Because definitive surgical care is often delayed until a white light environment is permissible, we sought to determine if night optical device (NOD) technology could enable surgical capabilities in blackout conditions.” Derickson et al (2019).

Abstract

INTRODUCTION: During military combat operations and civilian night-time aeromedical transport, medical providers are frequently required to perform life-saving interventions (LSIs) in low-light environments. Because definitive surgical care is often delayed until a white light environment is permissible, we sought to determine if night optical device (NOD) technology could enable surgical capabilities in blackout conditions.

METHODS: Using a cross-over design, 6 surgeons performed 11 different procedures on 6 swine, 3 in normal light conditions (LC) and 3 in blackout conditions (BC) using two-chamber NODs after familiarization with the procedures in both conditions on manikins. Successful completion and procedural times were compared between groups.

RESULTS: Blackout conditions were confirmed with ambient light reading of 0.2 lux during BC vs 3962.9 lux for LC (p<0.001). There were no significant differences in success rates for any procedure. There were no differences in operative times between BC and LC for extremity tourniquet placement, femoral artery cut-down and clamping, resuscitative thoracotomy, or percutaneous REBOA placement. The following procedures took significantly longer in BC vs LC: FAST exam (98s vs 62s), peripheral IV placement (140s vs 35s), intraosseous access (51s vs 26s), jugular vein cut-down and access (237s vs 104s), laparotomy and packing (71s vs 51s), stapled splenectomy (137s vs 74s), REBOA placement via cutdown (1,008s vs 338s), and cricothyroidotomy (177s vs 109s) (all p<0.05). CONCLUSION: LSIs can be safely and effectively performed in blackout conditions using NODS, although increased difficulty with select procedure types were identified. Focused training and technological improvements to currently available devices are needed.

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