

The Laparoscopic Irrigator Aspirator: A Cost and Time-Saving Alternative Irrigation Method for Open Fractures

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Purpose: The laparoscopic irrigator aspirator (LIA) is an irrigation method used in laparoscopic surgery that is ubiquitously available in all operating rooms (ORs). The LIA uses a battery-powered pump and has the ability to deliver irrigation efficiently, as well as aspirate that fluid in a similar manner. At our institution, the LIA has become the primary method for irrigation of open fractures due to its efficiency. The purpose of this study is to compare the cost and time between gravity tubing, pulse lavage, and LIA for one 3-L bag of normal saline (3L NS bag) and to extrapolate those data to estimate time and cost savings for open tibia fractures treated at our institution over 1 year.

Methods: Three methods of irrigation (gravity tubing, pulse lavage, and LIA) were set up with the bottom of a 3L NS bag at a height of 7 feet (213 cm) and the distal end of the irrigation delivery device at a height of 4 feet (122 cm). The time needed to drain one 3L NS bag was recorded for each. The prices for each method of irrigation were obtained and the time and cost saved per 3L NS bag was multiplied by three for the total time and cost for 9 L.

Results: For a 3-L bag of NS, pulse lavage was the slowest form of irrigation (4:02 [minutes:seconds]), followed by gravity tubing (2:45), and the LIA was the most efficient method (1:04). In our state, the average cost of OR time is \$37.45 per minute. For 3 L, the LIA was 101 seconds faster than gravity tubing and 178 seconds faster than pulse lavage. For 9 L, LIA saved 303 seconds compared to gravity tubing and 534 seconds compared to pulse lavage. At our institution, the cost of an LIA is \$39.16, pulse lavage is \$38.66, and gravity tubing is \$6.19. Over 9 L, the LIA results in \$156.15 saved over gravity and \$332.80 saved over pulse lavage when accounting for both the cost of OR time and the irrigation device. At our institution, 34 open tibia fractures were treated with the LIA in 2019, which resulted in 2.86 hours and \$5309.10 saved over gravity tubing and 5.04 hours and \$11,315.2 saved over pulse lavage.

Conclusion: The LIA is a viable alternative to gravity tubing and pulse lavage for open fracture irrigation and results in both time and cost savings.