

The Effectiveness of Saline Load Test in Detecting Simulated Traumatic Elbow Arthrotomies: A Cadaveric Investigation

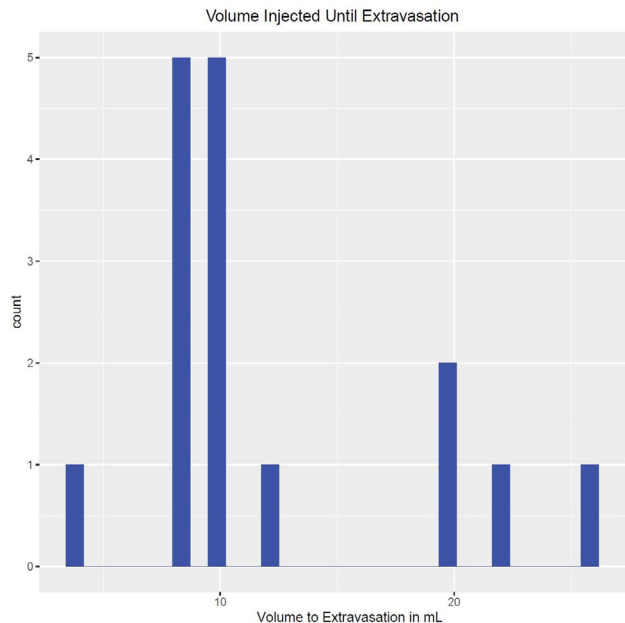
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Purpose: Injuries communicating with the elbow joint are essential to detect and treat promptly. While the saline load test to detect traumatic arthrotomy is well studied in other joints, it has not been well explored in the elbow; therefore, the appropriate volume of saline infusion to detect traumatic elbow arthrotomy is not known. This study aimed to determine (1) the saline infusion volume necessary to achieve 90%, 95%, and 99% sensitivity in detecting traumatic elbow arthrotomy; and (2) specimen factors associated with higher saline volume at arthrotomy detection.

Methods: 16 thawed, fresh-frozen forequarter upper extremity amputation cadavers were arthrotomized through the direct lateral arthroscopic portal site using a 4-mm trochar. The intra-articular location of the arthrotomy was confirmed through trapping the trochar in the ulnohumeral joint. An 18-gauge needle was then inserted into the elbow joint, followed by intra-articular saline-methylene blue injection. The preestablished arthrotomy site was monitored for extravasation. The amount of saline required to detect arthrotomy was recorded. All injections were confirmed as intra-articular through direct visualization of joint staining during post-experimentation open exploration.

Results: Mean saline volume required for extravasation was $12.2 \text{ mL} \pm 6.26$ (4 mL-26 mL). The volume of saline needed to achieve sensitivities of 90%, 95%, and 99% were 21, 23, and 25.4 mL, respectively (Figure 1). Linear regression demonstrated that increasing age was associated with lower volume to extravasation (odds ratio [OR]: 0.67; 95% confidence interval [CI]: 0.48-0.932; $P = 0.037$), while body mass index ($P = 0.571$) and extremity laterality ($P = 0.747$) did not affect the volume of saline required to achieve extravasation through similar-sized arthrotomies.

Conclusion: Saline infusion volume required to detect an elbow arthrotomy with 99% sensitivity was 25.4 mL. We recommend using at least 26 mL when performing the saline load test to rule out a potential elbow arthrotomy in the traumatic setting.



The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.