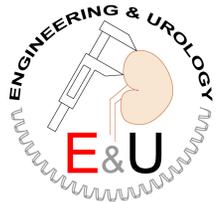


In Vivo Porcine Evaluation of the Multiphze™ Device: A Self-Contained Bladder Irrigation System



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Introduction:

Current standard bladder irrigation methods for clot evacuation are problematic due to the risk of blood and urine contamination of the patient, environment, and provider. The Multiphze™ enclosed irrigation system (Multiphze LLC) is a novel self-contained system designed to eliminate spillage while improving the efficiency of clot evacuation (figure 1).

Methods:

Two female, juvenile Yorkshire pigs were anesthetized, following which 100 ml of blood was drawn via a femoral vein and mixed with 44.4 ml of Glow-Bright Concentrate.

- Both bladders were drained with a 24 Fr 6 eye hematuria urinary catheter.
- 100 ml of blood mixed with the Glow-Bright Concentrate were instilled into the bladder using a Bard Irrigation Kit (BIK).

Bladder Irrigation

- After 5 minutes, 4 postgraduate urologists with prior experience using a BIK were randomized into two groups and performed bladder irrigation with 3 L of sterile water utilizing both the BIK technique and the Multiphze™ system in two separate trials. The two groups differed in the sequence they used the BIK technique vs. the Multiphze™ system.

Irrigation Cycle Assessment

- The time of each irrigation cycle was recorded at one-liter intervals.
- The clarity of drainage fluid was assessed using a spectrometer after each liter of irrigation.
- The total area of spillage on the procedural fields was identified with a Wood's lamp, photographed, and subsequently quantified using the ImageJ image processing program.

Results (Table 1):

- The mean clarity measurements at the end of 2 liters of irrigant for the Multiphze™ system and BIK trials were similar to the clarity obtained after 3 liters.
- The mean time to achieve the fluid clarity after 2 liters of irrigant was 50% less when using the Multiphze™ system compared to the BIK system (6.98 min. vs. 14.07 min.) ($p < 0.001$).
- Wood's lamp illumination revealed no spillage with the Multiphze™ system; with BIK the spillage was 208.95 cm² ($p = 0.036$).

Conclusion:

- In a porcine model, the Multiphze™ irrigation system halved the time to successfully clear a clot-filled bladder while eliminating any spillage of the irrigating fluid.



Figure 1. The Multiphze™ LLC enclosed irrigation system

Table 1. Mean irrigation time, fluid clarity, and spillage area among 4 postgraduate urologists.

	Standard	Multiphze™	
Time to irrigate 1 L (min.)	7.59 [7.17-7.93]	4.33 [3.43-5.0]	$p < 0.001$
Time to irrigate 2 L (min.)	14.07 [12.6-15.3]	6.98 [6.37-7.93]	$p < 0.001$
Time to irrigate 3 L (min.)	20.05 [17.8-21.8]	9.32 [8.05-10.4]	$p < 0.001$
Fluid clarity at 1 L (%)	53.9 [32.5-74.1]	39.6 [3.53-64.7]	$p = 0.433$
Fluid clarity at 2 L (%)	72.6 [71.4-74.1]	72.3 [68.6-76.1]	$p = 0.884$
Fluid clarity at 3 L (%)	74 [73.3-74.5]	73.2 [71.0-75.3]	$p = 0.431$
Spillage area (cm ²)	208.95 [88.0-492.7]	0 [0-0]	$p = 0.036$