



Dialyseal: Leak-Resistant Catheter For Peritoneal Dialysis

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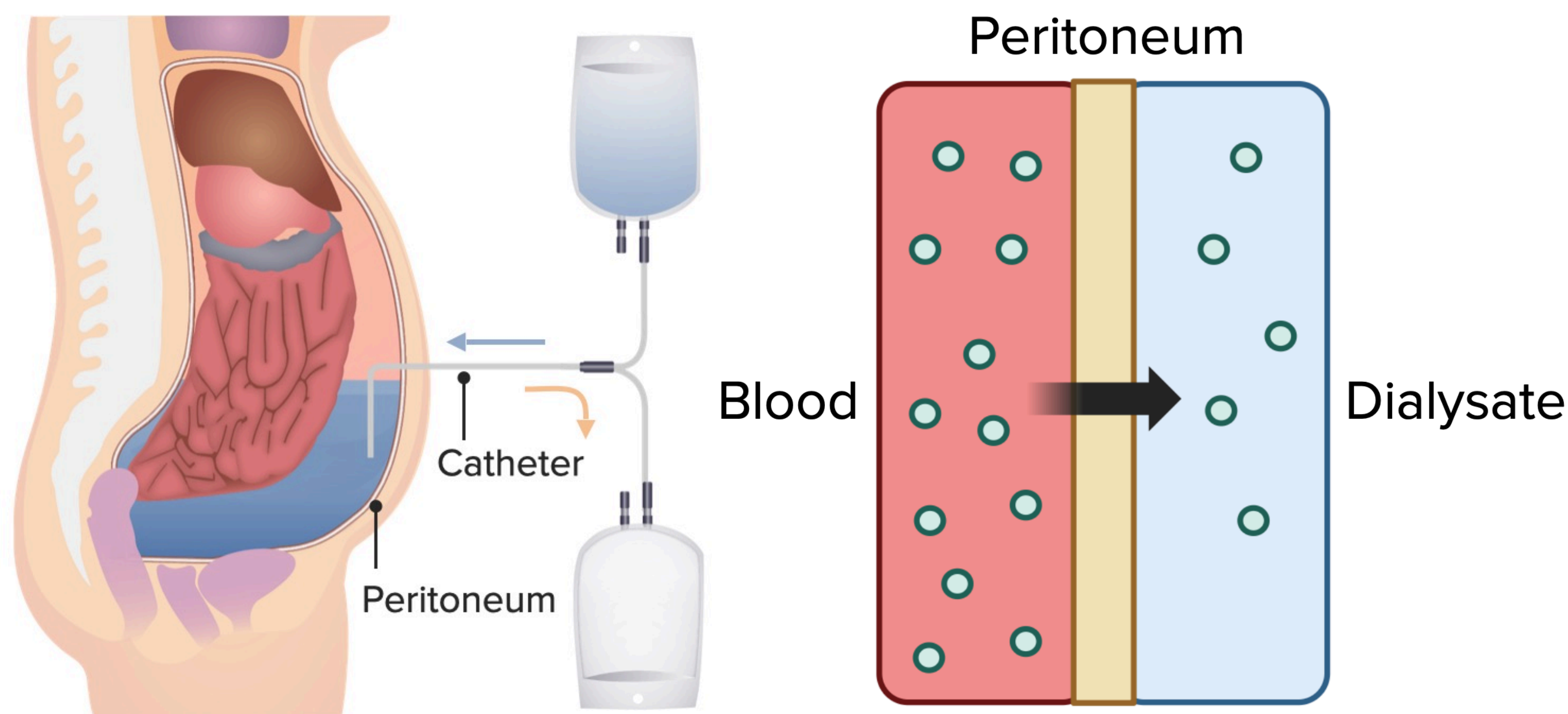
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Project Overview

Peritoneal Dialysis (PD) is the preferred treatment for children with end-stage renal disease (ESRD) as they await kidney transplant.¹ However, the catheter implantation requires a two-week recovery period to mitigate leakage complications, preventing immediate treatment.² As a result, many patients are forced to undergo hemodialysis (HD) or continuous renal replacement therapy (CRRT) to maintain solute clearance during their recovery period, which devastates their vasculature and permanently stunts development.³ We designed a device that can prevent leakage immediately post-catheter insertion, enabling urgent start PD for pediatrics. Our device creates a watertight seal within 24 hours and offers a simple, robust deployment workflow compatible with minimally invasive catheter insertion techniques.

What is PD?

The **peritoneum** (abdominal lining) acts as a filter. Toxins **diffuse across the membrane** from blood to the dialysate (sugary solution). The catheter cycles dialysate in and out of the cavity every 1-4 hours.



30-75%

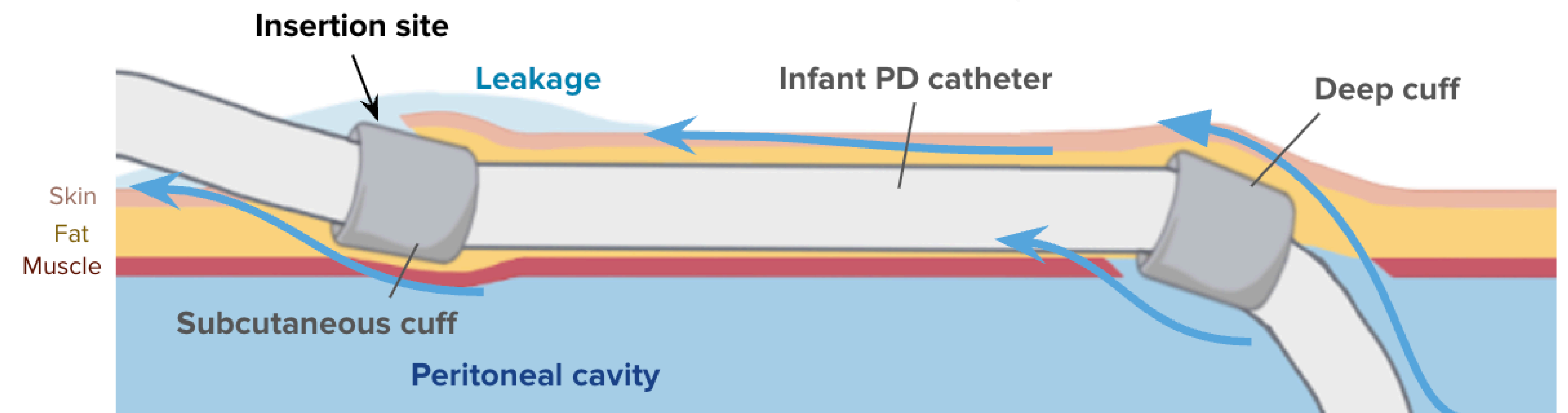
of pediatric PD patients have catheter leakage^{8,9}

Requires catheter replacement surgery and **4 additional weeks** of NICU stay

Increase risk of infection which is fatal **78%** of the time

Our Solution

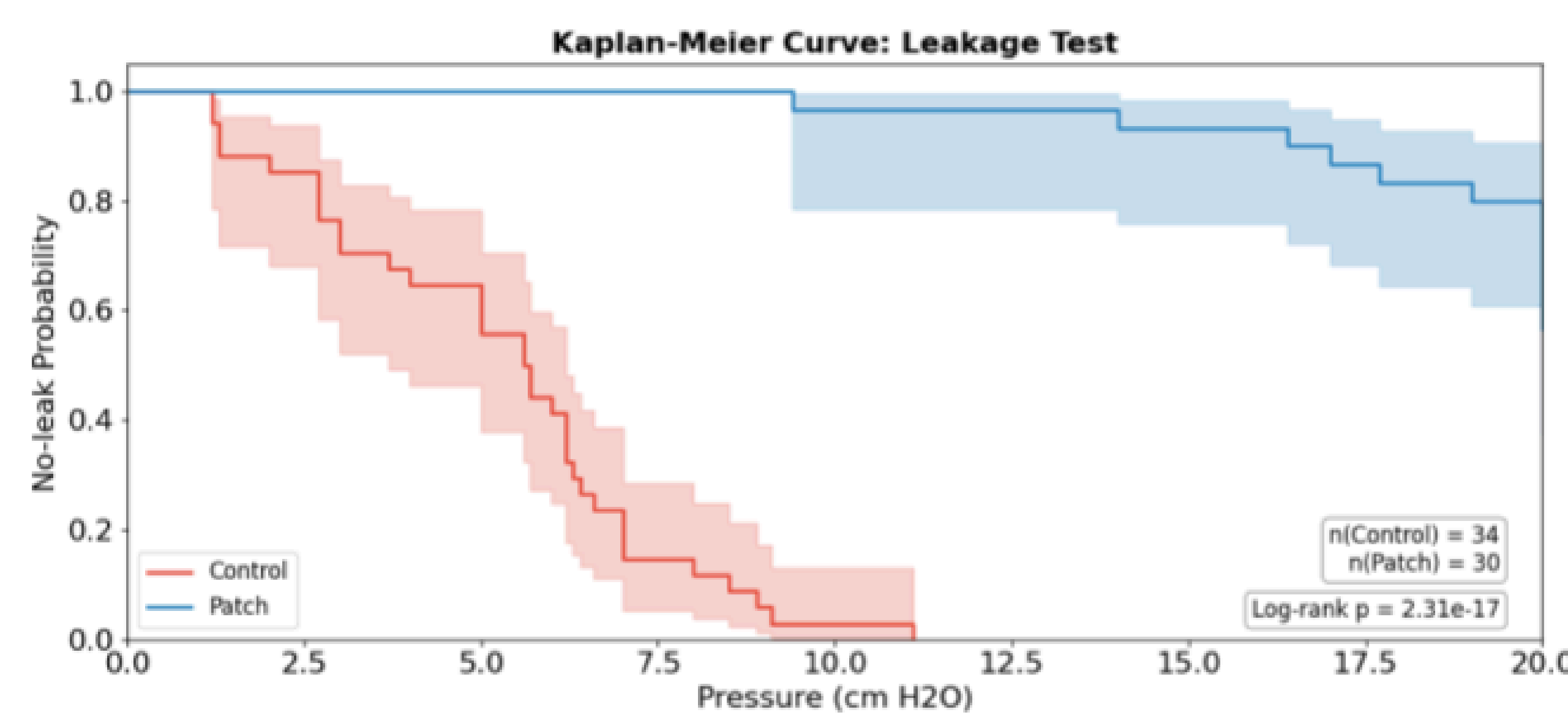
Pediatric surgeons need to quickly ensure no leakage around the peritoneal dialysis catheter in infants to initiate dialysis within one day.



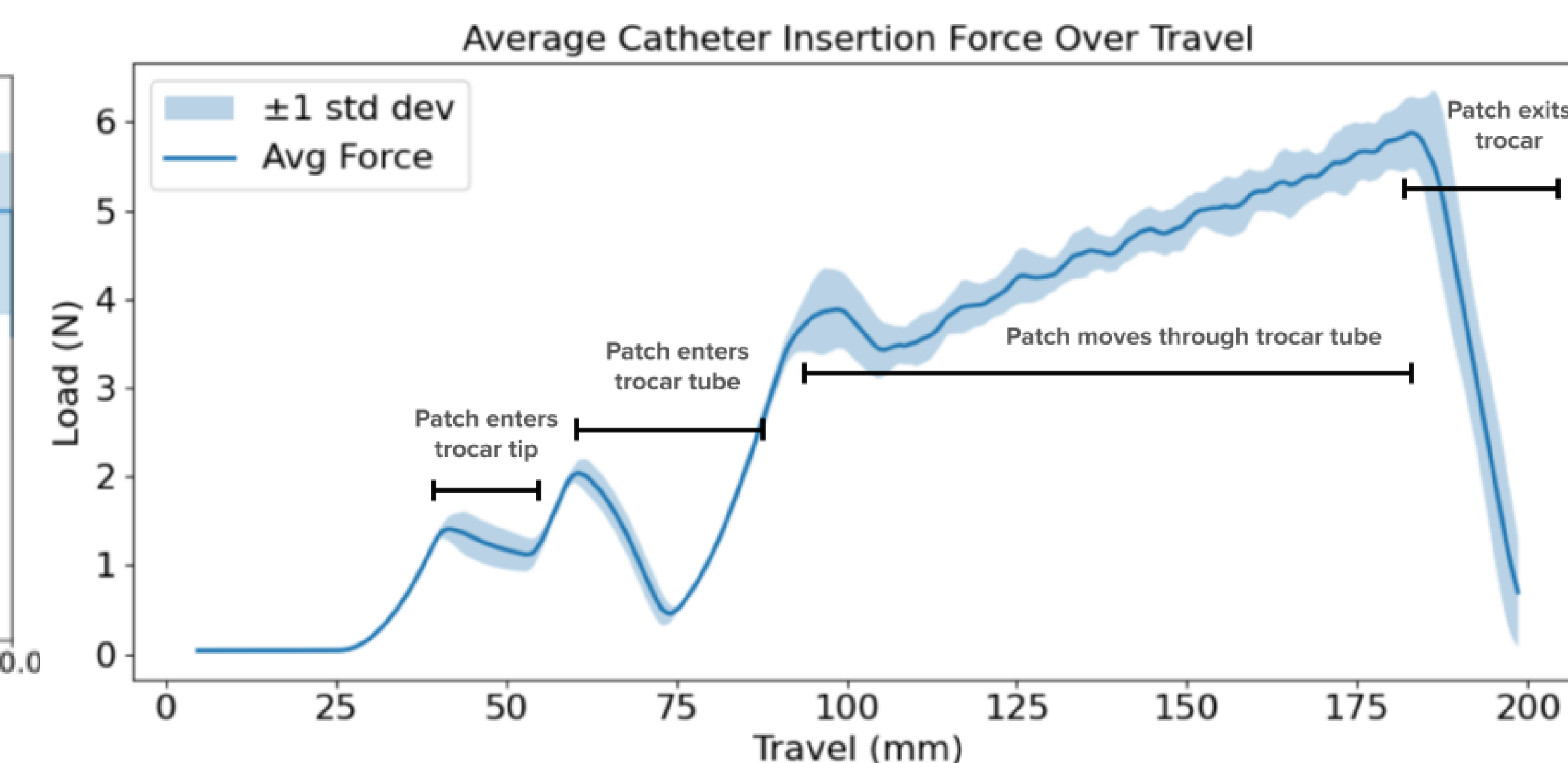
- 01.** Creates and maintains watertight seal immediately following catheter placement
- 02.** Compatible with open surgical and minimally invasive (laparoscopic) surgical workflows
- 03.** Preserves delicate infant anatomy and is robust to everyday movement

Results

Comparison of patch catheters to baseline catheters in a 3 layer silicone tissue model using PD dialysate cycling. Results showed hazard ratio of 0.013 and **75-fold reduction in leakage** (n=30).



Force required to insert our patch catheters through an 8mm trocar using a Mark-10 motorized test stand. Results showed a **peak force of 5.88 ± 0.41 N** (n=9).



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