

# IN VIVO PORCINE EVALUATION OF A NOVEL SELF-CONTAINED BLADDER IRRIGATION SYSTEM (MULTIPHZE™)



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## INTRODUCTION

Current standard bladder irrigation (SBI) methods are tedious and pose a biohazard risk due to spillage of blood and urine on the patient, environment, and provider. The enclosed Multiphze™ irrigation system (Multiphze LLC) (MIS), a newly developed self-contained system, was designed to eliminate spillage while improving the efficiency of clot evacuation.

## METHODS

### In Vivo Model (Figure 1)

- Under inhalation anesthesia, two female, juvenile pigs were each injected with 100mg fluorescein IV
- Via cardiac puncture, 60cc of blood was withdrawn and instilled into the pig's bladder via a 24Fr 3-way catheter and left in place for 10 minutes

### Bladder irrigation methods

- Multiphze™ system (Figure 2 and 3)
- Standard piston irrigation tray (Bard Medical)

### Comparison

- 3 urologists (i.e. chief resident, endourology fellow, and junior faculty) each performed trials with SBI and MIS.

### Assessment

- Time of each irrigation cycle
- Clarity (lux) of drainage fluid using a spectrophotometer were recorded after each liter of irrigation and compared
- Total surface areas of spillage on procedural field and operator were identified with a Wood's lamp and calculated (Figure 4)



Figure 1. In vivo porcine model



Figure 2. Multiphze™ system

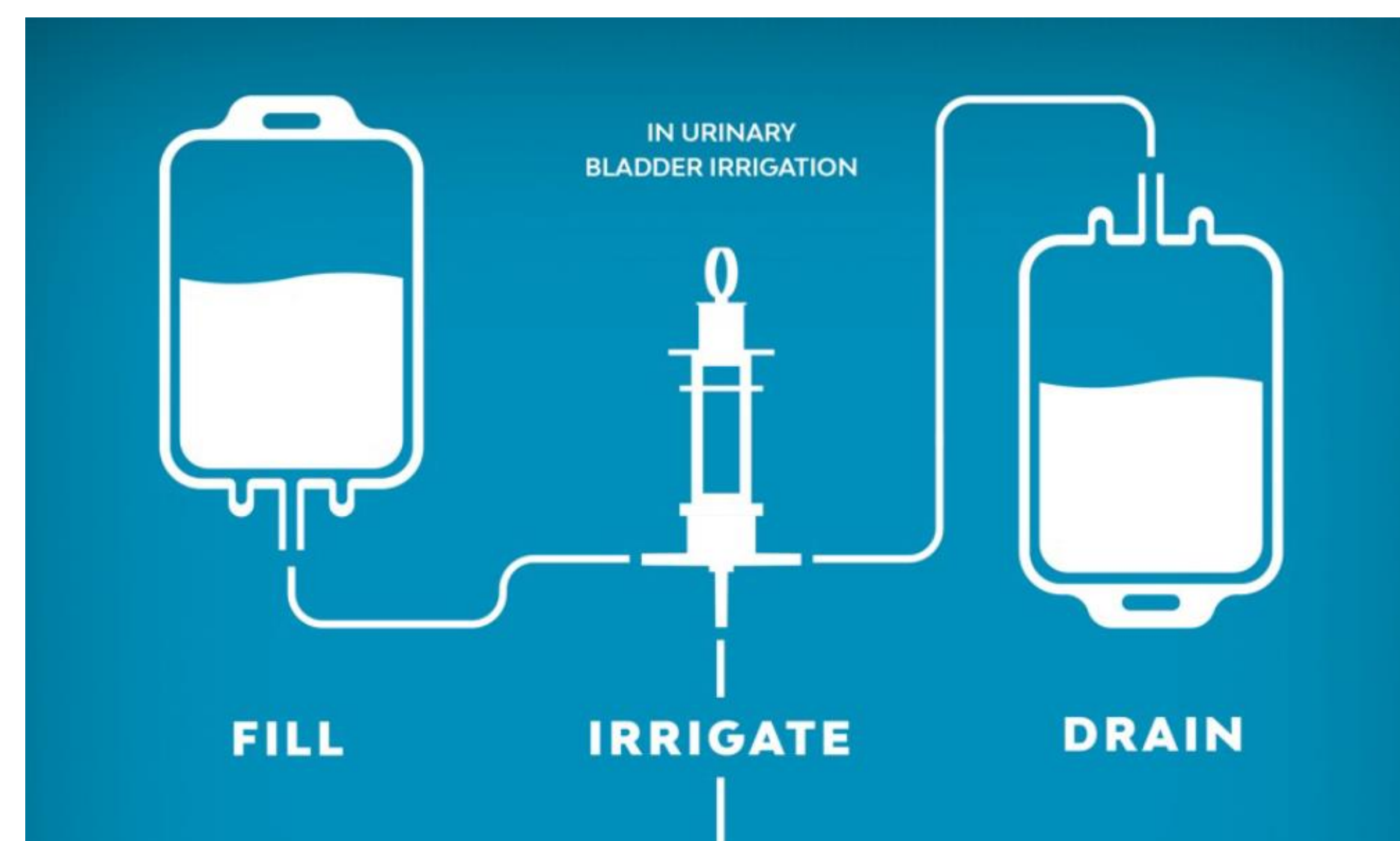


Figure 3. Multiphze™ system diagram

## RESULTS

- Mean irrigation time for 4L of irrigant with MIS and SBI were 17.9 and 23.1 minutes, respectively ( $p = 0.035$ ) (Table 1)
- Mean clarity measurements at end of each trial compared to control were similar for both MIS (82.7%) and SBI (82.9%)
- Wood's lamp illumination revealed 98% reduction of total spillage surface area with MIS compared to SBI: mean area of 19.8 cm<sup>2</sup> and 1001.3 cm<sup>2</sup>, respectively ( $p = 0.034$ )
- Despite no prior experience with the novel irrigation system, all operators had reduction in total irrigation time (range 2 to 9 minutes)

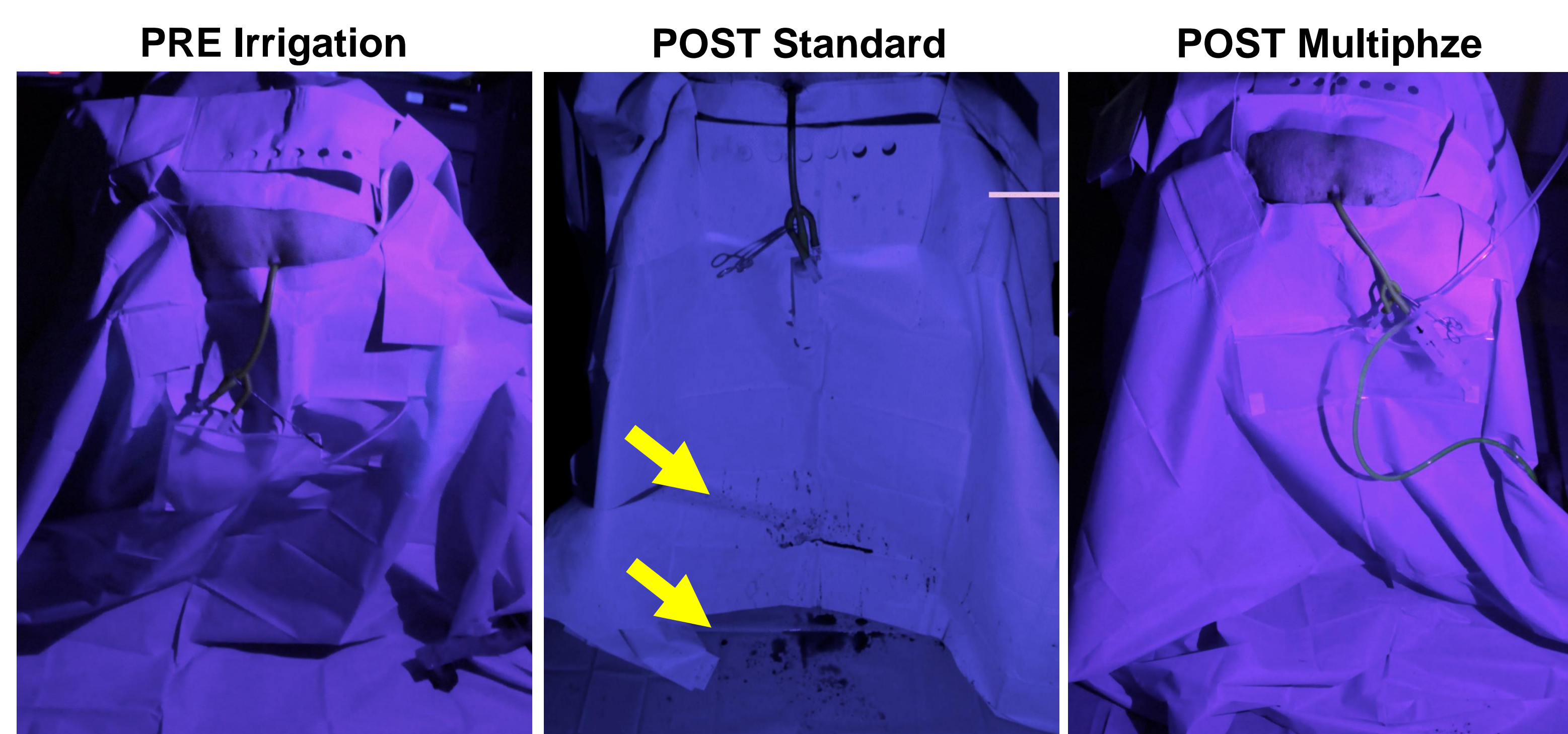


Figure 4. Wood's lamp photos of procedural field (Yellow arrow points to spillage)

	Standard (SBI)	Multiphze (MIS)	
Time to irrigate 1 L (min)	5.8 [4.1 - 7.4]	4.5 [3.7 - 5.5]	$p < 0.001$
Time to irrigate 4 L (min)	23.1 [18.5 - 26.2]	17.9 [16.4 - 19.1]	$p = 0.035$

Table 1. Mean irrigation times among all operators

## CONCLUSIONS

The newly developed Multiphze™ irrigation system reduced the time to successfully clear a clot filled bladder by 22% in a porcine model. Furthermore, the enclosed system demonstrated a 98% reduction in spillage of the spent irrigant.