Estimated blood loss – Your guess is as good as mine

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INTRODUCTION

Blood loss during **hip fracture surgery** increases the risk of **post-operative complications**. Current transfusion guidance emphasises **pre-operative haemoglobin (Hb)**, yet few standardised protocols exist to identify patients most at risk.

Visual estimation of blood loss (EBL) is the most common method in orthopaedic surgery, but inaccuracy can contribute to post-operative complications.

This pilot study aimed to assess the accuracy of visual EBL in simulated scenarios and explore correlations between **EBL**, **operation duration**, and **post-operative Hb** in hip fracture patients.

METHODS

This study comprised **two parts**:

- **Electronic questionnaire:** assessed accuracy of visual EBL in simulated **Dynamic Hip Screw (DHS)** and **Hemiarthroplasty** scenarios using known volumes of simulated blood.
  - **62 responses** were obtained from theatre staff.
- **Retrospective review:** data from **39 hip fracture patients**, including EBL, pre- and post-operative Hb, operation time, **ASA grade**, and transfusion requirement.

Regression analysis was performed to evaluate associations between these factors and predictors of post-operative transfusion.

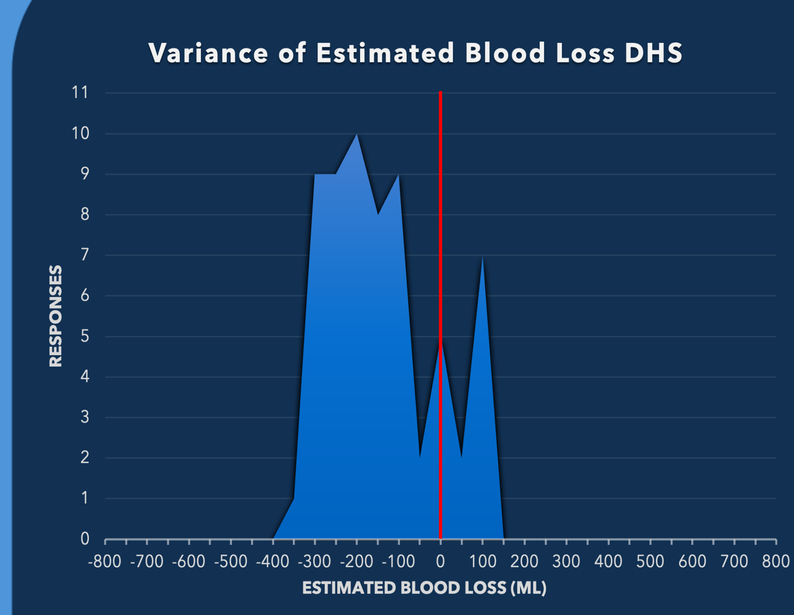
RESULTS

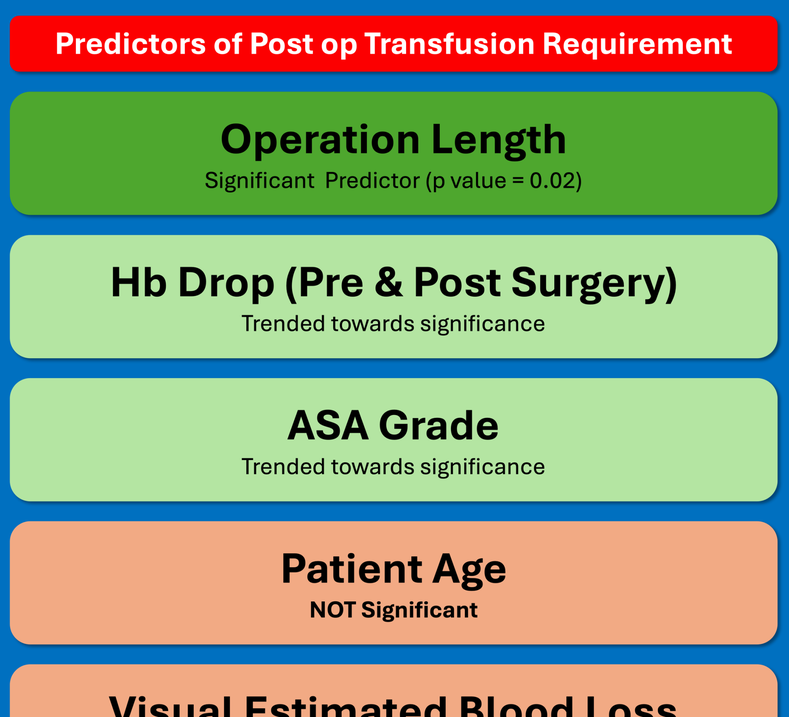
The simulated scenarios demonstrated a consistent **underestimation of EBL** for both procedures:

- **144 ml** for DHS (*95% CI: −176 to −112 ml*)
- **404 ml** for Hemiarthroplasty (*95% CI: −478 to −330 ml*)

Regression analysis examined relationships between **ASA grade**, **age**, **operation time**, **EBL**, **Hb drop**, and the likelihood of post-operative transfusion.

- **Operation time** was a significant predictor ($p = 0.02$).
- **ASA grade** and **Hb drop** trended toward significance.
- **Age** and **EBL** were not significant predictors.





DISCUSSION

This study confirms that **visual estimation of blood loss remains unreliable** in orthopaedic surgery, with a consistent trend toward underestimation. Such inaccuracies may delay recognition of significant blood loss and lead to suboptimal transfusion decisions.

Although **objective techniques** (gravimetric or photometric) improve accuracy, they are often impractical in standard theatre practice. Identifying **alternative, easily measured predictors** may therefore be more useful in daily settings.

Our findings indicate that **operation duration** significantly predicts transfusion, with **ASA grade** and **haemoglobin drop** also showing potential associations.

These variables could inform a **simple peri-operative screening tool** to identify higher-risk patients and support the development of **standardised EBL assessment protocols**.

REFERENCES

Foss, N.B., Kristensen, M.T. & Kehlet, H. (2008) *Anaemia impedes functional mobility after hip fracture surgery*. **Age and Ageing**, 37(2), 173–178. doi:10.1093/ageing/afm161.
Griffiths, R. *et al.* (2020) *Guideline for the management of hip fractures 2020*. **Anaesthesia**, 76(2), 225–237. doi:10.1111/anae.15291.
Stoker, A.D. *et al.* (2024) *Estimating surgical blood loss: A review of current strategies in various clinical settings*. **SAGE Open Medicine**, 12. doi:10.1177/20503121241308302.
Shah, A. *et al.* (2025) *Association of Anaesthetists guidelines: The use of blood components and their alternatives*. **Anaesthesia**, 80(4), 425–447. doi:10.1111/anae.16542.