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Ability of Antiretropulsion Devices to Prevent Intrarenal Pressure Rise in *Ex Vivo* Porcine Model.

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Background: Pressurized saline irrigation during ureteroscopy for ureteral calculi risks significant intrarenal pressure increase, leading to post-operative pain, sepsis, and renal injury due to pyelovenous and pyelolymphatic backflow. We sought to determine whether two commonly used antiretropulsion devices designed to prevent stone migration during ureteroscopic lithotripsy procedures have a beneficial, deleterious, or inconsequential effect on intrarenal pressures during ureteroscopic lithotripsy.

Methods: A 16-gauge angiocatheter was placed into the collecting system of an *ex vivo* intact porcine kidney, ureter, and bladder model for real-time continuous pressure monitoring. A flexible ureteroscope was then positioned within the proximal, mid, and distal ureter via the ureteral orifice. Multiple trials were performed with saline irrigation at gravity (84 cm H₂O) and steady-state pressures of 150 and 300 mmHg. Upon deployment of each device 1cm from the ureteroscope tip, percent pressure changes were measured.

Results: The mean percent reduction in intrarenal pressure from baseline and 95% confidence intervals are presented in tabular format (shaded regions are statistically significant):

	Proximal			Mid			Distal		
	Gravity	150 mmHg	300 mmHg	Gravity	150 mmHg	300 mmHg	Gravity	150 mmHg	300 mmHg
Spiral	10%	42%	33%	48%	51%	56%	27%	34%	3%
95% CI	8.6-11.4	41.3-42.7	25.2-40.8	39.6-56.4	50.2-51.8	54.7-57.3	25.6-28.4	34	0.2-5.8
Film-based	68%	33%	48%	65%	62%	68%	61%	54%	67%
95% CI	66.6-69.4	33	47.1-49.9	65	59.6-64.4	66.1-69.9	60.3-61.7	52.1-55.9	65.6-68.4

Conclusion: The spiral device [Stone Cone] failed to prevent intrarenal pressure increases with pressurized saline irrigation, while the film-based device [Accordion] provided superior ability to diminish intrarenal pressures at all three irrigation pressures. In some instances the film-based device [Accordion] completely occluded the ureter, preventing any pressure transmission from irrigation fluid into the collecting system.

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