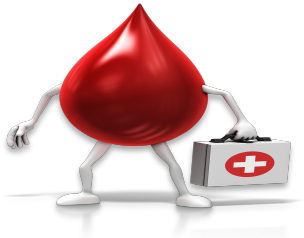
Massive obstetric haemorrhage

Nuala Lucas

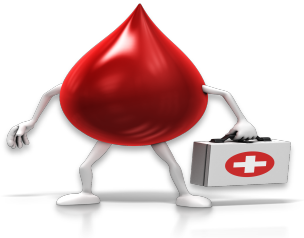
Epidemiology



Essentials of management

Anything new?

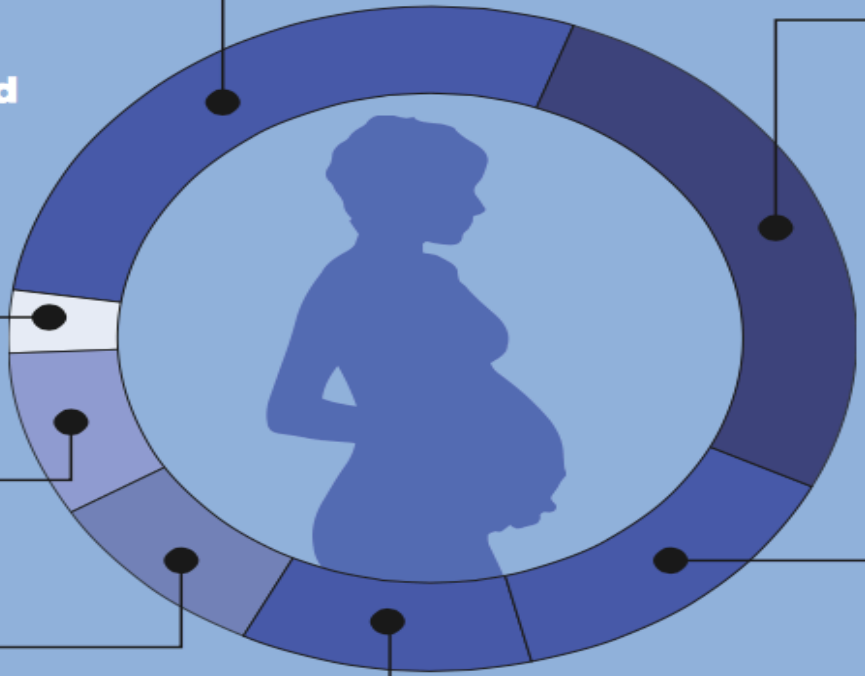
Epidemiology



Essentials of management

Anything new?

WHAT ARE PREGNANT WOMEN **DYING** FROM?



28%
Pre-existing medical conditions exacerbated by pregnancy (such as diabetes, malaria, HIV, obesity)

3%
Blood clots

8%
Abortion complications

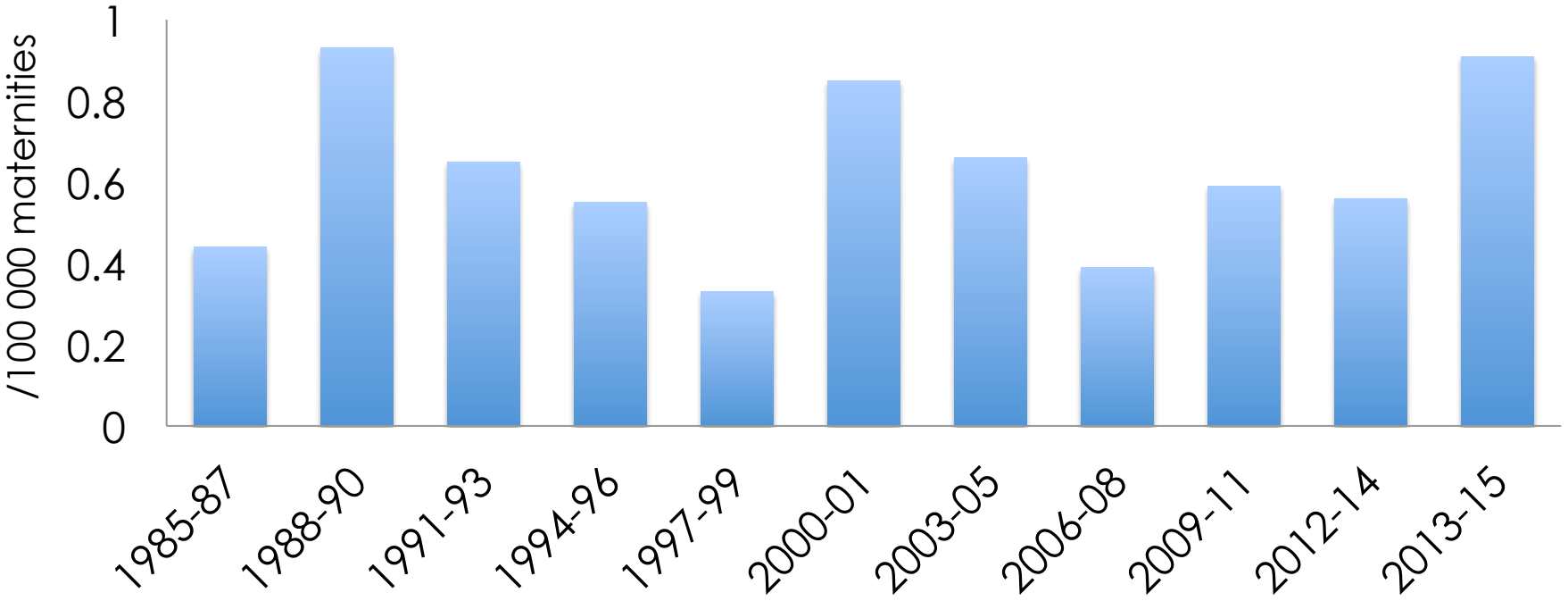
9%
Obstructed labour and other direct causes

27%
Severe bleeding

14%
Pregnancy-induced high blood pressure

11%
Infections (mostly after childbirth)

MBRRACE-UK – maternal death rate due to haemorrhage



Morbidity

- Recorded incidence of postpartum haemorrhage has nearly doubled from 7% of all maternities in 2005 to 13% in 2013

- Some regions report even greater increases
  - *massive PPH (>2000 mls) twice per year ➔ once a fortnight*

Quinn, AJOG, 2014

Morbidity

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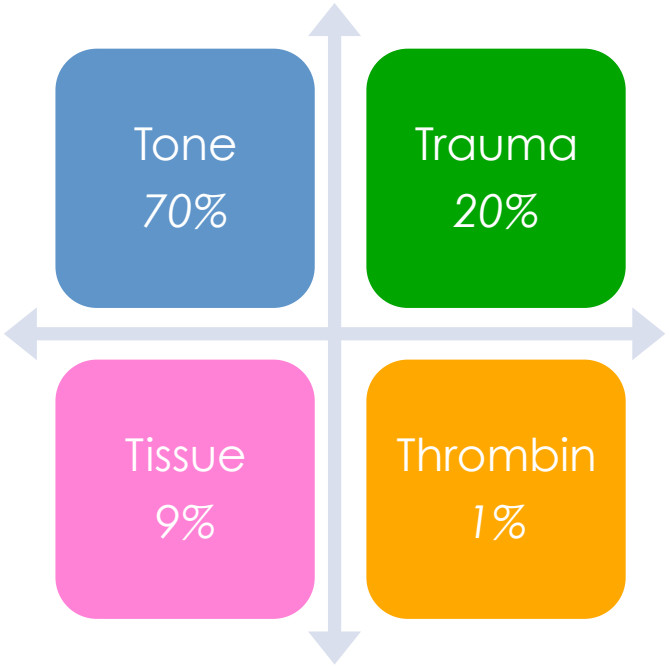
- Some regions report even greater increases
  - *massive PPH (>2000 mls) twice per year ➔ once a fortnight*

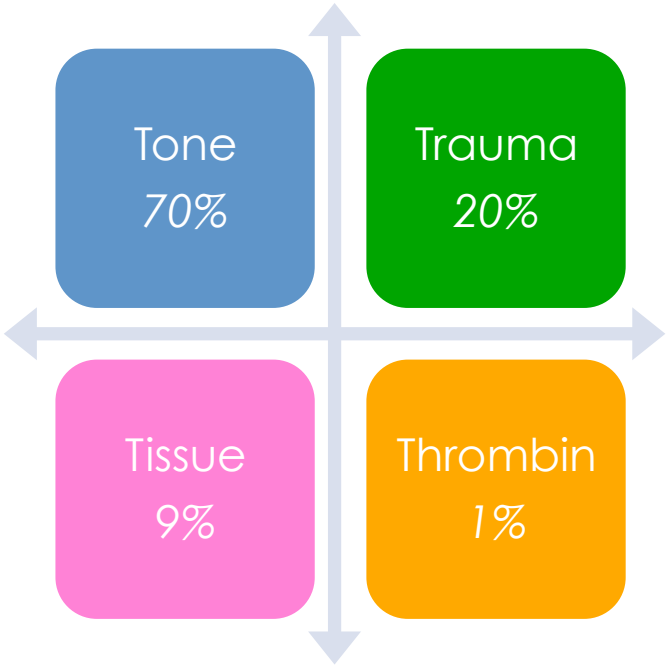
- Not only have PPH rates increased dramatically but they appear to be less predictable and unrelated to traditional risk factors

Quinn, AJOG, 2014

Causes of obstetric haemorrhage



Causes of obstetric haemorrhage



Massive PPH in UK

- 3% followed uncomplicated vaginal delivery
- 69% followed CS
- Atony accounted for only 40%

Green, 2015

Stemming the global caesarean section epidemic

The major rise in caesarean sections around the world is called unprecedented and unjustified in a new *Lancet* Series on optimising caesarean section use published today.

When medically indicated, such as in placenta preavia, fetal distress, or abnormal positioning, caesarean sections save the lives of women and babies. Underuse due to lack of access clearly exists in some areas, and is associated with maternal and perinatal harms. But overuse and its implications are now of growing concern. Population rates above 10–15% are considered excessive. Women who do not need a caesarean section and their infants can be harmed or die from the procedure, especially when done in the absence of adequate facilities, skills, and comprehensive health care.

The Series shows that the global rate of caesarean birth has doubled in the past 15 years to 21%, and is increasing annually by 4%. While in southern Africa use of caesarean section is less than 5%, the rate is almost 60% in some parts of Latin America, including in Brazil where we will launch the *Lancet* Series at the World Congress of Gynecology and Obstetrics (FIGO) on Oct 18. Of the 6·2 million unnecessary caesareans done each year, half are in Brazil and China. The wide

Provider-side interventions will be crucial. The WHO guidance recommends mandatory second opinions for caesarean section indication, as well as audits and feedback loops within facilities. Financial strategies that remunerate equally for vaginal births and caesarean sections are also recommended. The guidance acknowledges barriers to evidence-based practice: cultures of medicine shifting toward surgical intervention, risk of litigation, the financial incentives of performing caesarean sections, and the convenience of scheduled deliveries. As the Series notes, young doctors are regrettably now more equipped and confident with the skills for surgical delivery than they are with managing vaginal births. Clearly, providers must also become better equipped and confident to have meaningful, evidence-based, and supportive discussions with women about their birth options and concerns.

To facilitate this better communication and women-centred care, the best recommendation in the new WHO guidance is the collaborative midwifery-obstetrician model whereby care is provided primarily by midwives. The Series shows midwifery care to be associated with more vaginal births, safer outcomes, positive maternal experiences, and lower costs, and an accompanying

Lianne Milton/Panos Pictures

Lancet, 2018

THE LANCET

Appropriate use of caesarean section globally requires a different approach

- Sub-Saharan Africa, too few; in North America, too many

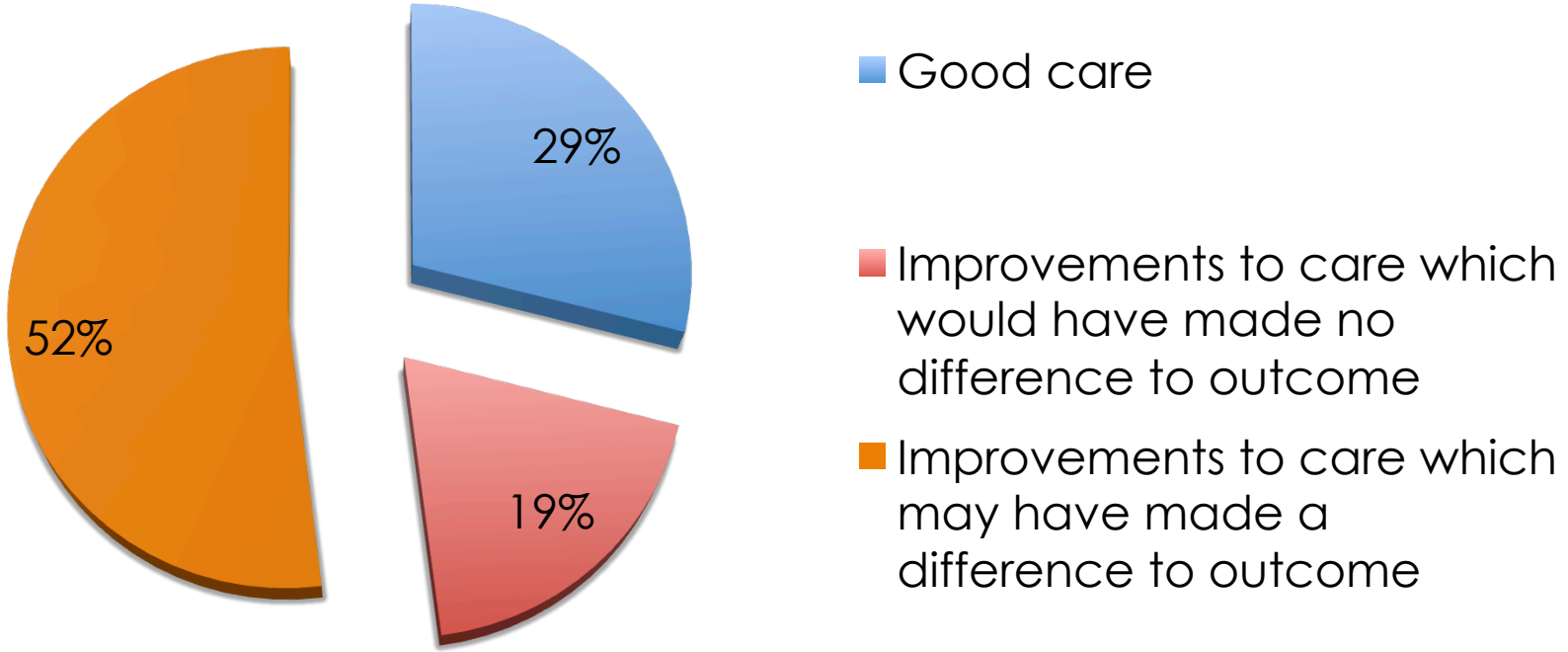
THE LANCET

Appropriate use of caesarean section globally requires a different approach

Oct, 2018

- FIGO Position Paper on stopping epidemic of CS
  - Matching costs for CS and vaginal birth (using a mean fee)
  - Ensuring hospitals publish their annual C-section rates
  - For very low income countries ensuring adequate access to skilled care, appropriate fetal surveillance and assisted births or operative delivery
- WHO nonclinical intervention to lower CS rates
  - Educational interventions for women and families to support meaningful dialogue with providers and informed decision-making on mode of delivery
- Lancet editorial
  - Involve midwives more

Maternal deaths due to ‘supoptimal care’ UK



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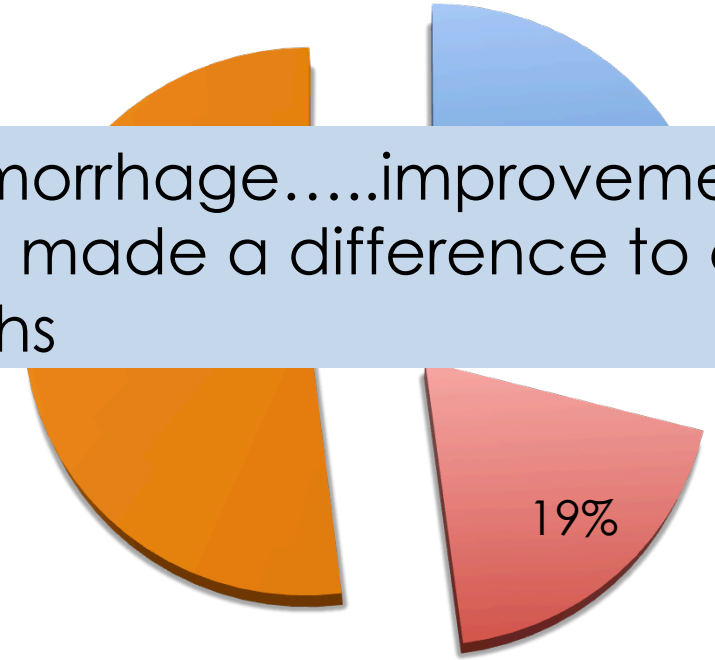

Good care

ch

difference to outcome

Improvements to care which may have made a difference to outcome

Haemorrhage…..improvements to care which may have made a difference to care were noted in ALL deaths

Case 1

An anaemic woman had a CS after a very prolonged labour. She was of small stature and lost almost 1000mls. No blood was ordered. Three hours later when she then bled 2500mls vaginally from an atonic uterus she was initially resuscitated with fluids, receiving 8L of crystalloid and 2L of colloid before blood was available for her. She developed pulmonary oedema and was transferred to ITU where she died from ARDS, sepsis and multi-organ failure

Case 1

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Failure to recognise extent of haemorrhage

Failure to recognise effect of weight on BV

Case 2

A woman had a ventouse delivery after the forceps blades had failed to lock. She immediately bled torrentially from vaginal tears and was taken to theatre. The extent of the bleeding in the room (2500ml) was not conveyed to the anaesthetist in theatre. After a further 2500ml of blood loss by the end of the repair in theatre she had only had ONE unit of blood as the anaesthetist had been reassured by a result from an acute point of care haemoglobin measurement which recorded a haemoglobin concentration of 110g/l.

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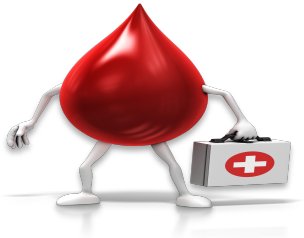
False reassurance from point of care testing

Epidemiology



Essentials of management

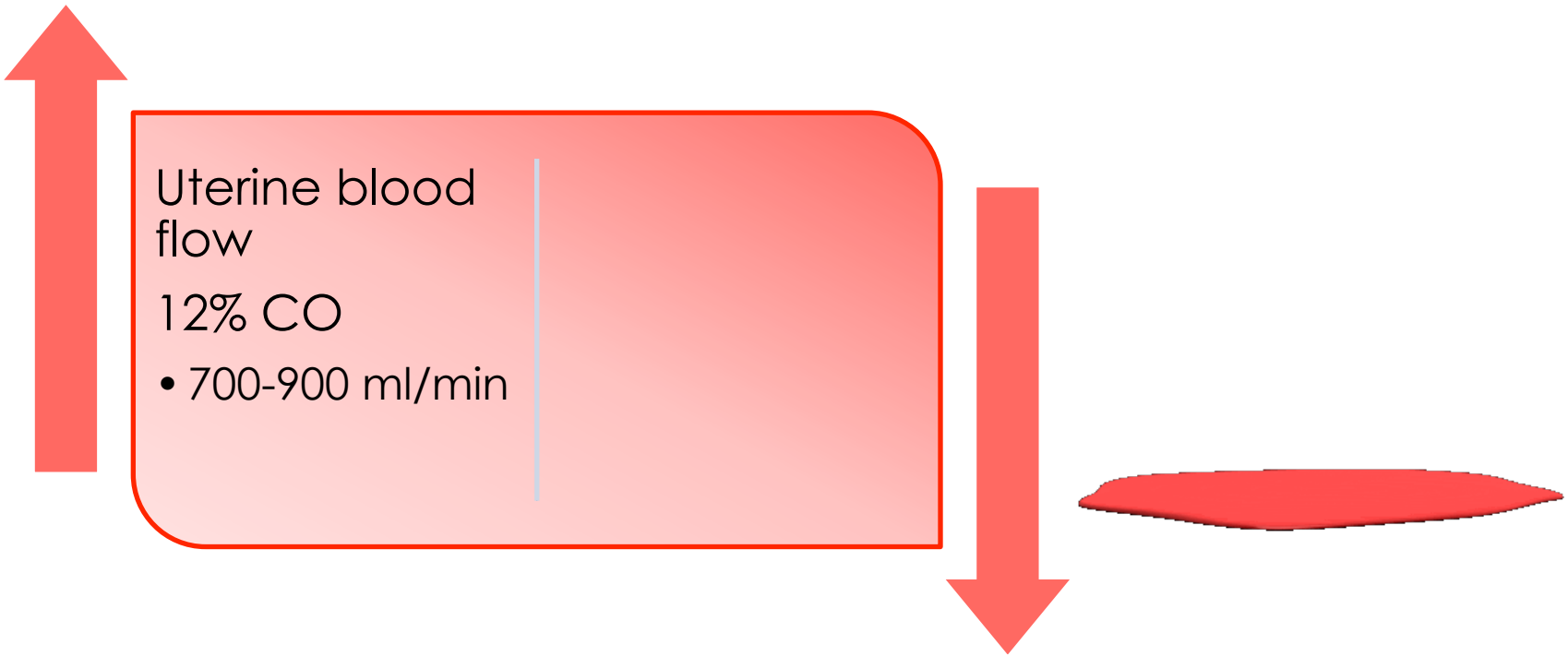
Anything new?

Recognition

Uterine blood flow

12% CO

- 700-900 ml/min



Recognition

Uterine blood flow

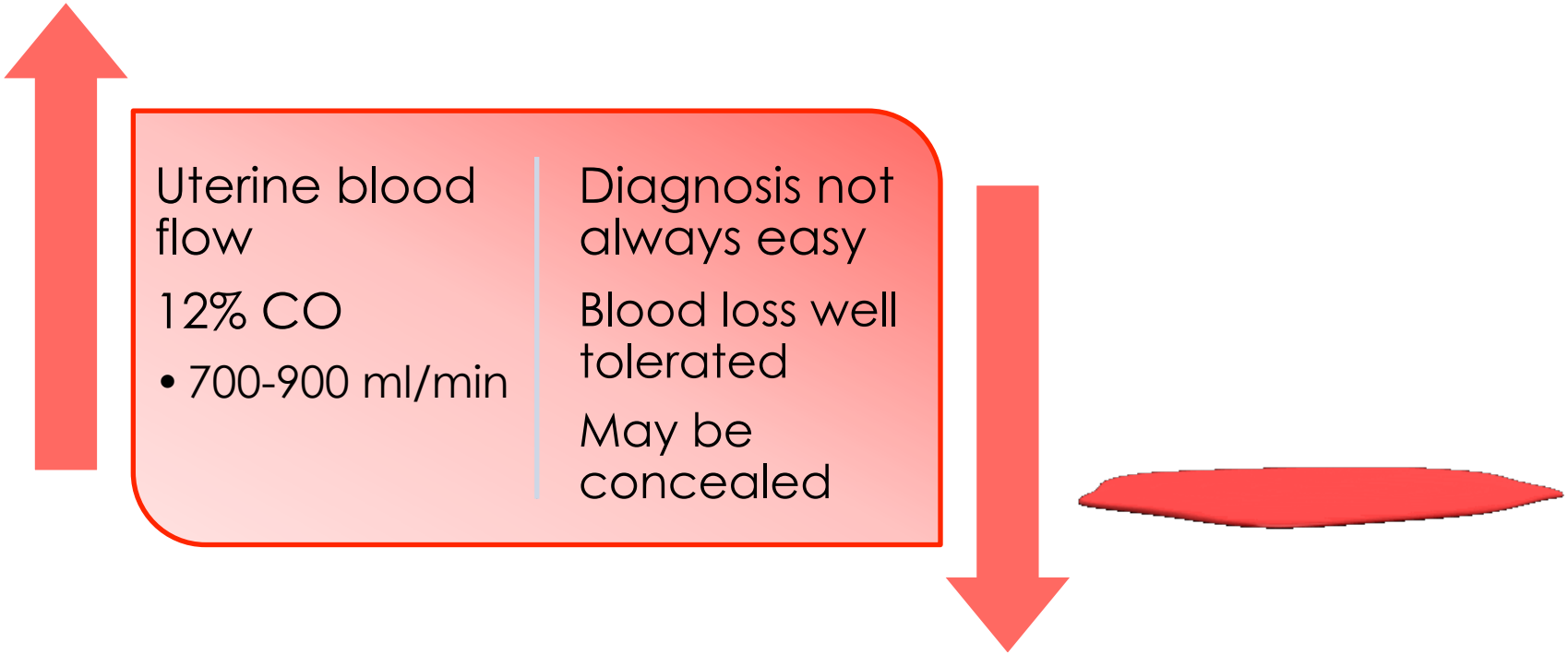
12% CO

- 700-900 ml/min

Diagnosis not always easy

Blood loss well tolerated

May be concealed



Recognition

- Post delivery
  - Heart rate, blood pressure

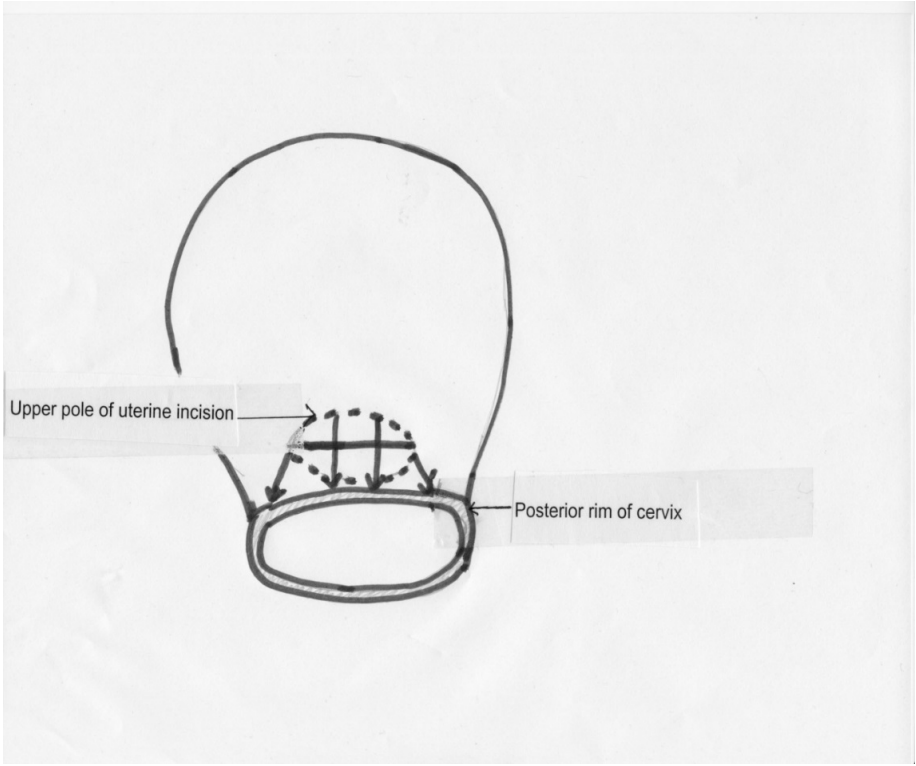
Recognition

- Post delivery
  - Heart rate, blood pressure
  - Fundal height & urine output
  - Low threshold for serial hemocue assessments

Beware the CS at full cervical dilatation

Greater risk of haemorrhage, bladder trauma
Extension tears of uterine angle
Inadequate closure

- upper pole of incision to rim of cervix
- CONCEALED BLEED



Effect of body weight on blood volume

Weight	Total BV	15% BV loss	40% BV loss
50 kg	3500 mls	525 mls	1400 mls
55 kg	3850 mls	577 mls	1540 mls
60 kg	4200 mls	630 mls	1680 mls
65 kg	4550 mls	682 mls	1820 mls
70 kg	4900 mls	1050 mls	1960 mls

“Midwives and doctors underestimate blood loss at delivery by 30 – 50%”

Glover P. Blood loss at delivery: how accurate is your estimation? *Aust J Midwifery* 2003;16:21-4

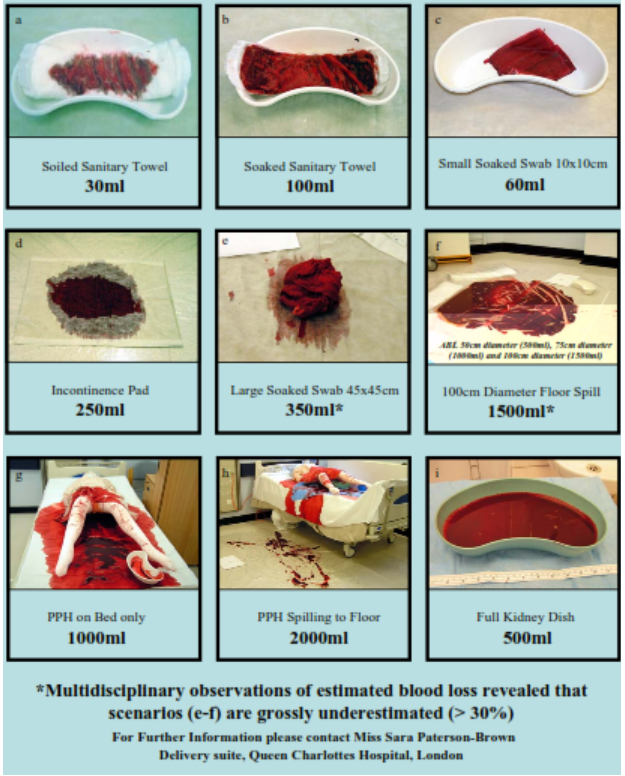
DOI: 10.1111/j.1471-0528.2006.01018.x
www.blackwellpublishing.com/bjog
General o

Improving the accuracy of estimated blood loss at obstetric haemorrhage using clinical reconstructions

P Bose,[a] F Regan,[b] S Paterson-Brown[a]

A Pictorial Reference Guide to Aid Visual Estimation of Blood Loss at Obstetric Haemorrhage: Accurate Visual Assessment is Associated with Fewer Blood Transfusions

Dr Patrick Bose, Dr Fiona Regan, Miss Sara-Paterson Brown



***Multidisciplinary observations of estimated blood loss revealed that scenarios (e-f) are grossly underestimated (> 30%)**

For Further Information please contact Miss Sara Paterson-Brown
Delivery suite, Queen Charlottes Hospital, London

Resuscitation

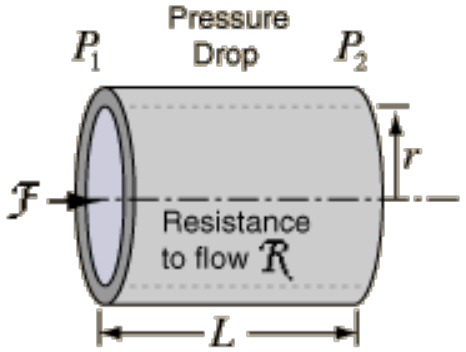
- Timing
- Fluids /blood
- How we give it

Resuscitation

- Timing
  - Call for help early!
  - In early stages of PPH 2^0 to uterine atony delaying care beyond 10 minutes increases risk of severe PPH

Driessen et al, Obstet & Gynecol 2011

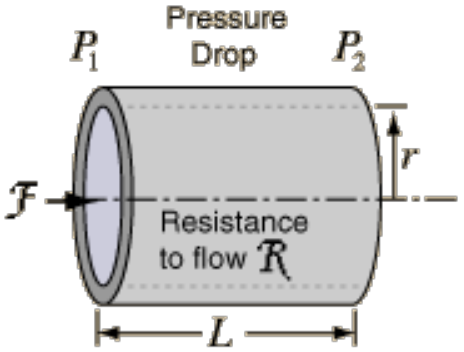
Resuscitation



- How we give it?
- Flow is proprtional to r^4

Cannula	Flow rate L/hr	
	X'lloid	Blood
14G	16.2	10.3
16G	10.8	7.1

Resuscitation



- How we give it?
- Flow is proprtional to r^4

Cannula	Flow rate L/hr	
	X'lloid	Blood
14G		
16G	10.8	7.1

Ensure adequate iv access

Case 3

A woman became hypotensive after a forceps delivery. The trainee anaesthetist was called to assist with additional IV access but was unable to insert a cannula. Fluid resus continued through the single existing large bore cannula and she received 3 litres of crystalloid over the next hour. Her hypotension persisted and a point of care hb measurement recorded a hb of 49g/L. Only at this time was blood ordered, and only one unit of blood was initially given due the woman feeling breathless. Two hours after the anaesthetist first attended, the woman was transferred to theatre for the insertion of a central line. After several failed attempts at CVP access and at the request of the consultant obstetrician the consultant anaesthetist was called to attend. By the time the consultant anaesthetist arrived the woman had already had a cardiac arrest due to hypovolaemia. The woman died from intra-abdominal bleeding secondary to a ruptured uterus.

Intraosseous needles

Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia, 2011, **66**, pages 306–310 doi:10.1111/j.1365-2044.2011.06629.x

CASE REPORT

Resuscitation in massive obstetric haemorrhage using an intraosseous needle*

D. J. Chatterjee,[1] B. Bukunola,[2] T. L. Samuels,[3] L. Induruwage[4] and D. R. Uncles[5]

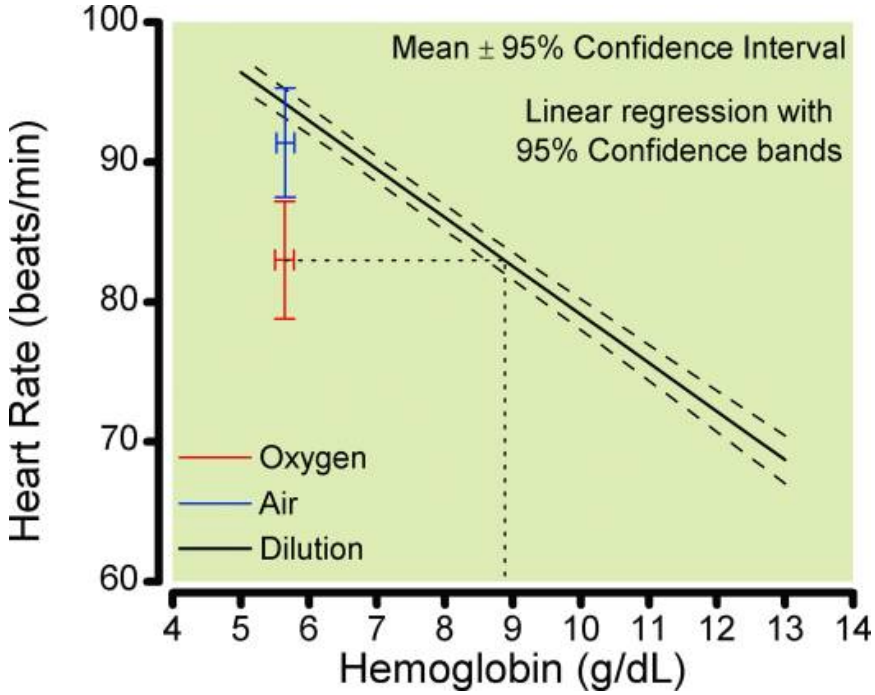
1 Specialist Trainee, 2 Specialty Doctor, 3 Research Registrar, 4 Core Trainee, 5 Consultant, Department of Anaesthesia, Worthing Hospital, Worthing, UK

Summary

A 38-year-old woman experienced a massive postpartum haemorrhage 30 minutes after emergency caesarean delivery. The patient became severely haemodynamically compromised with an unrecordable blood pressure. Rapid fluid resuscitation was limited by the capacity of the intravenous cannula in place at the time and inability to establish additional vascular access using conventional routes in a timely manner. An intraosseous needle was inserted in the proximal humerus at the first attempt and administration of resuscitation fluid by this route subsequently enabled successful placement of further intravenous lines. Blood and blood products were deployed in conjunction with intra-operative cell salvage and transoesophageal Doppler cardiac output monitoring was used to assess adequacy of volume replacement. Haemorrhage control was finally achieved with the use of recombinant factor VIIa and hysterectomy.

Resuscitation

- **Oxygen**



High oxygen partial pressure decreases anemia-induced heart rate increase equivalent to transfusion.
Feiner et al, Anesthesiology 2011

Resuscitation

- How we give it?
- **Maintain temperature**

Effect of hypothermia on the coagulation cascade
Rohrer, Crit Care Med, 1992

	37^0C	34^0C
PT	11.9±.5s	12.8±0.5s
APTT	36±0.7s	39.4±1s

Transfusion strategy

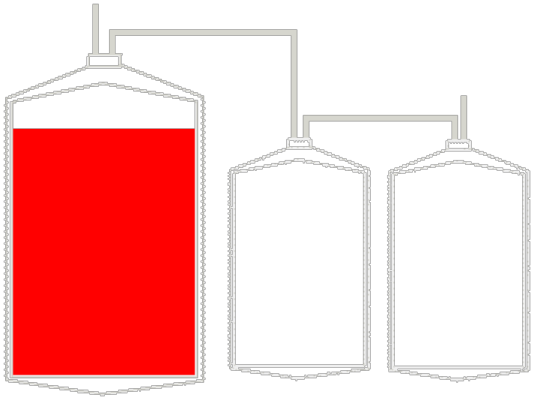
- Data from trauma related haemorrhage indicate that survival is increased for patients who receive warm whole blood compared to those who receive component therapy
- This finding has been echoed with
  - Severe bleeding 2 ruptured AAA

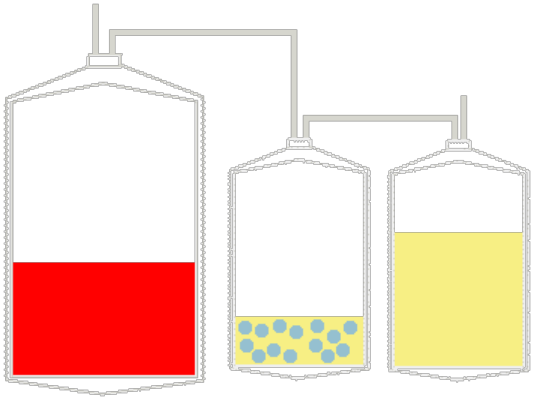
Johansson et al, Transfusion 2007

  - Emergency general surgical patients

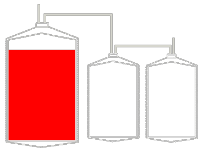
James et al, Transfusion Alternatives in Transfusion Medicine 2008

Whole blood vs component therapy

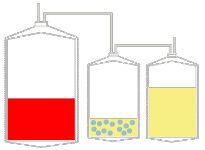




Whole blood vs component therapy

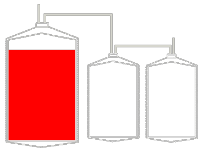


- Haematocrit 38-50%
- Platelets 150-400 K/µL
- Plasma coagulation factors 100%



- Packed red cells - hematocrit 55% (280ml)
- 75 x10^9 platelets (75ml)
- FFP 80% coagulation activity compared with whole blood (275ml)

Whole blood vs component therapy



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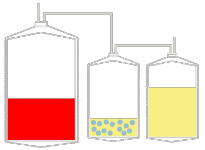

- Packed red cells - hematocrit 55% (280ml)
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1 unit PRC +
1 unit platelets +
1 unit FFP

=

635ml
Hematocrit 24%
Platelets 118k/ul
Coag activity 35%

Stopping the bleeding – treating the cause

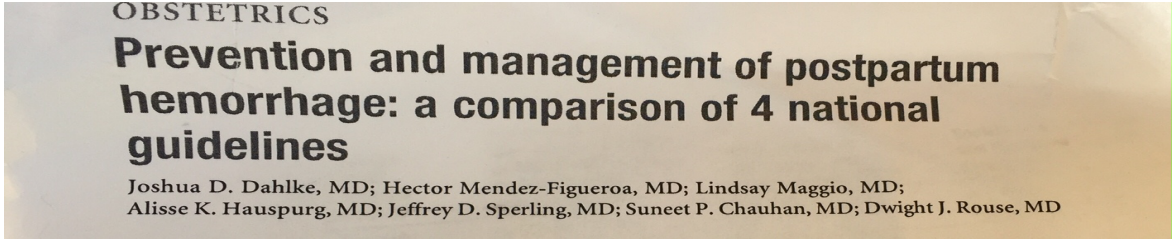
‘Uterotonic ladder’

- Syntocinon
- Ergometrine
- Carboprost
- Misoprostil
- Carbetocin

Problems

Prophylaxis vs management
Randomisation/blinding
Control groups
Outcomes

A consistent approach?


OBSTETRICS

Prevention and management of postpartum hemorrhage: a comparison of 4 national guidelines

Joshua D. Dahlke, MD; Hector Mendez-Figueroa, MD; Lindsay Maggio, MD; Alisse K. Hauspurg, MD; Jeffrey D. Sperling, MD; Suneet P. Chauhan, MD; Dwight J. Rouse, MD

Am J Obs & Gyn, 2015

	ACOG	RANZCOG	RCOG	SOGC
Oxytocin	10-40 U IV 10 U IM	Dose not specified	5 U 40 u /4 hours	10 U IM/5 U IV
Carbetocin				100 mcg IV
Ergots	Methyl-ergonovine 0.2mg IM	Ergometrine No dose specified	Ergometrine 0.5mg IV/IM	Ergonovine 0.25mg IM/IV

Stopping the bleeding – treating the cause

‘Uterotonic ladder’

- Syntocinon
- Ergometrine
- Carboprost
- Misoprostil
- Carbetocin

+

- Organised & responsive emergency care
- Availability of blood products
- High quality clinical care

Stopping the bleeding – treating the cause

- Organised & responsive emergency care

MOH call

+

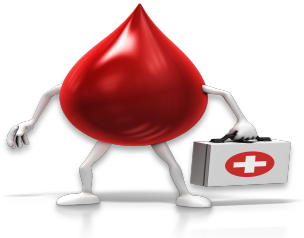
- Availability of blood products

Collaboration with transfusion

- High quality clinical care

Senior involvement, early

Epidemiology



Essentials of management

Anything new?

The future

- Imox study
  - Comparison of intramuscular carbetocin, syntocinon & syntometrine for 3rd Stage
- COPE study
  - Comparison of syntocinon & carboprost for the management of PPH

PPH prevention bundles

Optimise red cell mass

Minimise blood loss

Manage anaemia

- Change our perspective
  - PRO-ACT ***not*** REACT

PPH Risk Assessment

Complete on admission in labour, prior to second stage and following delivery

NHS Fife

ANTENATAL RISK FACTORS	Points
Placenta Praevia/Accreta	10
Placenta Abruption - significant	10
Multiple Pregnancy	6
Current Hb<85	6
Intrauterine Death	2
Pre-eclampsia/ gestational hypertension	4
Maternal Clotting Disorder	3
Previous PPH or Retained Placenta	3
Parity >4	3
Parity ≥6	6
Current BMI ≥40	2
Uterine Fibroids	2
Recurrent APH (minor)	2
Elective Caesarean Section / recurrent Caesarean Section	2
Antenatal Score	

PERINATAL RISK FACTORS	Points
Induction of labour/ Augmentation of labour	2
Sepsis /Pyrexia in labour	2
Prolonged 1st stage of labour > 12 hours (active)	2
> 12 hours of Syntocinon	2
Prolonged 2nd stage of labour> 4hours	2
Perinatal Score	
Antenatal + Perinatal Score	

POSTNATAL RISK FACTORS	
Retained Placenta	6
Emergency Caesarean Section	6
Baby >4kg	2
Operative Vaginal Delivery	2
Postnatal Score	
Total Score (Antenatal plus Perinatal plus Postnatal	

Management for 3rd stage and following delivery – alternative plans should be documented in the notes

Score less than 6	Score 6 - 9	Score 10 or more
Syntometrine IM at delivery or if contraindicated give Syntocinon 10iu IM/5iu IV Measure all blood loss Routine postnatal observations	Follow Green action PLUS IV access - Grey venflon Group & save FBC 10iu IM Syntocinon infusion 40iu/ 500ml 0.9% Saline @ 125mls/hr Commence MOEWS and record observations at least every 30 minutes for 2 hours. Consider Misoprostol / Ergometrine - EARLY	Follow Amber action PLUS 2nd Grey Venflon Crossmatch 2 units of blood if not suitable for electronic release Give one of the following: Misoprostol PR Ergometrine IM/IV Haemabate IM

BE AWARE OF THE CONTRA-INDICATIONS OF USING ERGOMETRINE

RED AMBER or GREEN plan for third stage

GREEN plan <6 points

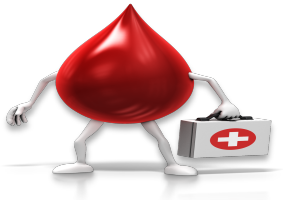
AMBER plan 6-9 points

RED plan ≥10 points

Health Improvement Scotland

Key takeaways

Post partum haemorrhage is increasing
Causes uncertain (maybe > one of the '4 Ts')



Recognition not always easy

Prevention *before* management – PPH bundles