SP482 A UREMIE GOAT MODEL CREATED BY SUBTOTAL RENAL ARTERY EMBOLIZATION

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INTRODUCTION AND AIMS: There is an urgent need for a large animal model for (end stage) kidney disease for preclinical testing of novel renal replacement therapies. The aim of this study was to create stable uremia in goats via subtotal renal artery embolization.

METHODS: 3 Dutch white female goats were used because female goats are docile, have easily accessible neck veins and have body weights (70±4 kg) and distribution volumes comparable with humans. Polyvinyl alcohol particles were infused in branches of the renal artery aiming for embolization of ~75-90% of one kidney (Fig. 1) and complete embolization of the contralateral kidney. Gentamicin (10 mg/kg/day) was administered for 7-11 days to further increase urea and creatinine concentrations. Glomerular filtration rate (GFR) and estimated renal plasma flow (ERPF) were determined before and after embolization by measuring insulin and para-amino-hippuric acid clearances, resp. Plasma urea, creatinine and hemoglobin concentrations were monitored regularly for up to 11 months (range 3-11).
RESULTS: After an initial phase of acute kidney injury, plasma urea and creatinine concentrations stabilized within 2-3 weeks and remained elevated during follow up (pre vs. post-embolization: median 6 mM (range: 4.5-6.5) vs. 12 mM (range: 11-14) and 64 μM (range: 57-64) vs. 210 μM (range: 197-237), resp.). GFR and ERPF decreased by 51% (range: 22-64) and 59% (range: 54-70%), resp. Gentamicin induced (partially) reversible acute-on-chronic kidney injury with urea and creatinine concentrations rising to 42 mM (range: 28-56) and 1133 μM (range: 541-1724), resp., necessitating intermittent hemodialysis (3 sessions in 5 days) in 1 goat. After recovery, urea and creatinine concentrations stabilized at 15 mM (range: 10-19) and 298 μM (range: 227-370), resp. Hemoglobin concentrations decreased in all goats from 6.1 (range: 5.9-7.8) to 5.4 (range: 5.3-5.8) within 1-2 months and were responsive to erythropoietin and iron therapy.

CONCLUSIONS: A stable mildly uremic model was established in goats by subtotal renal artery embolization. Gentamicin can be used to temporarily aggravate uremia on demand. Figure 1. Embolization of the inferior pole of the left kidney. Perfusion of blood vessels in the superior pole of the left kidney is visualized using x-ray imaging and a contrast material.