

Assessing accuracy of visual estimation of blood loss during simulated postpartum haemorrhage scenarios

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Introduction

Post-Partum Haemorrhage (PPH) is a significant cause of maternal morbidity⁽²⁾ and mortality⁽³⁾. Rapid and accurate measurement of blood loss facilitates early identification of PPH allowing early intervention⁽⁴⁾. Visual Estimation (VE) is commonly used to assess blood loss. VE is known to be inaccurate^(5,6) and at larger volumes can be underestimated by as much as 30-50%^(4,6)

Aim: To assess if VE of set blood volumes reflects the inaccuracies described in the literature, necessitating a change in practice.

Method

Approval for this project was gained from the local audit department of our District General Hospital. Simulated PPH scenarios were set up on the labour ward (Fig. 1) using known volumes of artificial blood which accurately reflects its density (1.05g/ml)⁽⁷⁾.

Labour ward staff attended the scenarios individually and were asked to provide a VE of blood loss. Mean difference and mean percentage errors were calculated for each scenario using Microsoft Excel version 16.68. Bland-Altman analysis curves were constructed comparing differences of the estimated versus the actual blood volume.

The principle outcome measure was accuracy of estimation.

PPH Is defined as:

>500ml of blood loss following normal vaginal delivery

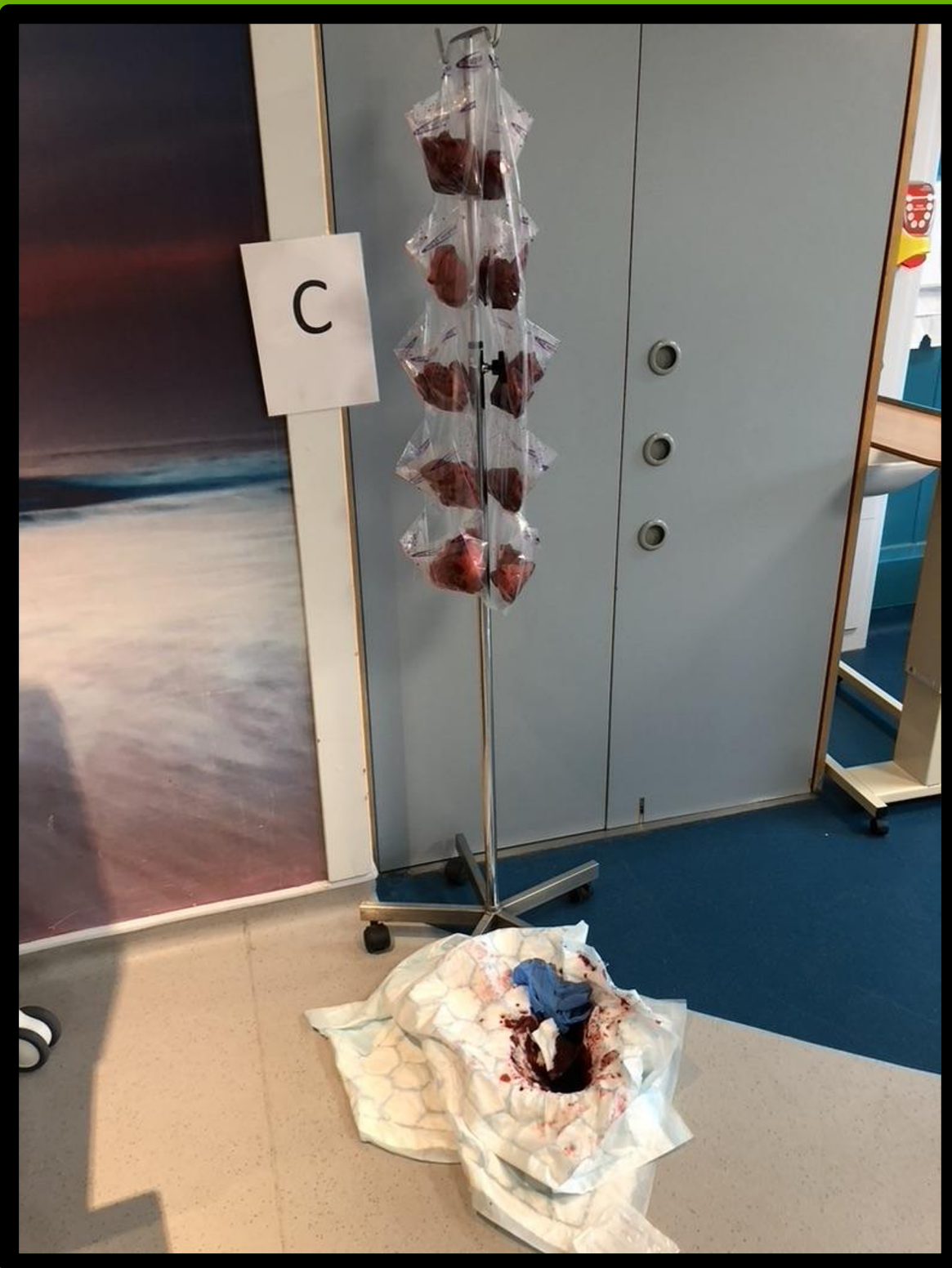
or

>1000ml following operative delivery⁽¹⁾

How good are you at estimating blood loss?



Figure 1



Results

Thirty members of the labour ward multidisciplinary team (7 anaesthetists, 6 obstetricians, 4 theatre staff, 13 midwives) made a VE of blood loss for the 4 simulated scenarios. This data was collated and the calculated volume and percentage error is presented in Figs. 2 and 3.

Years of experience (<10, 10-19 and >20) did not significantly affect accuracy of estimation (p=0.57 at 1400ml, p=0.60 at 3480ml, p=0.53 at 1680ml, p=0.33 at 740ml).

There was also no significant difference in ability to estimate between clinical roles (p=0.59 at 1400ml, p=0.19 at 3480ml, p=0.58 at 1680ml, p=0.63 at 740ml).

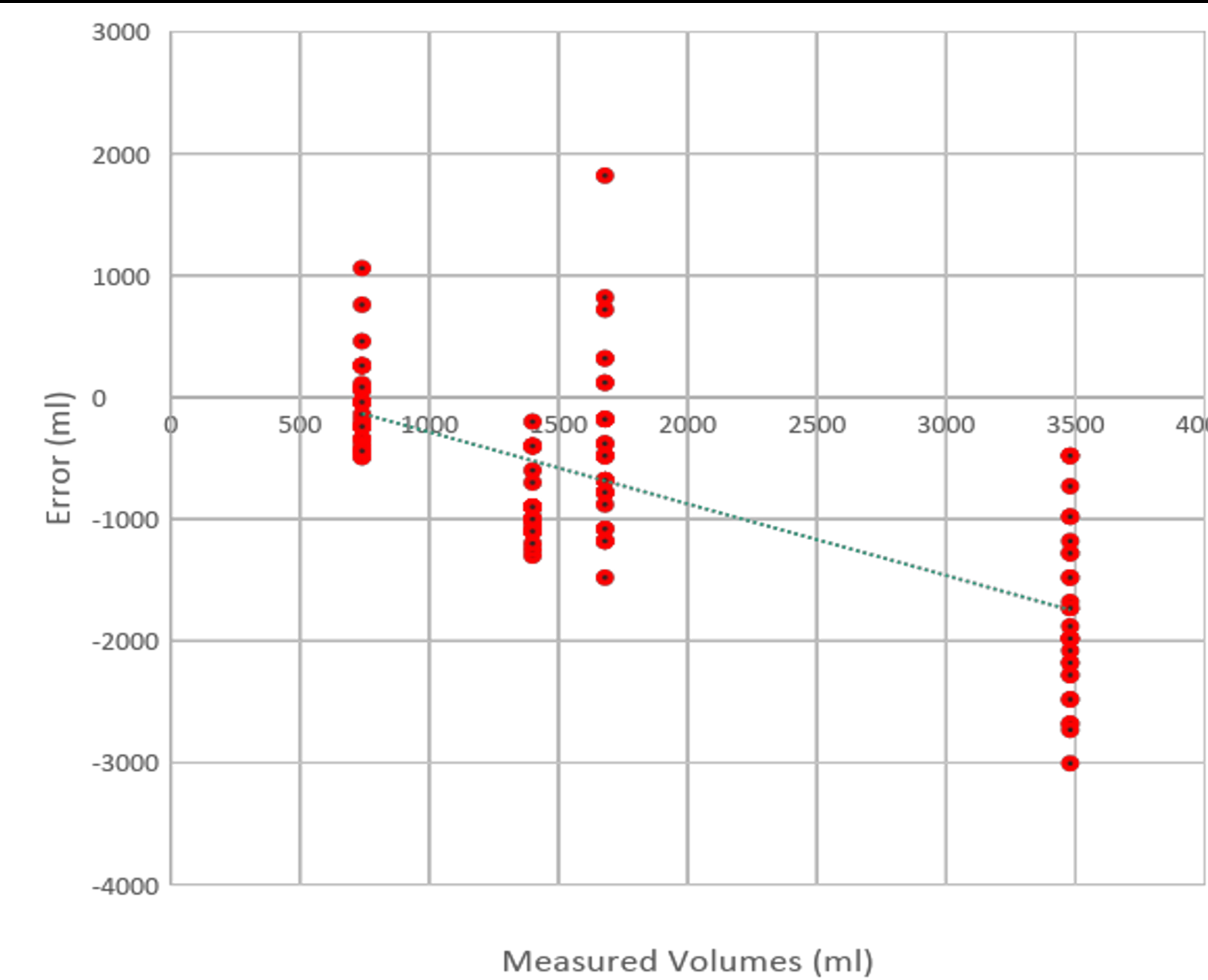


Figure 2. Bland-Altman plot of measured volume (ml) vs error (ml)

Scenario	Measured Volume (ml)	Mean Difference (95% C.I) (ml)	% Error (±SD)
A	1400	-883 (-779, -987)	63 (20)
B	3480	-1760 (-1496, -2025)	51 (20)
C	1680	-387 (-124, -648)	23 (42)
D	740	-54 (85, -193)	7 (51)

Figure 3. Measured volumes and error in estimation

Discussion

Blood loss was not accurately measured through VE in these simulated scenarios. Estimations were most accurate at the lowest volume of known blood loss. Percentage error increased as the known volume of blood loss increased. These findings reflect the inaccuracies described in the literature^[4-6]. Other variables including years of experience and clinical role did not improve the accuracy of VE.

VE tends towards underestimation of blood loss. VE makes early identification and management of PPH more difficult. Allowing PPH to go unrecognised or its severity unappreciated contributes to maternal morbidity and mortality. Accurate reporting of the incidence and severity of PPH could help improve future management and maternal outcomes.

References

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