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The capability of antiretropulsion devices to redirect fluid irrigation during ureteroscopy.

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Background: Backstop devices are utilized to hold a stone in place and prevent retropulsion/migration during intracorporeal lithotripsy. We sought to evaluate how these devices affect the flow of irrigation to the kidney and bladder during ureteroscopy.

Methods: A ureter was simulated by a plastic tube (7 mm inner diameter) with one end sealed to simulate the ureteral orifice. The Accordion (PercSys), Stone Cone (Boston Scientific), or NTrap (Cook) devices were deployed in the tube and fluid was infused through a flexible ureteroscope (ACMI DUR-8) held within 10 mm of the devices. Fluid was delivered at 150 and 300 mmHg for one minute and the volumes of fluid that exited from the proximal (kidney) and distal (bladder) ends of the plastic tube were measured and repeated 5 times.

Results: The Accordion significantly reduced the amount of irrigation that reached the kidney by 51.8% ($p < 0.001$) and increased backflow to the bladder compared to the other devices ($p < 0.001$). The Accordion allowed only 13.3% of the irrigation to reach the kidney with the other 86.7% rebounding back into the bladder and potentially taking small fragments with it at 300 mmHg of pressure irrigation. Both NTrap and Stone Cone transferred all irrigation to the kidney at both 150 and 300 mmHg, with no backflow of irrigation to the bladder.

Conclusion: The Accordion reduces the amount of irrigation that reaches the kidney during ureteroscopy and significantly increases the backflow or irrigation that potentially increases the amount of fragments washed into the bladder compared to NTrap and Stone Cone.

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