00373 A Novel Stent Coating for Targeted Drug Delivery in the Ureter

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Aims: The small calibre and constant flow of urine within the ureter presents a unique challenge to the topical delivery of therapeutics. We aim to demonstrate the safety and feasibility of a prototype drug eluting stent in the porcine model.

Methodology: A bilayer drug - eluting ureteral stent (DES), made of an inner layer of biodegradable polymer impregnated with mitomycin C (MMC) and an outer hydrogel coating which swells upon contact with urine and achieves apposition to ureteric mucosa were inserted unilaterally in 3 female pigs and ureters harvested at Day 1, 2 and 8 to assay for MMC. In a control pig, uncoated stent was inserted unilaterally and intravesical MMC was instilled on Day 8 for 1 hour before sacrifice to replicate current clinical practice.

Result: No technical issues or hydronephrosis occured during stent insertion and removal. On Day 1, the mid - ureter of the DES side, corresponding to the MMC coated segment of stent, had significantly higher levels of MMC detected (0.204 ± 0.093 ng/mg) compared to the proximal and distal ureters (0.003 ± 0.001 ng/mg and 0.002 ± 0.001 ng/mg). MMC levels were greatly reduced by day 2 in the mid - ureter (0.070±0.106 ng/mg) with negligible amounts in both proximal and distal ureter. Tissue MMC levels were undetected on Day 8. MMC was not detected outside of the ureter or in the serum and there was no significant change in serum creatinine for all 3 pigs. In the control pig, MMC levels in the stented ureter (0.031 vs. 0.204ng/mg)was significantly lower than that seen in the 1st pig.

Conclusion: We demonstrated proof of concept of a hydrogel - based drug - eluting ureteral stent in an in - vivo porcine study. The swelling of the hydrogel coating showed good apposition with the ureteric mucosa, facilitating targeted delivery of MMC to the ureteric tissue within 48 hours while staying within safety limits.