# Management of Obstetric Haemorrhage (or the 500ml/minute challenge)

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# **Obstetric Haemorrhage in Context**

- It is a leading cause of maternal mortality world wide accounting for up to 50% of deaths.
- The United Nations Millennial Development Goal MDG5 was to reduce maternal mortality by 75% by 2015.
- Targets for improvement were the numbers of unattended births and matching women with an increased of risk of haemorrhage with appropriate birth location.
- The target level has not been reached but a significant reduction from a maternal mortality ratio of 330/100 000 maternities in 2000 to 210/100 000 in 2013.

### UK Perspective – the size of the problem.

Defining obstetric haemorrhage as >500mls lost at vaginal delivery and >1000mls lost at c. section **the rate has doubled** from 2007 to 2012 to affect now **13%** of maternities.

6/1000 of maternities met the definition of severe obstetric haemorrhage in the Scottish Confidential Audit of Maternal Morbidity in 2012 (>2500mls blood loss/ 5 or more units of RBC/ or treatment for coagulopathy).

1/140 pregnancies in this audit suffered **severe morbidity** and haemorrhage was the cause in **80%**.

Maternal, Newborn and Infant Clinical Outcome Review Programme



#### Saving Lives, Improving Mothers' Care

Lessons learned to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-2012



# Direct deaths 2000-2012 per 100,000 maternities

	2000-2	2003-5	2006-8	2009-11	2010-12
VTE	1.5	1.94	0.79	1.26	1.08
PET/Eclampsia	0.70	0.85	0.83	0.42	0.38
Sepsis	0.65	0.85	1.13	0.63	0.50
Haemorrhage	0.85	0.66	0.39	0.59	0.46
Early pregnancy	0.75	0.66	0.48	0.17	0.33
AFE	0.25	0.80	0.57	0.29	0.33
Other	0.70	0.47	0.48	0.12	0.17

**Overall rate 2009-2012 = 0.49/100,000 (95% CI 0.29 – 0.78)** *i.e. no statistically significant difference* 

A case fatality rate of approximately 1 per 1200 women with MOH

(assuming an estimated rate of MOH of 6 per 1000<sup>1</sup>)

1 Lennox and Marr 2013



- 17 women died 2009-2012 from obstetric haemorrhage
- 7 deaths from uterine atony
- 7 deaths from genital tract trauma
- 1 death from placenta praevia and 2 deaths from placental abruption.
- Low body weight women were overrepresented and 2/17 were Jehovah's Witnesses

## Care could have been improved in all cases

### **1. Anticipation and avoidance strategies:**

- Antenatally: Follow up abnormal blood results, treat antenatal anaemia
- Intra/post partum: anticipate problems

"An anaemic small woman had a CS after prolonged labour losing 1000mls. No blood was ordered and no prophylactic uterotonics were given. She then bled 2500mls postpartum due to atony. She was resuscitated with 8L of crystalloid and 2L of colloid before blood was available"



# Care could have been improved in all cases

- 2. Earlier recognition of the severity of the problem:
- record and communicate blood loss clearly
- assess blood loss as proportion of the patient's blood volume - Small women have small blood volumes
- assess the impact of the blood loss on the patient by diligent and complete MEOWS scoring



# Key learning points from the Haemorrhage deaths:

- Treat antenatal anaemia.
- Avoid hyperstimulation of the uterus (risk factor for uterine atony and uterine rupture)
- An early Hb measurement in the evolution of a haemorrhage may be normal, do not delay resuscitation on the basis of this result.
- Signs of shock late in the young and fit, paradoxical bradycardia can be present rather than tachycardia.
- Give coagulation support in ongoing bleeding before coagulation indices are abnormal.
- Early recourse to hysterectomy if other medical and surgical options are not working (especially if no blood or refuse blood).

### Conclusion from Haemorrhage chapter:

 "Obstetric Haemorrhage is common and familiar to all obstetricians, anaesthetists and midwives who have to manage it on a regular and frequent basis. This should not make us casual in our vigilance to recognise and respond to it. We must continue to scrutinise the care of women who have this complication to identify failings in systems processes or individuals in order to learn from them and avoid deaths such as these reviewed here which may have been preventable."



# ost-Partum Haemorrhage (PPH)





### **PPH Prevention Bundle**

- The PPH prevention bundle consists of 6 elements:
- 1. Documented antenatal risk assessment and management plan
- 2. Recognition and treatment of antenatal anaemia
- Documented reassessment of PPH risk at admission for delivery and during the 2<sup>nd</sup> and 3<sup>rd</sup> stages of labour
- 4. Active management of 3rd stage
- 5. Ongoing quantitative assessment of blood loss
- 6. Ongoing evaluation of vital signs





### **PPH Management Bundle**

- The PPH management bundle consists of 5 elements:
- 1. Ongoing quantitative assessment of blood loss
- 2. Ongoing evaluation of vital signs
- 3. Assessment and documentation of cause of bleeding
- 4. Communication and escalation to appropriate staff
- 5. Administration of uterotonics in a staged approach



### Total severe PPH rate for 11 of 17 units which have reported consistently from Oct '13 to Apr '16



# New Guidance and Targeted Research:

At present the guidelines for the haemostatic management of obstetric haemorrhage are largely extrapolated from major trauma and the underpinning research has been lacking.

### Areas for focus:

- There is evidence now that haemostatic impairment in the pregnancy population is different from trauma induced bleeding and that 1:1:1 not appropriate.
- The cause of the obstetric bleeding determines the haemostatic problem.
- Treatment of relative hypofibrinogenaemia In PPH very important as more morbidity once fibrinogen<2.</li>
- Point of care testing. and Goal Directed Therapy to correct coagulopathy, what should the **thresholds** be?

Anaesthesia 2015, 70 (Suppl. 1), 78-86

doi:10.1111/anae.12913

### Review Article

#### Haemostatic management of obstetric haemorrhage

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# Issues with standard tests of coagulation and pregnancy physiology:

- Because pregnancy is a prothrombotc state conventional coagulation studies (PT/aPTT) remain normal despite large blood loss (>5000mls).
- However the fibrinogen level falls progressively with increasing loss and therefore reaches critically low levels earlier than other coagulation factors.
- Waiting until suggested RCOG guideline thresholds of PT/aPTT of >1.5 normal and fibrinogen <1 is too late.

# Hypofibrinogenaemia

• Charbit et al

Women recruited at the time of a second line uterotonic for resistant atony , fibrinogen of <2 had a positive predictive value for progression to severe PPH.

• Gayat et al

Fibrinogen <2 at 4 hours into a PPH was an independent predictor of need for an invasive procedure such as internal iliac art ligation/hysterectomy.

• Poujade et al

Found fibrinogen an independent predictor of successful arterial embolization. Mean fib in successful group 2.89, and 1.79 in the unsuccessful group.

• There is good evidence the ROTEM Fibtem assay can be used as a surrogate for Clauss fibrinogen in PPH.

# Why the Cause of the Obstetric haemorrhage is important:

• Large blood loss but lack of a significant coagulopathy with uterine atony, genital tract trauma, surgical trauma. If bleeding not controlled dilutional coagulopathy will ensue with fluid resuscitation affecting clot strength.

V

 Placental abruption where there is rapid consumption of coagulation factors localised to the placental bed characterised by hypofibrinogenaemia and thrombocytopaenia despite initial low blood loss.

### AND

 Amniotic Fluid Embolism – rare but severe and rapid disseminated IC.(Can include some cases of pre eclampsia/HELLP)

### Argument against "shock packs" in obstetrics:

- FFP will have the lower fibrinogen, Von Willebrand factor and factor VIII level of non pregnant donors leading to dilution of these factors.
- Early FFP a good idea if consumptive cause (abruption/AFE) or where torrential blood loss expected (Pl accrete/uterine rupture).
- This paper showed that platelets rarely fall below 75 during obstetric haemorrhage unless being consumed/there is an inherited or immune thrombocytopaenia.

Anaesthesia 2016, 71, 648-656

doi:10.1111/anae.13448

### Original Article

Platelet count and transfusion requirements during moderate or severe postpartum haemorrhage\*

R. M. Jones,<sup>1</sup> L. de Lloyd,<sup>2</sup> E. J. Kealaher,<sup>3</sup> G. J. Lilley,<sup>2</sup> E. Precious,<sup>4</sup> D. Burckett st Laurent,<sup>1</sup> V. Hamlyn,<sup>1</sup> R. E. Collis,<sup>2</sup> P. W. Collins<sup>5</sup> and collaborators<sup>#</sup>

### AAGBI transfusion guidelines for Obstetrics 2016:

- If coagulation tests are not known then FFP should be withheld until 4 units of RCC have been given.
- If no coagulation results are available and bleeding is ongoing then give 4 units FFP after 4 units of RCC and a 1:1 RCC-FFP transfusion ratio maintained until results are known,
- Fibrinogen replacement with cryoprecipitate or fibrinogen concentrate should be considered in on going bleeding when the fibrinogen is <3 and especially <2.
- POC testing recommended
- Platelet transfusions rarely required
- Give tranexamic acid 1g after 500ml loss at vaginal delivery and 1000ml at C.section.

Anaesthesia 2016, 71, 829-842

doi:10.1111/anae.13489

### Guidelines

AAGBI guidelines: the use of blood components and their alternatives 2016

A. A. Klein,<sup>1</sup> P. Arnold,<sup>2</sup> R. M. Bingham,<sup>3</sup> K. Brohi,<sup>4</sup> R. Clark,<sup>5</sup> R. Collis,<sup>6</sup> R. Gill,<sup>7</sup> W. McSporran,<sup>8</sup> P. Moor,<sup>9</sup> R. Rao Baikady,<sup>10</sup> T. Richards,<sup>11</sup> S. Shinde,<sup>12</sup> S. Stanworth<sup>13</sup> and T. S. Walsh<sup>14</sup>

### **Tranexamic Acid**

- Reduces bleeding by inhibiting the enzymatic breakdown of fibrin clots.
- Awaiting results of the World Maternal Antifibrinolytic trial which is examining if the early administration of tranexamic acid in PPH reduces mortality, hysterectomy or morbidity.
- 20,000 women, 20 countries, an international randomised double blind placebo controlled trial.
- Limitation will be that at recruitment the women will likely have normal coagulation and therefore can the results be translated to severe PPH.



# Trials of Fibrinogen concentrate

- Best trial to date Wikkelso et al showed no benefit in reducing RBC transfusion with fibrinogen concentrate. But limited by being given at 1500ml blood loss, no measurement of fibrinogen levels, a fixed dose and only 2.2% of participants had a fibrinogen <2.</li>
- Trials to investigate the fibrinogen level that should act as a *trigger* to fibrinogen concentrate replacement and a therapeutic *target* level underway.

British Journal of Anaesthesia 114 (4): 548–50 (2015) Advance Access publication 3 March 2015 · doi:10.1093/bja/aev033

### Fibrinogen concentrates for post-partum haemorrhage? Do not miss the most relevant population!

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STUDY PROTOCOL OPEN ACCESS

#### Fibrinogen concentrate versus placebo for treatment of postpartum haemorrhage: study protocol for a randomised controlled trial

Nadine Aawar 📼 , Raza Alikhan, Daniel Bruynseels, Rebecca Cannings-John, Rachel Collis, John Dick, Christopher Elton, Roshan Fernando, Judith Hall, Kerry Hood, Nicki Lack, Shuba Mallaiah, Helena Maybury, Jacqueline Nuttall, Shantini Paranjothy, Rachel Rayment, Alexandra Rees, Julia Sanders, Julia Townson, Andrew Weeks and Peter Collins

 Trials
 2015
 16:169
 DOI: 10.1186/s13063-015-0670-9
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 15 July 2014
 Accepted: 24 March 2015
 Published: 17 April 2015

### Cell Salvage in Obstetrics new guidance:

• NICE 2015:

"Consider intraoperative cell salvage with tranexamic acid for patients who are expected to loose a high volume of blood for example major obstetric procedures"

#### AAGBI 2016:

"Cell salvage is recommended once >1000ml blood loss at c.section and a leucocyte filter should be used for the autotransfusion of processed blood."



Home > NICE Guidance > Conditions and diseases > Injuries, accidents and wounds > Injuries, accidents and wounds: general and other

Blood transfusion

NICE guideline [NG24] Published date: November 2015



### Cell salvage Research in Obstetrics

- A randomised controlled multicentre trial of intraoperative cell salvage during C. section in women at risk of haemorrhage.
- Primary objective: If routine IOCS at C.section in women at risk of haemorrhage reduces the need for donor blood transfusion.
- Secondary objectives: the number of donor units transfused, mean fall in Hb, morbidity from anaemia (time to first mobilisation, duration of hospital stay, fatigue inventory). Also is it cost effective compared to current practice?



### Publication of results Spring 2017

•3054 randomised across 23 UK maternity units.

- •Large database obtained as a result of the trial of abnormal placentation.
- •Lessons learned about recruiting women in labour which will inform future methodology/powerful network established.
- •Results awaiting peer review and economic analysis.

### The real world

#### MAJOR OBSTETRIC HAEMORRHAGE : AIDE MEMOIRE

	Time #1	Time #2	Time #3
MOH CALL? Pls circle: Yes/No			
IT Yes, when			
And by whom			
Vea/No			
I CS/NO If yes, when			
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# • "The position of women in any civilisation is an index of the advancement of that civilisation: The position of women is best gauged by the care given at the birth of her child" *Haggard 1929*