IMOET National Meeting
Tuesday 30th September 2014
Dublin Castle

Standardisation of multidisciplinary obstetric emergency training nationally.

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

IMOET
Irish Multidisciplinary
Obstetric Emergency Training

Postpartum Haemorrhage

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IMOET
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Obstetric Emergency Training

Recent publications

CEMACE (UK and NI 2006-2008) 2011

Maternal Death Enquiry (Ireland 2009-2011) 2012

Scottish Confidential Audit of Severe Maternal Morbidity 9th Annual Report 2013

Irish Confidential Audit of Severe Maternal Morbidity 2013

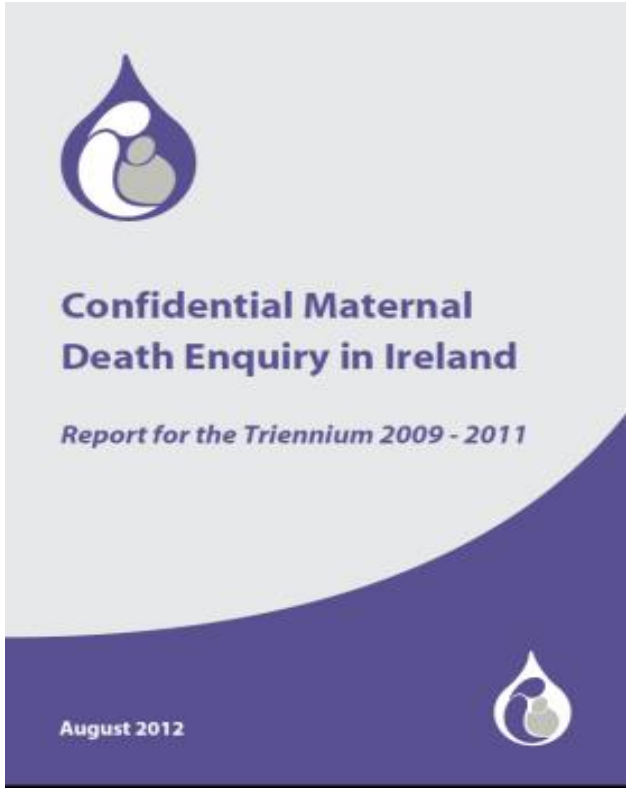
National Guidelines in Obstetrics and Gynaecology No. 17:
Prevention and Management of primary PPH 2013 (Updated 2014)

Outline

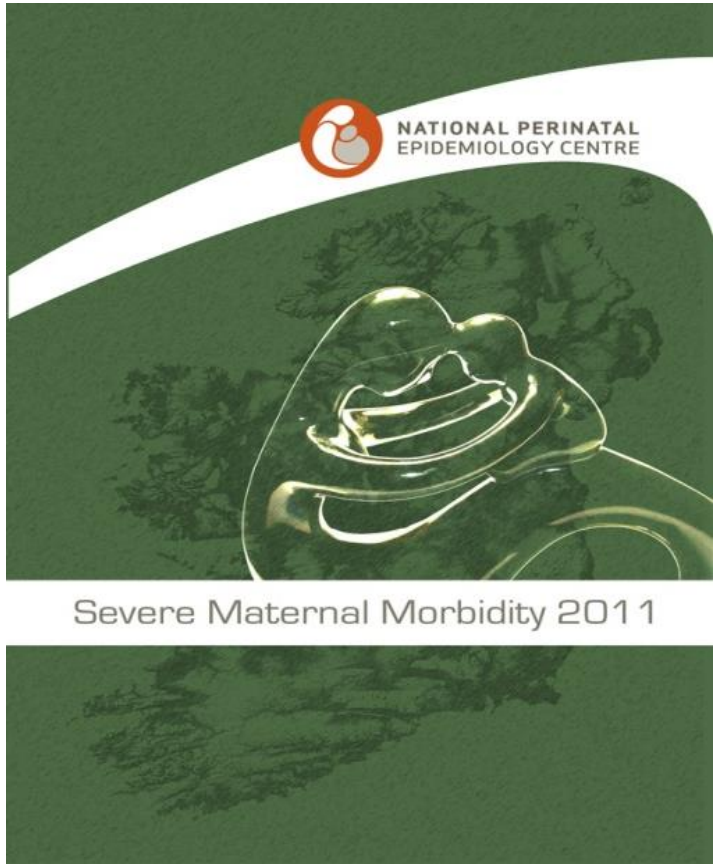
- To establish the clinical significance of PPH in an Irish context
- Definition of PPH
- Recognition of PPH
- Appropriate clinical management of PPH
- Team working
- Quality standards

MDE Report 2009-2011: Key Findings

- 18 deaths
- 8.4/100,000 (95% CI 4 -11.8)
- [CSO – 4/100,000]
- Direct maternal deaths = 31.6%
- Indirect maternal deaths = 68.4%
- Cause of 'direct' maternal deaths: thromboembolic disease continues to feature prominently
- **MOH in 2 cases of AFE and uterine rupture**



Severe Maternal Morbidity Audit



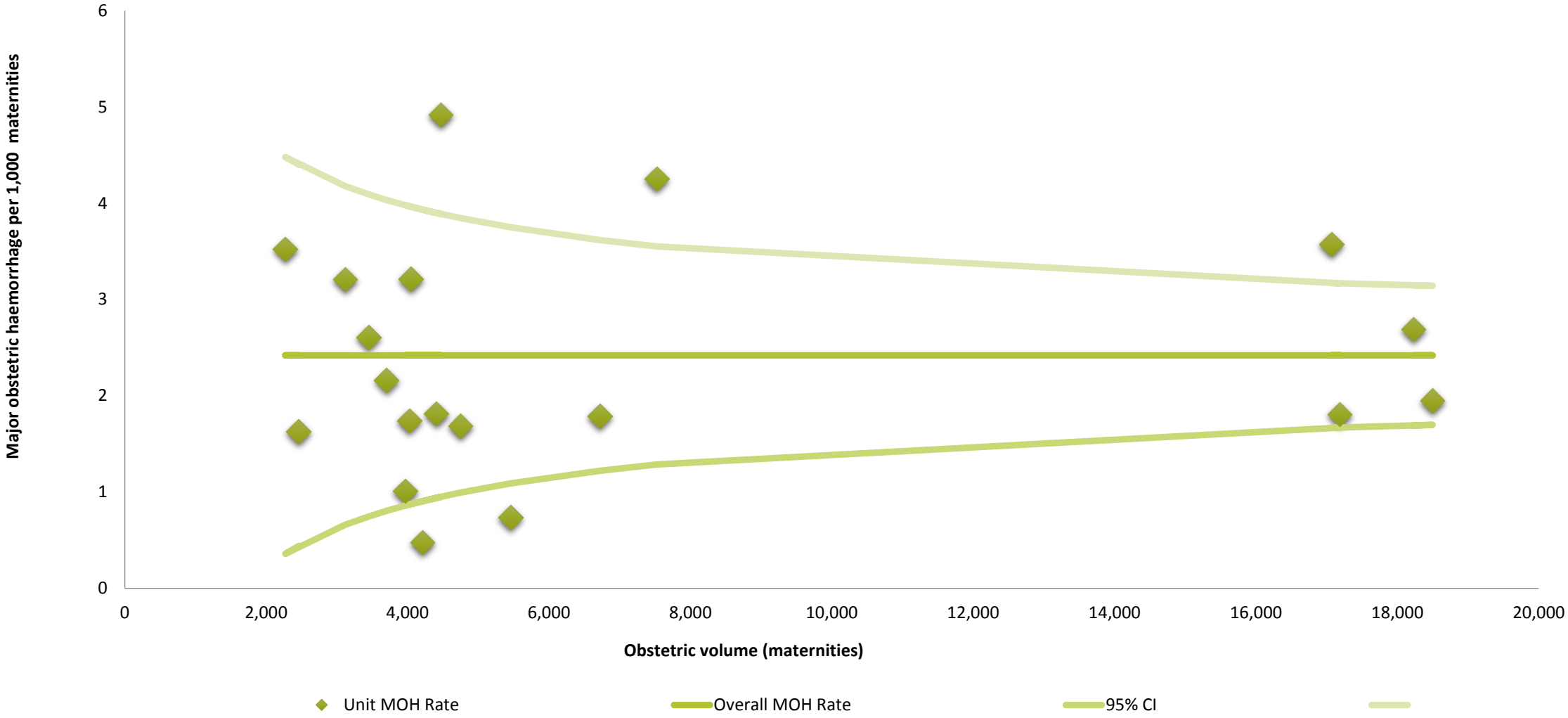
- 260 women identified (3.8/1000)
- Major Obstetric Haemorrhage (2.3/1000)

Report available at:
http://www.ucc.ie/en/npec/publications/

Morbidity-specific rates, 2011/12

Event	2011	2012	Rate per 1,000 maternities (2011+2012)
Major obstetric haemorrhage	159	164	2.38
ICU/coronary care unit admission	111	130	1.78
Renal or liver dysfunction	26	22	0.35
Peripartum hysterectomy	23	21	0.32
Pulmonary embolism	12	18	0.22
Eclampsia	12	8	0.15
Pulmonary oedema	8	11	0.14
Cardiac arrest	7	7	0.10
Anaesthetic problem	7	5	0.09
Cerebrovascular event	6	4	0.07
Acute respiratory dysfunction	5	3	0.06
Septicaemic shock	4	4	0.06
Status epilepticus	3	0	0.02
Interventional radiology*			
Planned	8	3	0.08
Unplanned	8	0	0.06

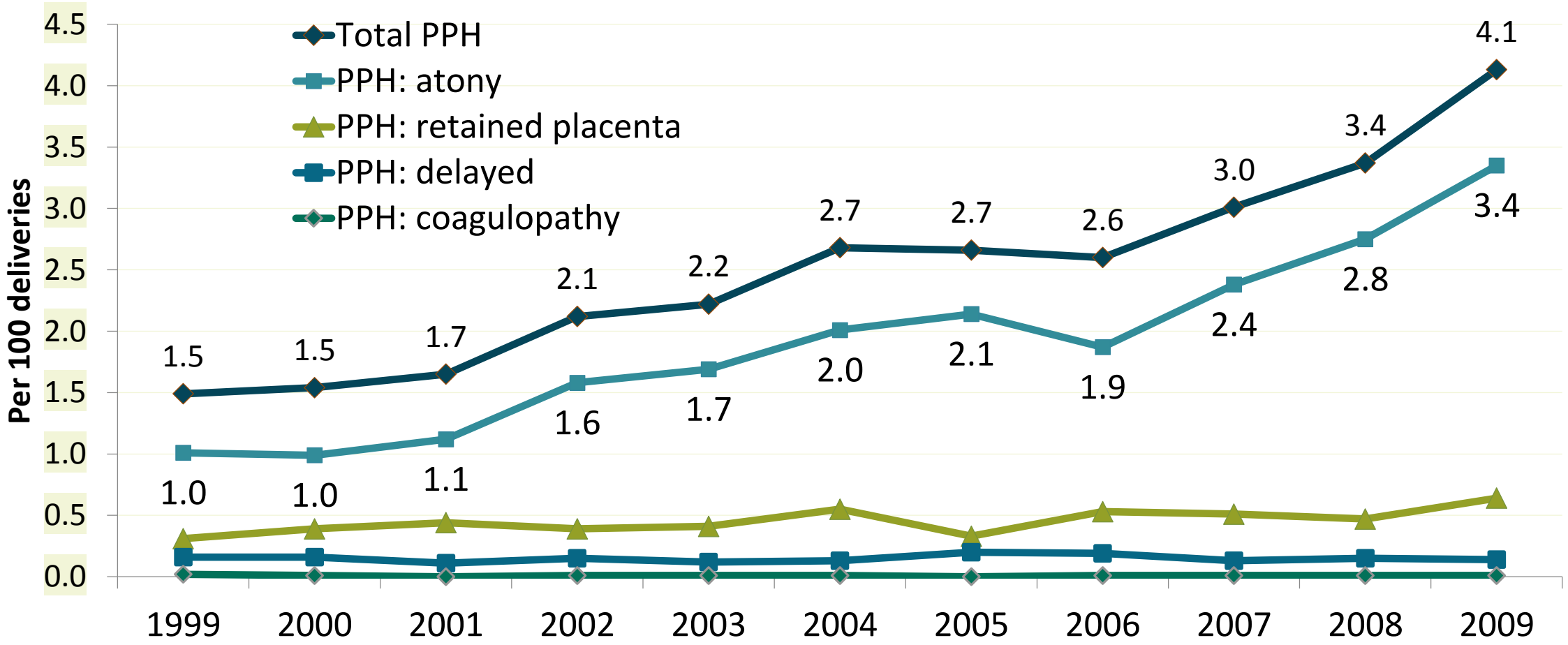
Major Obstetric Haemorrhage Rates per maternity unit, 2011/12



Causes of major obstetric haemorrhage, 2011/12

Reported causes	n (%)	% delivered by CS
Uterine atony	130 (40.1%)	60%
Retained placental membranes	52 (16%)	4%
Bleeding from uterine incision	44 (13.6%)	100%
Placenta praevia	41 (12.7%)	100%
Morbidly adherent placenta	31 (9.6%)	97%
Vaginal laceration	26 (8%)	0%
Placental abruption	25 (7.7%)	78%
Cervical laceration	7 (2.2%)	43%
Broad ligament haematoma	4 (1.2%)	75%
Uterine rupture	4 (1.2%)	25%
Uterine inversion	1 (0.3%)	100%
Other specified cause	78 (24.1%)	81%

Temporal trends in PPH – Ireland 1999-2009



Source: Lutomski et al;BJOG 2011

Definition

- Primary / Secondary
- > 500 mls after vaginal birth
- > 1000 mls after CS (1)
- > 750 mls after CS (2)
- > 1000 mls Significant
- > 2500 mls Major (3)
- Irish Guideline Minor 500-1000/ major >1000mls
- Major divided into Moderate 1000-2000 or Severe > 2000mls (4)

1. ACOG 2006; 2. Austr NZ J Obstet Gynaecol 2008; 3. Towards better birth 2008; 4. National Guideline No. 17

- **Prevention**
- **Early recognition**
- **Early appropriate intervention**

Prevention

Identification of antenatal risk factors

- Anaemia (<9 g /dl)
- Obesity (BMI >35)
- Age > 40 years
- Multiple Pregnancy
- History of PPH or retained placenta
- History of caesarean section
- Placenta praevia, percreta, accreta
- PET / PIH

Women at risk of PPH should be delivered in a unit with access to blood

All women with a history of CS should have ultrasound identification of the location of the placenta.

When placenta accreta/ percreta is suspected there should be multidisciplinary planning of delivery in the most appropriate site with access to the most appropriate personnel and facilities.

- **Prevention**

- Identify intrapartum risk factors
  - IOL
  - Placental abruption
  - Prolonged labour (>12 hours)
  - Operative vaginal birth or caesarean section
  - Retained placenta
  - Macrosomia
  - Pyrexia in labour

Active management of the third stage of labour
Prophylactic oxytocics
Syntocinon infusion 40 units in 500 mls N saline over 4 hours

- **Prevention**
- **Early recognition**
- **Early appropriate intervention**

Early recognition

Identification of Blood Loss

- Calibrated vaginal drape markings
- Transparent plastic collection bags
- Weighing
- Staff training

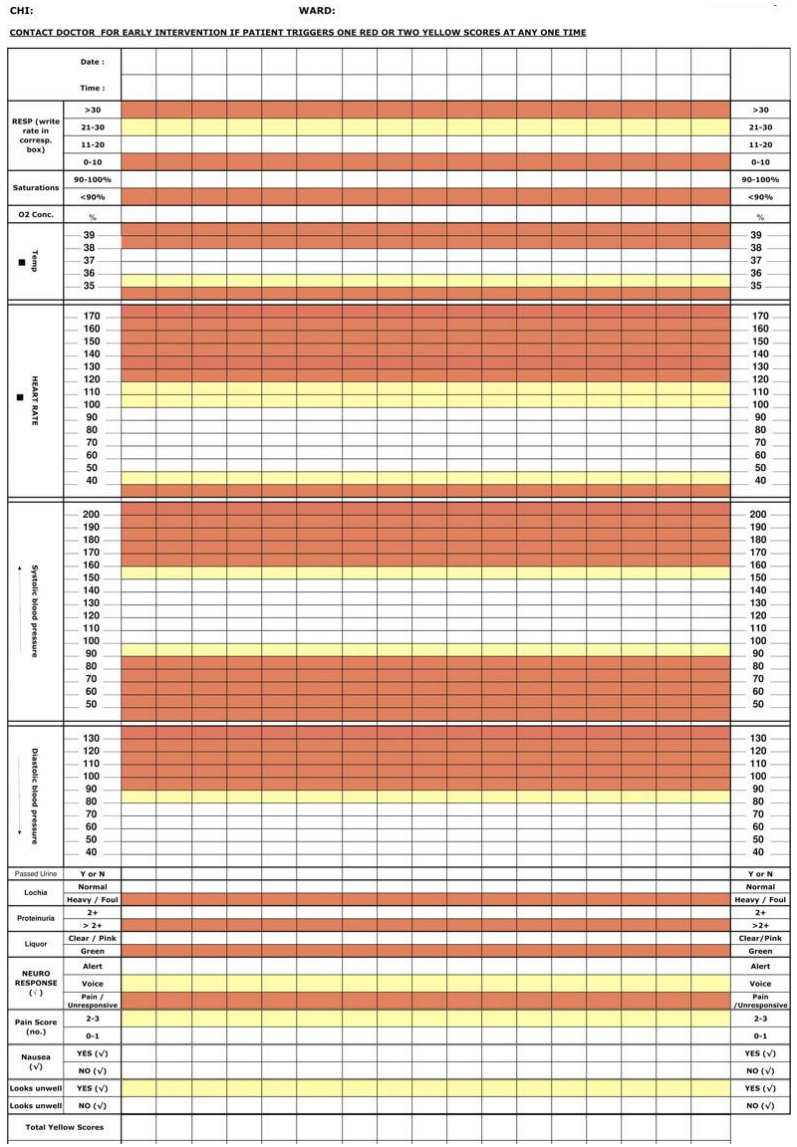
Early Recognition

Clinical features of shock in pregnancy related to blood loss

Blood loss (mls)	Signs	Symptoms	Level of shock
500-1000	Normal blood pressure Tachycardia	Palpitations, dizziness.	Compensated
1000-1500	Hypotension systolic 90-80 mmHg Tachycardia Tachypnoea Pallor, sweating.	Weakness, faintness, thirst	Mild
1500-2000	Pallor / sweating Hypotension 80-60 mmHg Rapid, weak pulse > 110 bpm Tachypnoea Pallor, cold clammy skin. Poor urinary output < 30 ml/hr	Restlessness, anxiety, confusion.	Moderate
2000-3000	Severe hypotension < 50 mmHg Pallor, cold clammy skin, peripheral cyanosis. Air hunger. Anuria	Confusion or unconsciousness, collapse	Severe

Early recognition
Identification of Bleeding

- MOEWS
- 676 obs admissions
- 200 triggered
- Sensitivity 89% (95% CI 81 – 95)
- Specificity 79% (95% CI 76 – 82)


CHI: WARD:

CONTACT DOCTOR FOR EARLY INTERVENTION IF PATIENT TRIGGERS ONE RED OR TWO YELLOW SCORES AT ANY ONE TIME

	Date :		
	Time :		
RESP (write rate in corresp. box)	>30		>30
	21-30		21-30
	11-20		11-20
	0-10		0-10
Saturations	90-100%		90-100%
	<90%		<90%
O2 Conc.	%		%
Temp	39		39
	38		38
	37		37
	36		36
	35		35
HEART RATE	170		170
	160		160
	150		150
	140		140
	130		130
	120		120
	110		110
	100		100
	90		90
	80		80
	70		70
	60		60
	50		50
	40		40
Systolic blood pressure	200		200
	190		190
	180		180
	170		170
	160		160
	150		150
	140		140
	130		130
	120		120
	110		110
	100		100
	90		90
	80		80
	70		70
	60		60
	50		50
Diastolic blood pressure	130		130
	120		120
	110		110
	100		100
	90		90
	80		80
	70		70
	60		60
	50		50
	40		40
Passed Urine	Y or N		Y or N
Lochia	Normal		Normal
	Heavy / Foul		Heavy / Foul
Proteinuria	2+		2+
	> 2+		>2+
Liquor	Clear / Pink		Clear/Pink
	Green		Green
NEURO RESPONSE ( )	Alert		Alert
	Voice		Voice
	Pain / Unresponsive		Pain /Unresponsive
Pain Score (no.)	2-3		2-3
	0-1		0-1
Nausea (√)	YES (√)		YES (√)
	NO (√)		NO (√)
Looks unwell	YES (√)		YES (√)
Looks unwell	NO (√)		NO (√)
Total Yellow Scores			

Singh et al Anaesthesia 2012: 67 ; 12-8

- **Prevention**
- **Early recognition**
- **Early appropriate intervention**

Early appropriate intervention

- Once PPH recognised
  - Communication
  - Resuscitation
  - Monitoring
  - Investigating / arresting the bleeding

  - All of the above must be undertaken SIMULTANEOUSLY

Early appropriate intervention

CALL FOR HELP

- Senior Midwife
- Obstetric On call team
- Anaesthetic On call team
- Porter

Alert

- Haematologist
- Blood Transfusion service
- Theatre Staff

Assign

- A midwife for communication & documentation

Initial management: key principles

Assessment

Resuscitation

Stop the bleeding

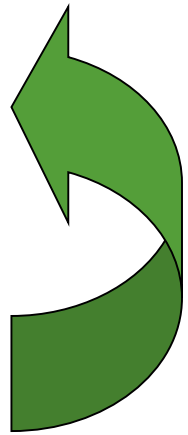
Initial Assessment

Vital signs - A B C

Extent of bleeding

Cause of bleeding

Blood investigations



Resuscitation

- Lie flat
- Ensure airway and breathing
- O2 by mask , 10 -15 L / min
- IV access: 2 x 14 or 16 gauge cannulae

- Blood (22ml) for:
  - Cross match (4 - 6 units)
  - Full blood count
  - Clotting screen (Fibrinogen, APTT, PTT).
  - Base line RFTs / LFTs
- Foley catheter (monitor hourly urine output)/ fluid balance)
- Monitor: pulse, blood pressure, 0_2 saturation, ECG, pulse oximetry x every 15 min.
- Central line

Resuscitation

Volume Replacement

- Fluid Crystalloid / Colloid 1lt in each cannula (max 3.5 lts)
- Blood
  - Preferably cross matched but O Rh- Negative or group specific blood if life threatening blood loss

  Blood products
  - Fresh frozen plasma if PT/ APTT > 1.5 x normal or 4 units for every 6 units of RCC.
  - Fibrinogen concentrate if Fibrinogen < 1.5 g/L
  - Platelets if platelet level < 50 x 10^9 / L

Blood product administration should be guided by the clinical picture and not by blood tests alone.

Keep fluids and patient warm.

Stop the bleeding

Massage the uterus/bimanual compression

Urinary catheter

Syntocinon 5 units i.v.

Ergometrine* 500ugs i.v. or i.m

* Syntometrine and ergometrine contraindicated with raised BP

Stop the bleeding

Syntocinon infusion

40 Units in 500ml N saline over 4 hours

Carboprost (Haemabate)

250 ugs im every 15 min x max 8 doses

Carboprost (Haemabate)

500 ugs direct intramyometrial

Misoprostol

600 ugs po/sl

Surgical Management

EUA

Tone
Tissue
Trauma
Thrombin

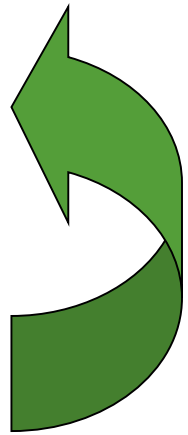
Monitoring and investigation
Continual Assessment

Airway Breathing Circulation

Cause of bleeding

Extent of bleeding

Blood investigations



Surgical Management

Advanced

Balloon tamponade

B-Lynch suture

Uterine devascularisation

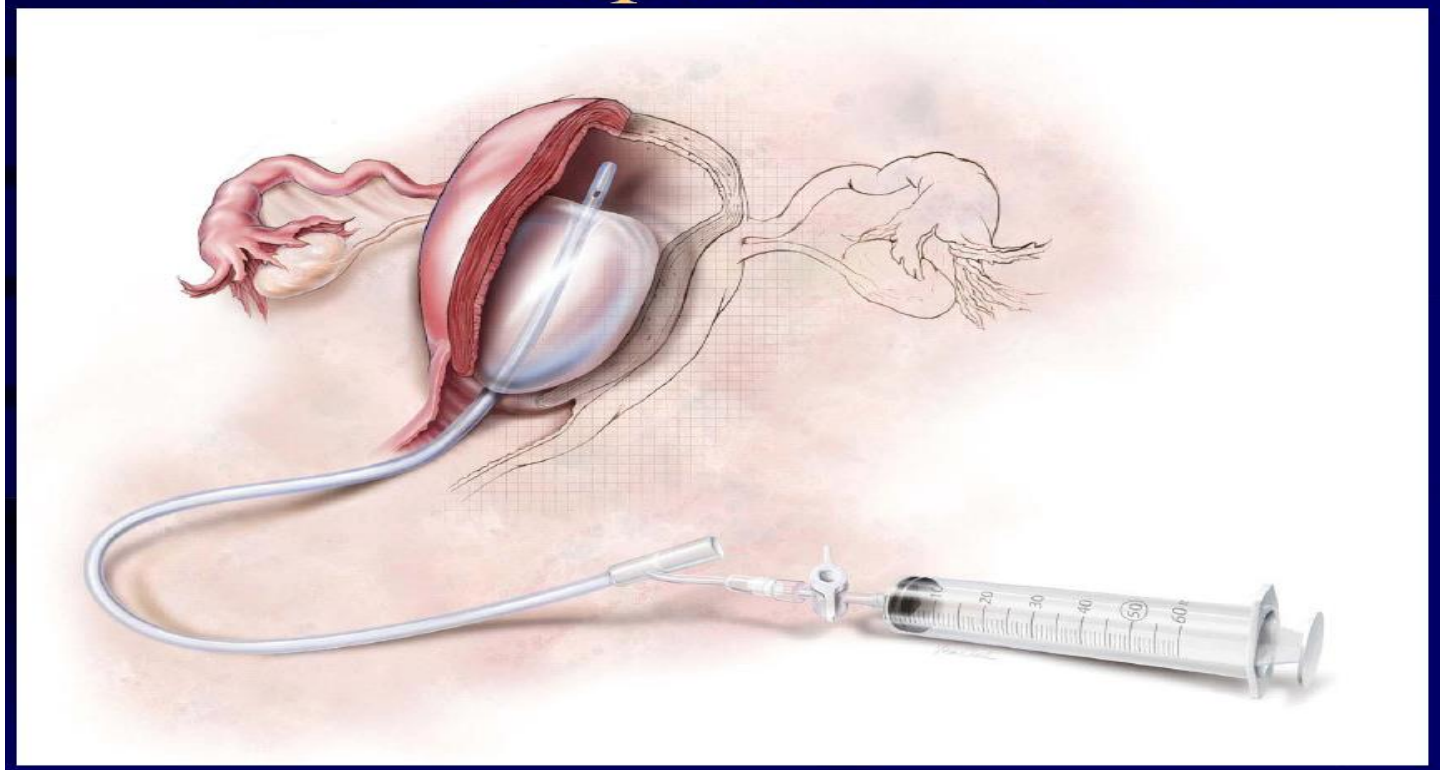
Internal iliac artery ligation

Hysterectomy

Abdominal packing

Interventional radiology

COOK MEDICAL
Bakri Postpartum Balloon



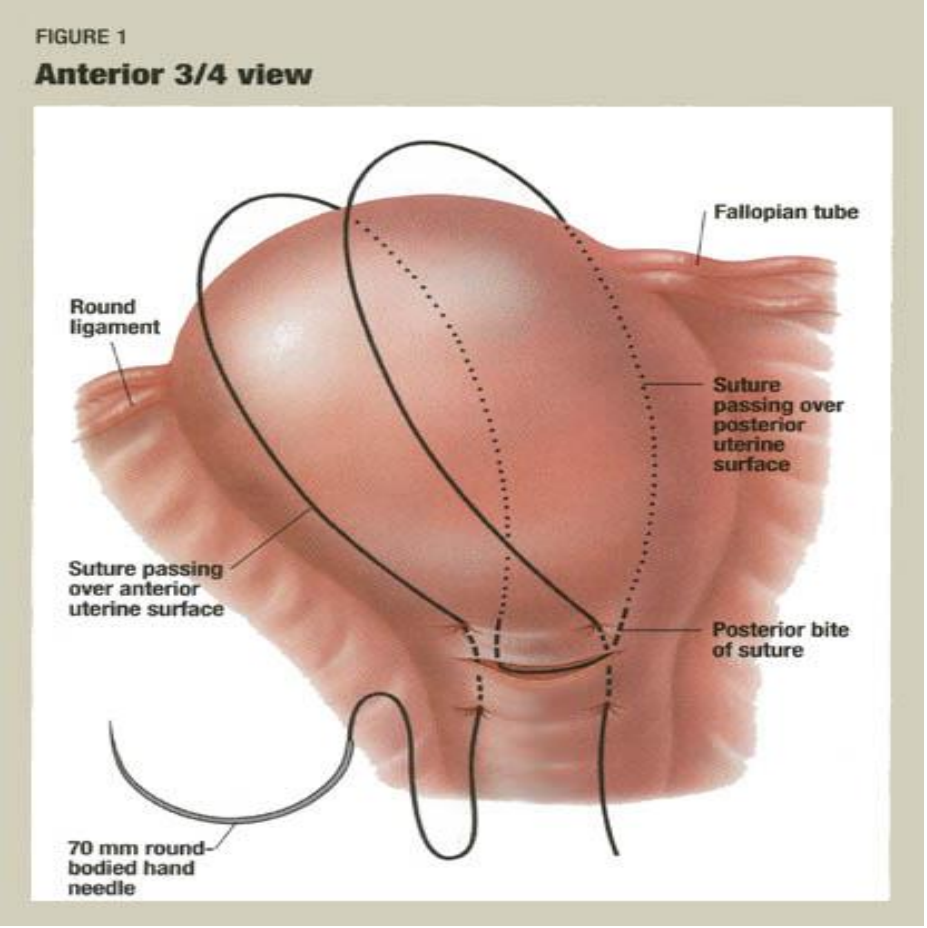
Cook OB/GYN (www.cookmedical.com)

Uterine compression sutures

- B-Lynch suture

Place in lithotomy
Exteriorize uterus
Bimanual compression
70-80mm round bodied needle
Monocril

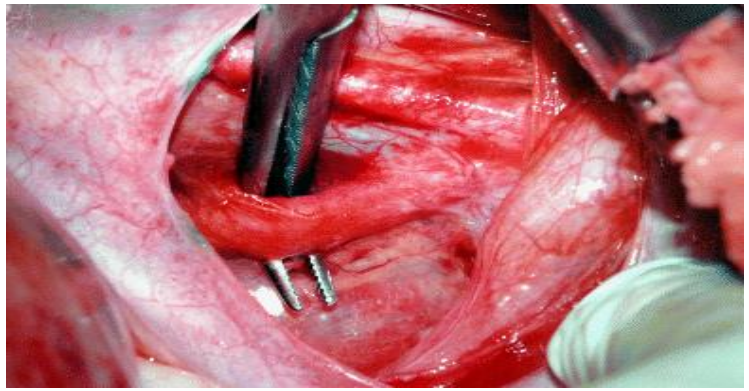
19 / 1600 successful

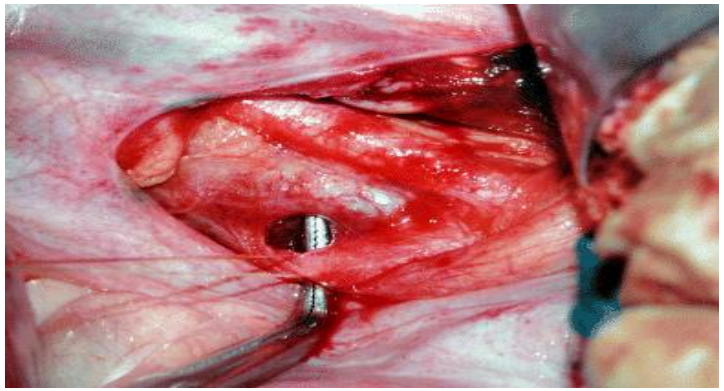


V. Joshi, S. Otiv, R. Majumder,
Y. Nikam, and M. Shrivastava.

Internal iliac artery ligation for
arresting postpartum haemorrhage.

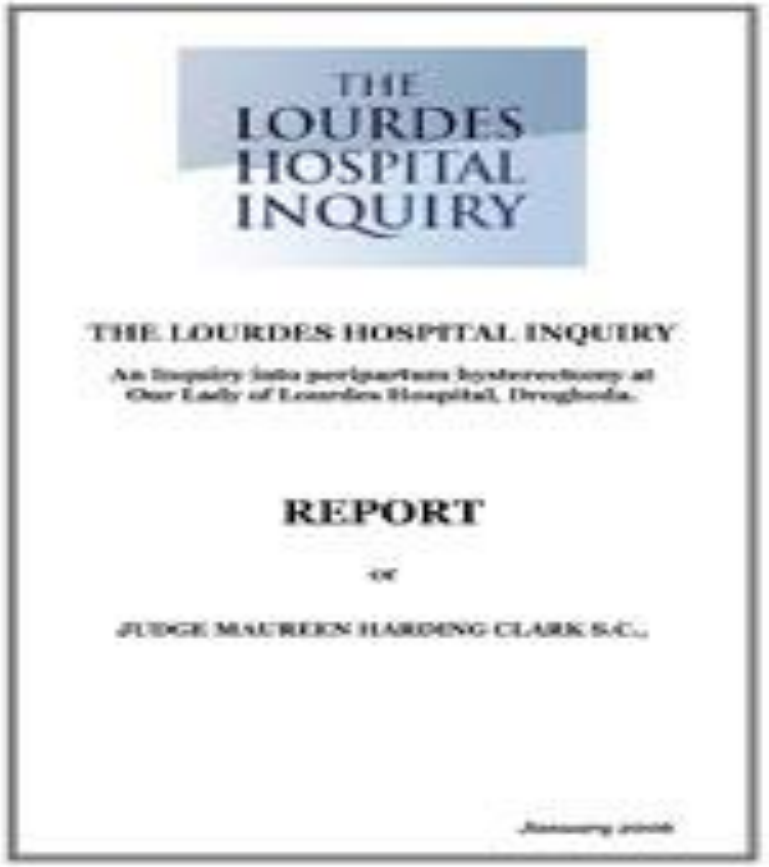
BJOG. 114 (3):356-361, 2007.





Hysterectomy

- 0.24 – 1.4/1000
- 0.3/1000



Placenta accreta

Dublin Maternity Hospitals	(1966-1975) vs (1996-2005)		
Caesarean Section	6%	to	19%
Peripartum hysterectomy	o.85	to	0.2/1000
Placenta accreta	5.4%	to	46.5%

Flood et al AJOG 2010

Uterotonic Agents Used 2011

Uterotonic	NPEC SMM 2011 N (%)	SCASMM SMM 2011 %
Syntocinon 5-10 units (IM/IV)	50 (73.5)	56%
Syntocinon infusion (40 units)	63 (92.6)	89%
Ergometrine 0.5mg (IM/IV)	22 (32.4)	55%
Syntometrine 5mg (IM)	22 (32.4)	NR
Carboprost 0.25mg (IM)	46 (67.6)	70%
Misoprostol 200 µg/mcg(PO/PV)	57 (83.8)	20%
Tranexamic acid 1g	6 (8.8)	NR

Note: Categories are not mutually exclusive and may add up to over 100%. NR: Not reported

Incidence of Haemostatic Surgical Procedures

Procedure	NPEC SMM 2011 Women undergoing procedure N (%)	NPEC SMM 2011: Hysterectomy ultimately required N (% of subcategory)	SCASMM SMM 2011 %
Intra-uterine balloon tamponade	47 (29.6)	8 (17.0)	24.9%
Manual removal of placenta/retained tissue	36 (22.6)	2 (5.6)	--
Repair of vaginal/cervical lacerations	33 (20.8)	1 (3.0)	--
Intra-myometrial carboprost	25 (15.7)	6 (24.0)	--
Hysterectomy	22 (13.8)	--	10%
Re-suturing caesarean section uterine incision and/or suturing of lateral extension	15 (9.4)	2 (13.3)	--
Haemostatic brace uterine suturing	12 (7.5)	2 (16.7)	6.6%
Bilateral ligation of uterine arteries	4 (2.5)	1 (25.0)	0.9%
Uterine artery embolization [Interventional Radiology]]	8 (5.0)	1 (12.5)	4.3%
Bilateral ligation of iliac arteries	1 (0.6)	1 (100.0)	0.9%

Table 4: Comparison of EBL, blood results, blood product usage and duration of stay.

	Cryoprecipitate Group *(n=14)*		Fibrinogen Group *(n=21)*		Sig Level (p-value)
	Mean	*SEM*	*Mean*	*SEM*	
EBL (Litres)	5.19	1.07	3.34	0.49	0.13
Min Haematocrit	0.206	0.017	0.192	0.009	0.42
Min Platelets ($X10^9$g/L)	92.9	12.98	105.0	11.1	0.49
Min Fibrinogen Level (g/L)	1.04	0.13	1.35	0.20	0.26
RCC (Units)	7.21	1.23	5.86	0.92	0.37
Octaplas (Units)	4.07	0.74	3.10	0.62	0.32
Platelets (Pool)	1.00	0.36	1.05	0.29	0.92
Fibrinogen Post Treatment (g/L)	3.35	0.19	3.34	0.22	0.35
Duration of HDU Stay (Hours)	34.1	4.32	33.1	6.58	0.90
Duration of Hospital Stay (Days)	5.2	0.33	6.5	0.81	0.19

Mean, SEM= Standard error of mean, Significance testing by Independent Samples t-test.

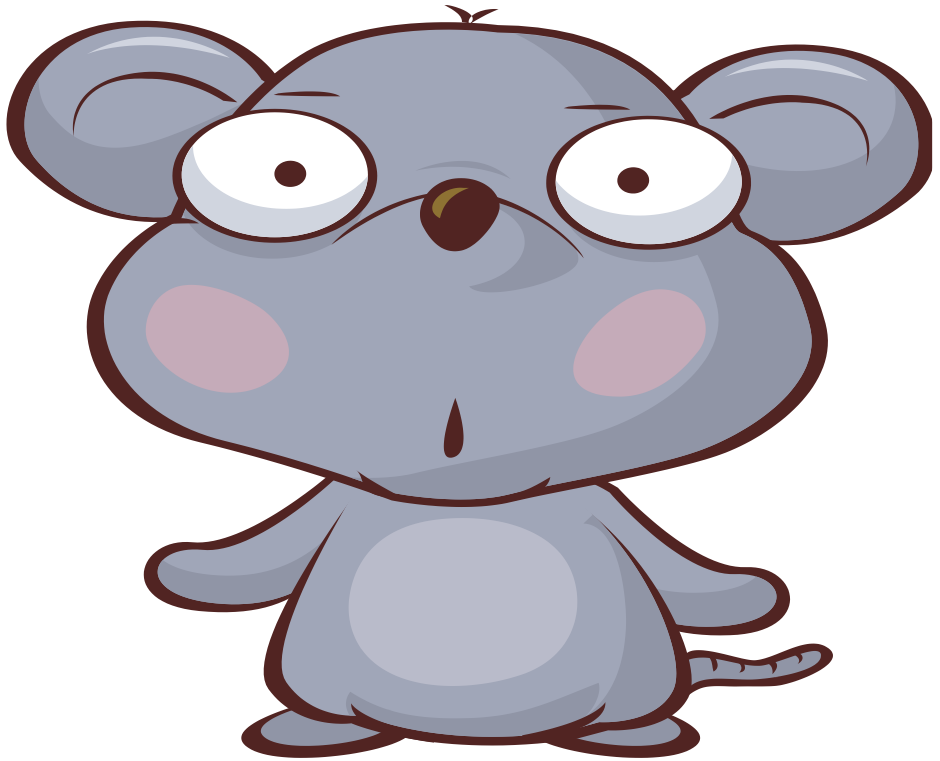
Ahmed at al Transfusion Medicine 2012

Managing PPH on the ground!

- Protocol / Guidelines
- Training of Staff
- Rehearsals / Fire drills
- Senior Staff Involvement
- Emergency PPH Box

HEAD

Airway Breathing
Oxygen
Lie flat



HELP

Call for help
Communicates
Records
Evaluates

ARMS

Circulation
IV access
Bloods
Fluids
Drugs

UTERUS

Deliver placenta/Rub up contraction/Bimanual compression/Urinary catheter/Drugs

Documentation

- Staff in attendance and the time of arrival
- Sequence of events
- Timing of administration of pharmacological agents
- Timing and sequence of surgical interventions
- Timing of fluid and blood products
- Condition of mother

Care following the event

Close monitoring of vital signs, blood loss and urine output
HDU or ICU setting
Multidisciplinary input
Care of the newborn
Thromboprophylaxis
Debriefing
Clinical incident reporting

Quality standards and improvement

- Monitor all cases of blood loss > 1000mls
- Appropriate identification and management of women at risk of PPH
- Documentation
- Appropriate management of cases
- Notification to risk management
- Regular training of team

Summary

Women at increased risk of PPH should be identified and a care plan for delivery put in place.

Management of PPH requires Communication; Resuscitation; Monitoring and investigation; and arresting the bleeding.

Good team work is essential and promoted by multidisciplinary skills and drills sessions

Looking forward

- PPH rates are increasing
- We are delivering more complex patients
- We need multidisciplinary planning for delivery
- We need to recognize the signs and symptoms of haemorrhage, call for help and work as a cohesive team to resuscitate the patient and stop the bleeding.
- If you do only one thing when you return to your unit,

Set up sporadic haemorrhage drills and analyse a case of MOH monthly