Visual Obstetric Blood Loss Estimation Exercise – RESULTS.

Introduction

Maternal haemorrhage is the leading cause of preventable maternal death worldwide and encompasses antepartum, intrpartum and postpartum bleeding. (1)
Over 500,000 deaths occur worldwide every year due to pregnancy with an estimated 127,000 due to haemorrhage.(2)
In the UK, major haemorrhage occurs in approximately 3.7 per 1000 births.(3)
Maternal haemorrhage has fallen to being the 6th leading cause of direct maternal death in the UK (mortality rate of 0.39 per 100 000 births). (4)
Uterine blood flow increases from 5-12% of cardiac output during pregnancy (700-900ml/min), hence blood loss can be rapid and difficult to control.(5)
Accurate visual estimation of blood loss is known to facilitate timely resuscitation however it remains inaccurate.(6)

Methods

On Friday 24th January 2014 the London and South East Coast Regional Transfusion Committees (RTCs) joined together to hold a joint education day, "Mums, Babies and Blood". During this day the delegates attending were presented with a "Visual Blood Loss Estimation Exercise" to perform (see Appendix). This consisted of 9 pictures containing images of varying levels of blood loss. The delegates were asked to estimate the level of blood loss in each picture, state their job title on the top of the form and return it to the course organisers at the end of the lunch break for marking and analysis.
The results obtained are detailed in table 1 below and were fed back to the delegates at the end of the last session.
A small margin of error was allowed (10%) for each answer where the delegate would have been marked as having given a correct answer as long at it was within the range specified.

Results

Out of over 200 delegates attending the education day, only 59 forms were returned for marking. Delegates were asked to indicate their staff group at the top of the form. The breakdown of staff completing the exercise was as follows:
33 x Midwives
8 x Transfusion Practitioners
3 x Doctors (1 Consultant Haematologist, 1 Anaesthetist, 1 SpR)
2 x BMS
13 job title unknown (section on form not completed)

Table 1 – Breakdown of results obtained for each picture in the exercise

Picture Number	Correct Answer (Range accepted)	Average Answer (Range given)	No of delegates answering correctly	Staff groups answering correctly	Range of correct answers given
1	500ml (450-550)	578ml (250-1500)	20	9 x midwife 1 x BMS 4 x TP 1 x SpR 5 x unknown	450-500ml
2	250ml (225-275)	243ml (20-750)	3 *	1 x Midwife 1 x BMS 1 X Unknown	250ml
3	1800ml (1620-1980)	1496ml (375-3500)	0	n/a	n/a
4	30ml (27-33)	81ml (4.5-900)	2 **	1 x Cons Haem 1 x Midwife	30ml
5	30ml (27-33)	105ml (10-400)	3	1 x BMS 1 x TP 1 x Midwife	30ml

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6	1000ml (900-1100)	840ml (50-2000)	19 ***	11 x Midwives 4 x TPs 1 x BMS 3 x Unknown	1000ml
7	100ml (90-110)	200ml (25-1000)	10	6 x Midwives 1 x TP 1 x BMS 2 x Unknown	100ml
8	500ml (450-550)	342ml (30-1500)	6	4 x Midwives 2 x TPs	450-500ml
9	300ml (270-330)	255ml (20-900)	7	5 x Midwives 2 x Unknown	300ml

* 2 delegates chose not to answer this question
** 1 delegate chose not to answer this question
*** 1 delegate chose not to answer this question

The highest mark scored by a delegate was 4 correct answers out of 9. This was achieved by only 3 delegates (1 x BMS, 1 x TP and 1 x Midwife).
The breakdown of scores achieved is detailed in table 2 below.

Table 2 – Breakdown of correct answers obtained

Correct Answers Given	Number of delegates achieving correct answers	Staff groups achieving correct answers
0/9	15	8 x Midwives 2 x TP 1 x Anaes 4 x Unknown
1/9	26	1 x BMS 15 x Midwives 3 x TPs 1 x Cons Haem 1 x SpR 5 x Unknown
2/9	13	9 x Midwives 1 x TP 3 x Unknown
3/9	2	1 x TP 1 x Unknown
4/9	3	1 x BMS 1 x Midwife 1 x TP
5/9	0	n/a
6/9	0	n/a
7/9	0	n/a
8/9	0	n/a
9/9	0	n/a

The Royal College of Obstetrics and Gynaecologists (RCOG) classifies blood loss into minor blood loss (500-1000ml), moderate blood loss (1000-2000ml) and severe blood loss (>2000ml). [7]
This exercise did not contain any images were the blood loss was greater than 2000ml and so for the purposes of this exercises analysis the 9 images used were classified as either minor (<500ml), or major (>500ml) blood loss. The rationale for analysing the answers given in this way was to determine if blood loss is under or over estimated and if the quantity of blood loss involved has any bearing on the estimation. Table 3 below shows the breakdown for each image.

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Table 3 –Blood loss classification and breakdown of under/over estimation by the delegates

Picture number	Blood Loss Classification	% of delegates under estimating the blood loss	% of delegates over estimating the blood loss
1	Minor	32% (19/59)	34% (20/59)
2	Minor	59% (35/59)	32% (19/59)
3	Major	59% (35/59)	41% (24/59)
4	Minor	19% (11/59)	76% (45/59)
5	Minor	8% (5/59)	88% (51/59)
6	Major	49% (29/59)	17% (10/59)
7	Minor	12% (7/59)	72% (42/59)
8	Minor	72% (42/59)	19% (11/59)
9	Minor	56% (33/59)	32% (19/59)

The results in table 3 show us that in 5 out of 9 cases the majority of delegates under estimated the level of blood loss shown in the image.

Conclusions

It must be acknowledged that estimating any obstetric blood loss from an image on a piece of paper has its limitations. However these exercises have previously been shown to be a useful way of establishing the ability of certain staff groups, particularly those clinically active in the field of obstetrics (e.g. midwives and doctors), to recognise different levels of blood loss. [6]

It must also be acknowledged that due to the small number of delegates completing the exercise (<30%) the sample size for analysis is small on this occasion.

The level of blood loss shown in the images was only over estimated when this had been classified as a minor blood loss (i.e. <500ml). This could potentially result in an inappropriate blood transfusion being prescribed and administered.

Both images of major blood loss (i.e. >1000ml) were under estimated by the majority of delegates that completed the exercise. Some of these under estimates were as little as 375ml for an image that depicted a 1800ml loss and 50ml for an image that depicted a 1000ml. This is potentially very worrying as an inability to recognise major blood loss in this clinical scenario could result in delayed activation of a hospitals' major obstetric haemorrhage (MOH) protocol which could have serious implications for both mother and baby.

It is important that all clinical staff involved in the care of pregnant women are able to accurately assess the level of blood loss and are aware of their own hospitals MOH protocol in order to activate it at the earliest opportunity in order to prevent any major morbidity or even mortality for either mother or baby.

Further Work

There is clearly an element of learning that can be taken from this exercise and so naturally the results will be shared with others that may benefit, this will be done by:

- Sharing the report online with the delegates that attended the education day and with the South East region as a whole.
- Sharing the report with the National PBMP team for dissemination and learning nationally.
- Asking TPs and delegates to share with colleagues with working in obstetrics.
- Development of a poster to be displayed at national conferences to support visual blood loss estimation exercises.

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References

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5. Badve and Vallejo
Principles of Obstetric Anaesthesia
http://www.pitt.edu/~mvallejo/files/OB_AnesPrinciples.pdf

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Improving the accuracy of estimated blood loss at obstetric haemorrhage using clinical reconstructions.
Br J Obstetics and Gynaecology 2006; 113(8):919-924

7. Royal College of Obstetrics and Gynaecologists
Green Top Guideline 52, 2009
Prevention and Management of Postpartum Haemorrhage

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Appendix

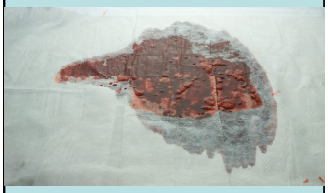
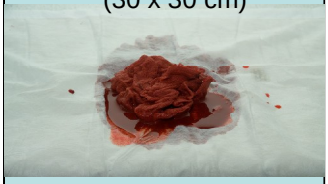
Mums, Babies and Blood
Job Title_____
Complete this blood loss estimation exercise and **hand it into organisers by the end of lunch**. Results will be presented at the end of the day.
This resource will be available for you after the event.

Visual Obstetric Blood Loss Estimation Exercise

Major post partum haemorrhage (PPH) is defined as a blood loss of >1000ml postpartum.
Major PPH should prompt a full protocol of measures to achieve resuscitation and haemostasis.[1]

Visual blood loss estimation often underestimates blood loss. RCOG Green top Guideline no.52 states that written and pictorial guidelines may help staff working in labour wards to estimate blood loss.[1]

Guess the blood loss (mls) in the photos below.

Receiver	Spill on incontinence sheet	Spill on bed and floor
		
Saturated gauze swab (7.5x10cm)	Soiled maternity pad	Blood on bed
		
Saturated sanitary pad	Floor spill (136 x 30 cm)	Saturated large swab (30 x 30 cm)
		

Accurate visual estimation of blood loss is known to facilitate timely resuscitation, minimising the risk of disseminated intravascular coagulation and reducing the severity of haemorrhagic shock.[2]

References: 1) Royal College of Obstetric and and Gynaecologists. 2009 Green-top Guideline No.52

2) Bose P, Regan F, Paterson-Brown S. Improving the accuracy of estimated blood loss at obstetric haemorrhage using clinical reconstructions. BJOG 2006; 113:919–924.

Photo content provided with thanks from the Better Blood Transfusion Team Wales

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