

# Blood Loss: Accuracy of Visual Estimation

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As discussed repeatedly in other chapters of this textbook, clinical estimation of blood loss is notoriously inaccurate, although the degree of inaccuracy varies greatly. While some studies have indicated overestimates as high as 500%<sup>1</sup>, others have reported underestimates as low as 30–50%<sup>2–5</sup> of actual losses. Despite conflicting observations, it is likely that overestimation of blood loss occurs at low volumes and underestimation at high volumes. Clearly, the volume of loss affects the degree of accuracy of visual estimates<sup>1,3,5,6</sup>.

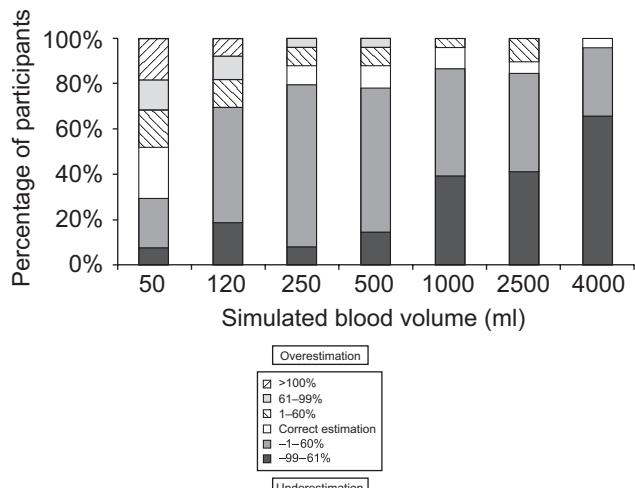
When translated into clinical practice, overestimation may result in unnecessary and costly interventions, and, perhaps more importantly, underestimation may delay or deter identification and diagnosis of what is truly a hemorrhage. This latter circumstance may result in an unplanned obstetric emergency with catastrophic outcome. To mitigate these potential negative sequelae, multidisciplinary drills to highlight the nature of the problem are mandatory, particularly in training programs (see Chapters 36 and 40).

A labor ward drill conducted at the John H. Stroger Jr Hospital of Cook County provided obstetric care teams with an opportunity to assess their skills at determining blood loss. A multi-station blood loss simulation was designed with seven stations which created opportunities to assess predetermined simulated blood losses. Grape jelly and pomegranate juice were used to simulate clots and blood. Each station had a measured amount, ranging from 50 to 4000 ml. Simulated blood quantities were placed on sanitary pads, delivery pads, basins, drapes and on the floor. This study was approved by the Institution Review Board.

A total of 49 participants (medical students, physician assistants, nurses, obstetric and gynecologic residents and attending staff) completed the skills session. Study results are depicted in Figure 1. The findings clearly document the inaccuracy of blood estimation, as well as the fact that the accuracy of the estimate decreased with an increase in blood volume. This was particularly true above 1000 ml. Of interest, the under buttocks absorbent delivery pad was most deceptive for estimating. In general, underestimates were similar for liquid and clots, but the 4000 ml station consisted entirely of ‘clots’ and was most underestimated by the vast majority of participants.

This training program was enlightening for participants to understand the limitations of the visual assessment of blood loss. Repetitive interval sessions may aid individuals to increase their accuracy and/or develop a personal blood loss assessment coefficient to anticipate levels of underestimation. Such a coefficient would be comparable to a golf handicap and of great use to individuals who regularly are called upon to assess blood loss in a variety of situations. Future studies could expand on this experiment with larger numbers and under more varied conditions, of which the quality and quantity of atmospheric lighting is most important. This information may be informative in the ongoing education of labor and delivery room staff in drills and other attempts to simulate real-time emergency situations.

Visual estimates provide a quick and inexpensive method of assessing blood loss without technical limitations. However, issues of inaccuracy must be overcome to enhance the reliability of such estimations. The implementation of standardized visual estimation and training programs has the potential to improve accuracy<sup>6</sup>. In addition, as opposed to unaided visual estimates, the use of simple tools such as the collection drape with a calibrated collection pouch has shown great potential for producing more accurate blood loss estimates<sup>5,7</sup>. Accurate detection of blood loss is crucial to reduce the morbidity and mortality of postpartum hemorrhage.



**Figure 1** Accuracy of blood volume estimate

## References

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