

Evaluating the Safe Administration of Contrast Medium in X-Ray Cystograms for Pelvic Trauma Patients

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BACKGROUND

- About 20-25% of pelvic fracture patients have associated lower urinary tract injuries including urethral and bladder injuries[1].
- The BOAST guideline for managing urological trauma associated with pelvic fractures recommends X-Ray cystograms using:
 - 1:1 dilution of 150ml IV contrast and 150ml normal saline**
 - Does not specify contrast medium concentration**



BRITISH ORTHOPAEDIC ASSOCIATION AUDIT STANDARDS for TRAUMA

AUG 2016

The Management of Urological Trauma Associated with Pelvic Fractures

- The available concentrations of Omnipaque in our hospital are 140mg iodine/ ml and 350mg iodine/ mL
- Our hospital guidelines recommend a 1:10 dilution using 300 or 350mg iodine/mL contrast medium.
- However, our departmental practice follows BOAST's 1:1 ratio regardless of contrast concentration

OBJECTIVES

- Assess baseline knowledge of X-Ray cystograms amongst T&O, Major Trauma, Urology and ED clinicians.
- Audit to assess documentation of IV contrast concentrations and dilution ratios used in X-Ray cystograms
- Literature review of evidence on best practices and safe contrast use in cystograms
- Identify reported risks linked to varying contrast densities

STUDY DESIGN & METHODS

Literature review: PUBMED databased used
Search Terms: *(Pelvic trauma OR pelvic fracture OR blunt trauma)*
AND *(Urological injury OR cystogram OR cystography OR bladder rupture OR urethral injury)*

Inclusion criteria	Exclusion criteria
Primary research articles	Grey literature
Live human study participants	Abstracts from conferences
Case reports	Non-English articles
Review articles	Animal studies
Guidelines	Paediatric studies

To assess baseline knowledge:

- 43 clinicians from T&O, Major Trauma, Urology and ED completed a survey assessing knowledge of contrast medium and dilution for X-Ray Cystograms

To assess documentation of IV contrast concentrations and dilution ratios:

- Retrospective review of 50 patient electronic medical notes

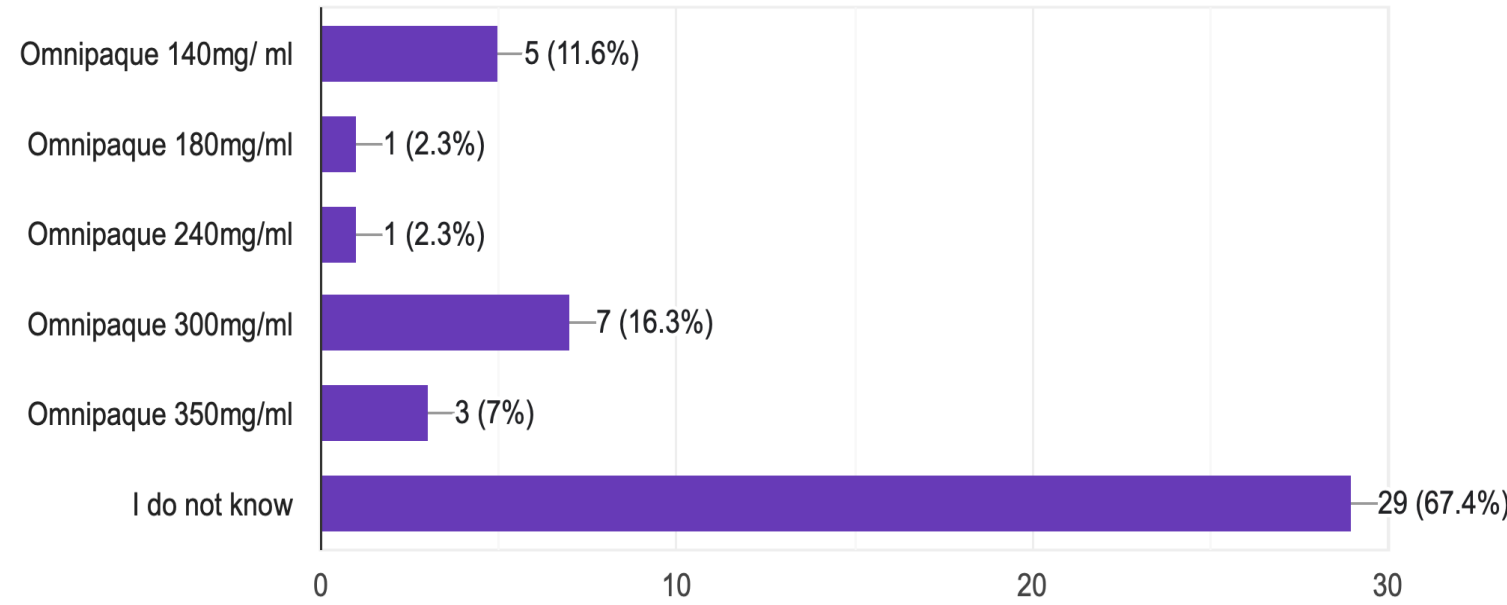
LITERATURE REVIEW RESULTS

- 8 research** papers identified (3 retrospective and 5 prospective studies).
- Vast majority of studies included CT cystogram rather than XR
 - Final volume from all studies were between 300-400ml
 - No clear consensus on the final iodine concentration** used within final volume.
 - No adverse events documented** in these patients from contrast in patients with confirmed urological injuries.

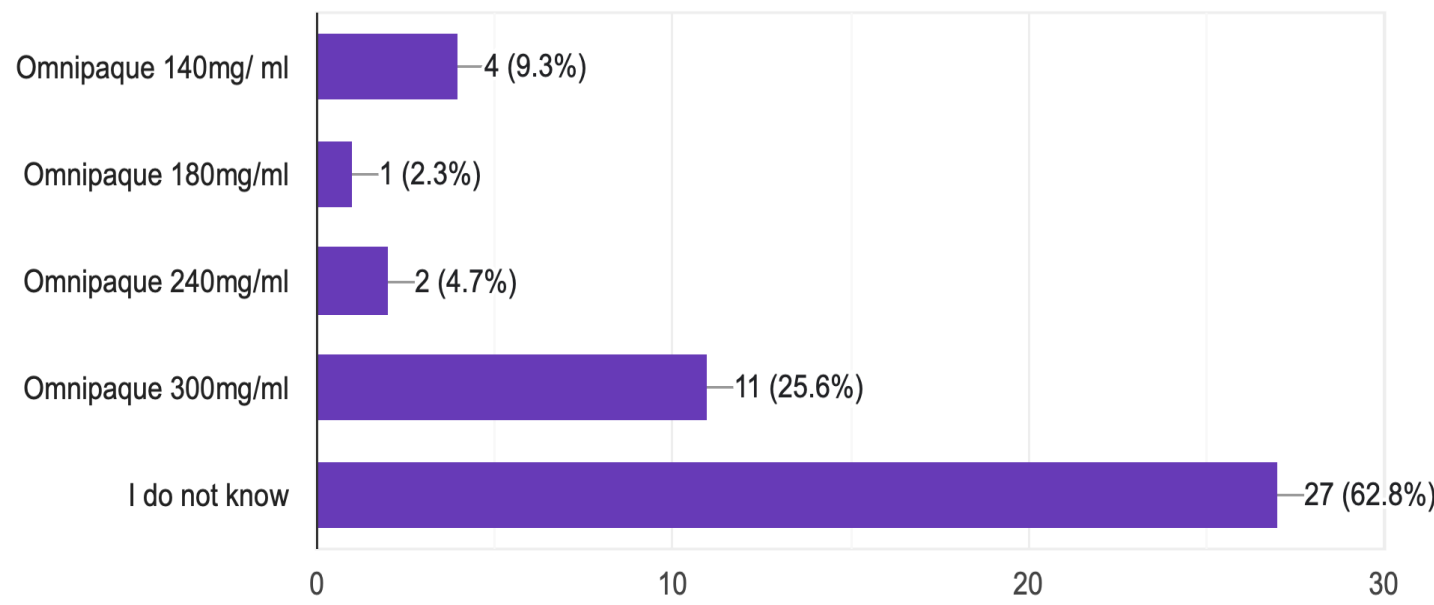
SURVEY RESULTS

Total responses: 43

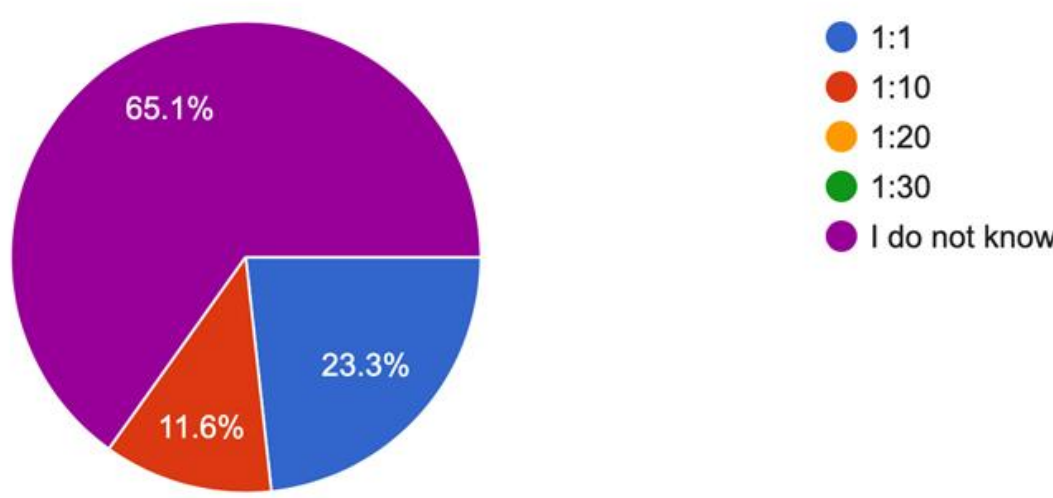
What Omnipaque Concentrations (mg Iodine/ mL) are available in the hospital?



What Omnipaque Concentration is used for X-Ray Cystograms?



What contrast Dilution is Used for X-Ray Cystograms?



DOCUMENTATION AUDIT RESULTS

- Medical records of 50 patient admitted with pelvic fractures reviewed
- Period audited: October 2024 to January 2024
- 60% of patients underwent X-Ray cystograms
- 0% had clear documentation of Omnipaque concentration or dilution used

CONCLUSION

- Wide range of contrast media concentrations are available, making a **simple volume-based dilution insufficient** for safe administration of intravesical contrast.
- Current BOAST guidelines lacks specific concentration and dilution guidance**
- Authors raised this concern with the **BOAST Clinical Standards Committee**
- Committee confirmed the guideline **is under revision** and will address and include the issue raised
- Once BOAST has clarified and revised guideline:
 - Staff education** on safe contrast use will be implemented
 - Local guidelines** will be updated to reflect new standards

References:

- Demetriades, D. *et al.* Pelvic Fractures: Epidemiology and Predictors of Associated Abdominal Injuries and Outcomes1. *J. Am. Coll. Surg.* **195**, 1–10 (2002).
- British Orthopaedic Association. BOAST: The management of urological trauma associated with pelvic fractures. 2016.