography while achieving an equivalent rate of technical success. Selective carbon dioxide angiography should be considered a first line modality for patients with TRAS in need of endovascular therapy.