

FAST Kits: Fluorescent Assessment of Sterile Technique (FAST) for opening procedural kits



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INTRODUCTION

Maintaining sterility of the procedural kits during central venous access and intrathecal injection is critical for preventing serious infections and their complications. In practice, some clinicians open and assemble kits prior to patient arrival, then reseal them due to perceived increased efficiency (“re-open” method). Others prepare kits immediately prior to use (“open” method). This randomized trial was performed to compare the incidence of sterile breaches associated with each preparation method for both central venous cannulation and intrathecal injection.

METHODS

Methods: Fluorescent ultraviolet (UV) dye was sprayed on the outside of both spinal and central line procedural kits. Participants performed mock spinals and central line placement on mannequins via each method. A blinded evaluator identified breaches in sterility either on the mannequin or internal components of the kit. The size and location of sterility breaches were documented, as well as time to procedure completion. The incidence of sterility breaches in both study arms was analyzed.

RESULTS

Table 1: Primary Contamination Outcomes by Setup Method (Overall Data, Central Line and Spinal Kits)

Outcome	Open	Re-open	p value
CENTRAL LINE KITS (n = 48)			
Absolute contamination, n (%)	2/24 (8)	11/24 (46)	0.008†
Dye contamination in kit, n (%)	1/24 (4)	9/24 (38)	0.01†
Mannequin contamination, n (%)	1/24 (4)	3/24 (13)	0.38†
Setup time, median (s)	298	168	<0.001‡
Contamination extent, median (cm)	0.0	0.0	0.16‡
SPINAL KITS (n = 52)			
Absolute contamination, n (%)	15/26 (58)	19/26 (73)	0.38†
Dye contamination in kit, n (%)	3/26 (12)	18/26 (69)	<0.001†
Mannequin contamination, n (%)	1/26 (4)	3/26 (12)	0.61†
Setup time, median (s)	126	59	<0.001‡
Contamination extent, median (cm)	0.10	1.50	0.16‡

† Fisher’s exact test, ‡ Mann–Whitney U test

Figures 1 & 2: Schematic showing revised spraying method (kit sprayed with inner contents covered then resealed)

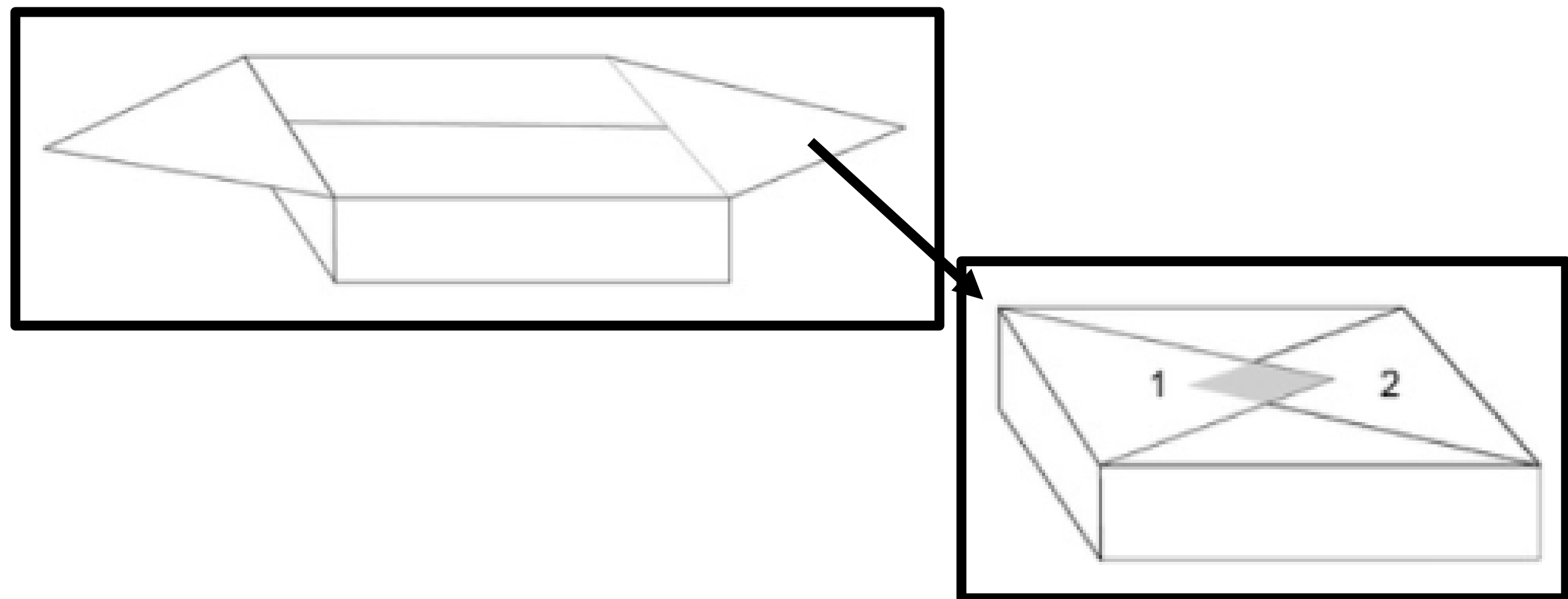
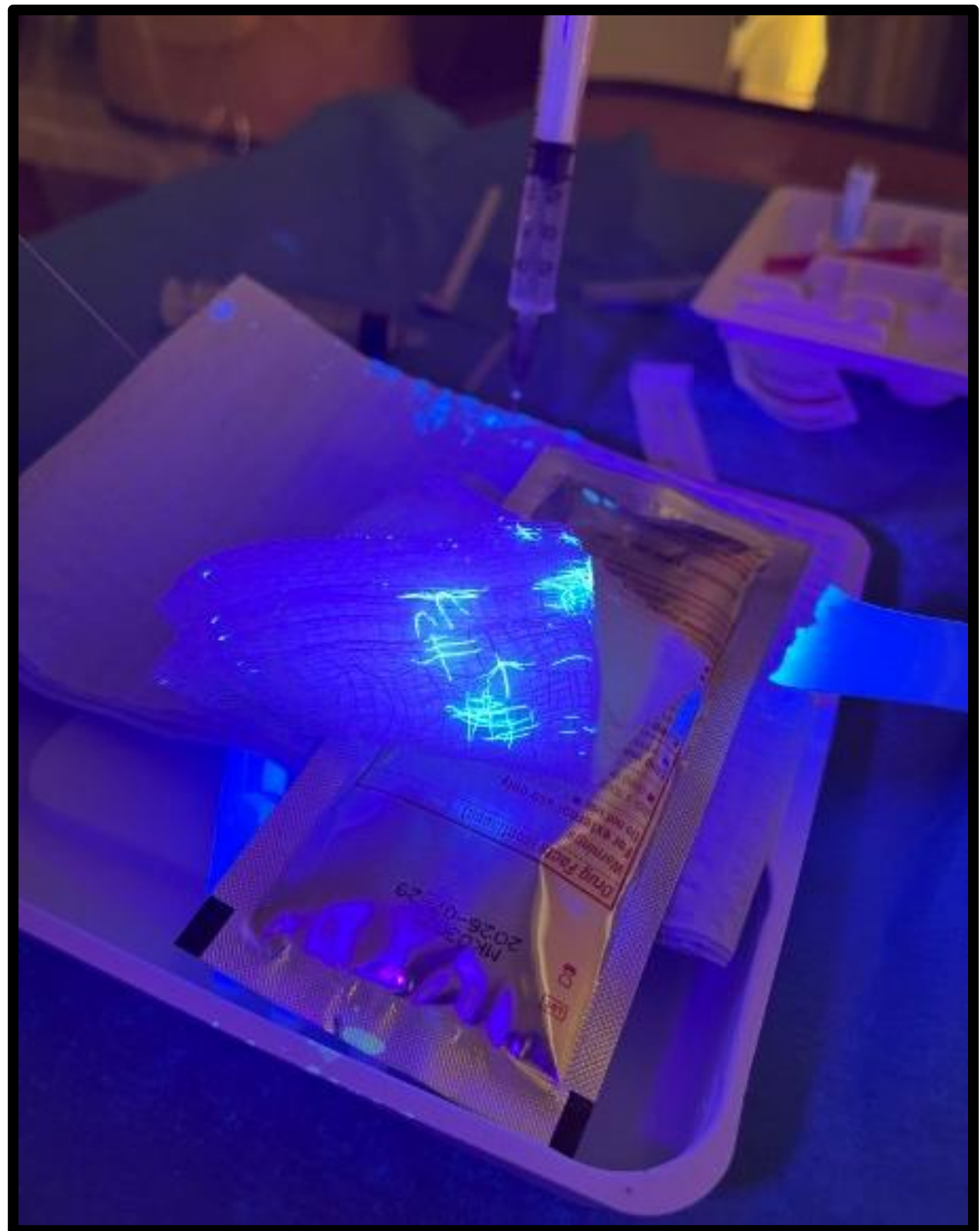
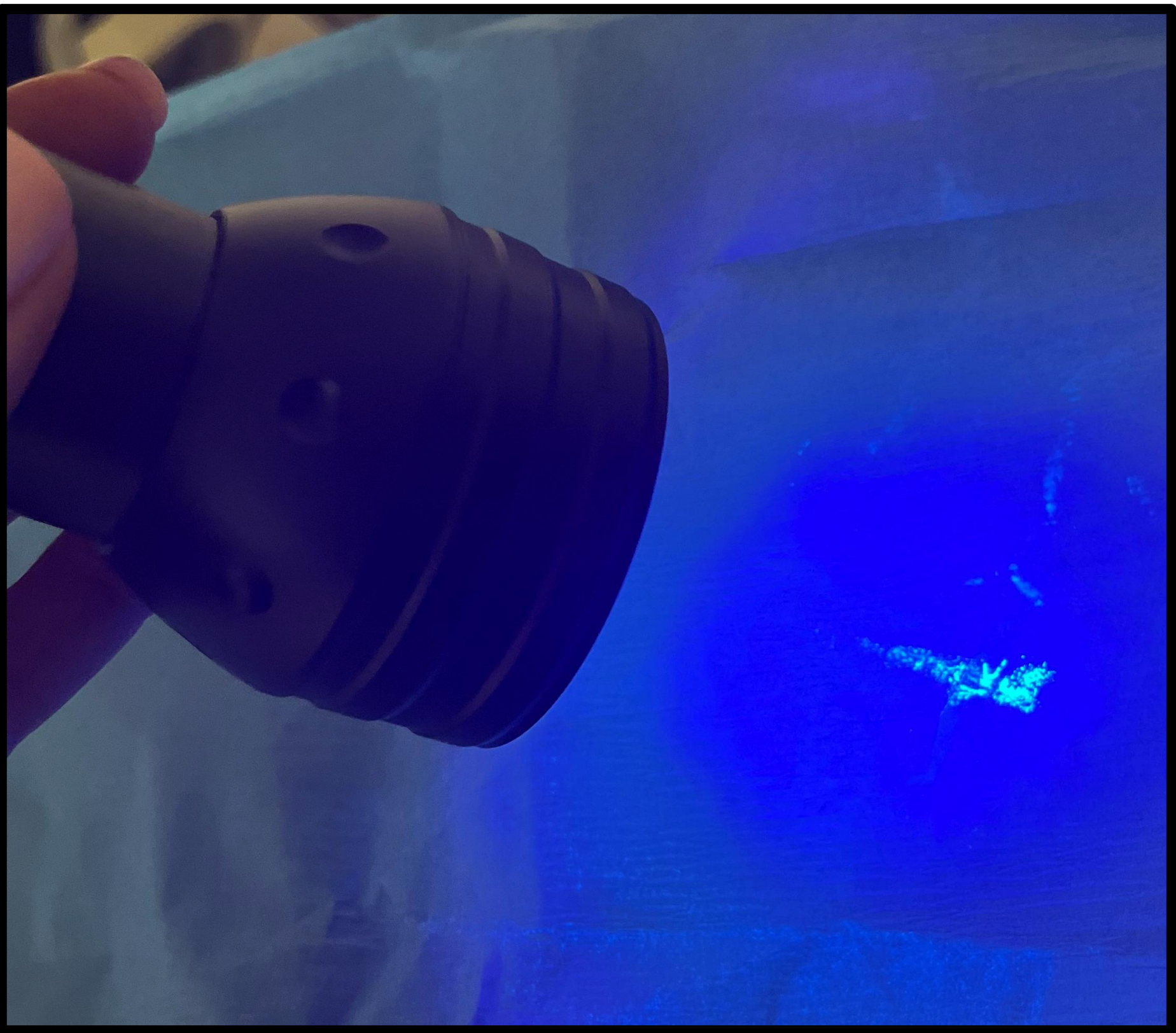


Figure 3 & 4: Representative images of fluorescent dye contaminating spinal kit



RESULTS

Central line kits: Absolute contamination occurred significantly more often with the reopen vs open-once method (46% vs 8%, $p = 0.008$).

Internal kit contamination was significantly higher with the reopen method for both central line kits (38% vs 4%, $p = 0.01$) and spinal kits (69% vs 12%, $p < 0.001$).

Subgroup analysis demonstrated consistently higher internal kit contamination with the re-open method across both dye-application techniques, confirming the robustness of the primary findings.

CONCLUSIONS

In this single-center, assessor-blinded two arm randomized controlled trial examining two methods of preparing central line and spinal kits, a statistically significant increase in kit contamination was demonstrated in the “re-open” method of kit preparation. Based on these findings, the preparation and resealing of sterile kits should be avoided. Further studies should be targeted toward examining the problematic step(s) as well as identifying further means of preventing kit contamination.