Introduction:
Elevated renin levels have been shown to be associated with an increased risk of death and more severe acute kidney injury (AKI) in patients with vasodilatory shock (VS). Recent data show that patients with VS and elevated renin levels have improved survival when treated with angiotensin II (Ang II) + standard care (SC) vs placebo (PBO) + SC. We hypothesized that VS patients with severe AKI and elevated renin levels would have improved survival and enhanced renal recovery with Ang II treatment.

Methods:
In the randomized, PBO-controlled, double-blind ATHOS-3 study, 321 patients with severe VS received >0.2 μg/kg/min of norepinephrine or the equivalent and were randomized to intravenous Ang II + SC (n=163) or PBO + SC (n=158). In a post hoc analysis, we assessed the subset of patients with elevated renin (defined as a renin level greater than the median value of the overall ATHOS-3 population) and severe AKI (defined as those with AKI requiring renal replacement therapy [RRT] at baseline). Survival and renal recovery were assessed in patients treated with Ang II + SC (n=45) and PBO + SC (n=60).

Results:
In patients with elevated renin and severe AKI, baseline age, Acute Physiology and Chronic Health Evaluation II score, and blood pressure were similar between Ang II + SC vs PBO + SC. The median baseline serum renin level in the whole group was 352.5 pg/ml (IQR: 115.9-785.4; normal range for serum renin: 5-58 pg/ml). A significantly higher proportion of patients receiving Ang II + SC vs PBO + SC survived to day 28 (43% vs 22%, respectively; p=0.03). Ang II recipients also had a higher rate of discontinuation from RRT by day 7 (43% vs 12%; p=0.04).

Conclusion:
In this study, elevated-renin shock patients with AKI treated with Ang II + SC gained a survival benefit and earlier discontinuation from RRT compared to those receiving PBO + SC. Elevated renin is likely caused by an angiotensin-converting enzyme defect and may identify those patients with a biotype that responds well to Ang II therapy.