QUICK REFERENCE GUIDE

POSTPARTUM HAEMORRHAGE (PPH)

2016

NATIONAL TECHNICAL COMMITTEE
CONFIDENTIAL ENQUIRIES INTO MATERNAL DEATHS

Coordinated by:
Family Health Development Division
Ministry of Health Malaysia
2016
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FOREWORD

Maternal mortality has declined over the last five decades in Malaysia. Postpartum haemorrhage continues to haunt us as one of our leading causes of maternal deaths.

This revised training manual on PPH has brought to fore the latest evidence on the management options in PPH.

The quick reference guide has been introduced with this manual. This will serve to minimise the need to “flip the pages” when the need arises to address PPH, in the clinical scenario.

The time, energy, effort and commitment of the committee to bring forth this manual is greatly appreciated. It must be acknowledged that excellent work has been done.

It is my fervent hope that this manual will be of benefit to both the public and the private sector in optimising the management of our PPH patients and hence reducing both the mortality and the morbidity of our patients.

Dr J Ravichandran R Jeganathan
Chairperson,
National Technical Committee for the CEMD, Ministry of Health,
Advisor of National Obstetrics & Gynaecological Services,
Senior Consultant & Head, Department of Obstetrics & Gynaecology,
Hospital Sultanah Aminah, Johor Bahru
MEMBERS OF THE NATIONAL TECHNICAL COMMITTEE FOR CONFIDENTIAL ENQUIRIES INTO MATERNAL DEATHS

(Alphabetical Orders)

Dr. Ahmad Kashfi bin Ab. Rahman
Consultant Physician of Infectious Disease,
Hospital Sultanah Nur Zahirah,
Kuala Terengganu

Dr. Arpah Ali
Senior Principal Assistant Director,
Medical Development Division,
Ministry of Health

Dato’ Dr. Bhupinder Singh
Senior Consultant Forensic and
Pathologist, Department of Forensic
Medicine, Hospital Pulau Pinang

Dr. Faridah bt. Abu Bakar
Senior Consultant Public Health
Physician and Deputy Director,
Family Health Development Division,
Ministry of Health

Dr. Frederick Walter De Rozario
Consultant Physician,
Hospital Umum Sarawak

Dato’ Dr. Ghazali bin Ismail
Senior Consultant Obstetrician &
Gynaecologist and Head of Department
of Obstetrics and Gynaecology, Hospital
Sultan Ismail, Johor Bharu, Johor

Dr. Hayati bt. Mohd Radzi
Senior Consultant Public Health
Physician, State Health Deputy Director,
Kedah State Health Department

Prof. (Dr.) Jamiyah Hassan
Senior Consultant
Obstetrician & Gynaecologist,
University Malaya Medical Centre

Dr. Jessie Hiu
Consultant Forensic Pathologist,
Department of Forensic Medicine,
Hospital Queen Elizabeth,
Kota Kinabalu, Sabah

Dr. Majdah bt. Mohamed
Public Health Physician and Senior
Principal Assistant Director,
Family Health Development Division,
Ministry of Health

Dr. Hayati bt. Mohd Radzi
Senior Consultant Public Health
Physician, State Health Deputy Director,
Kedah State Health Department

Pn. Masnie bt. Baliran
Principal Assistant Director,
Nursing Division, Ministry of Health

Dr. Mohd Daud bin Che Yusof
Family Medicine Specialist,
Kuantan Health Clinic, Pahang

Dr. Mohd Rohisham bin Zainal Abidin
Senior Consultant Anaesthesiologist &
Head of Department of Anaesthesiology
and Intensive Care,
Hospital Tengku Ampuan Rahimah,
Klang, Selangor
<table>
<thead>
<tr>
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<th>Position and Affiliation</th>
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<tr>
<td>Prof. (Dr.) Mohd Shukri bin Othman</td>
<td>Senior Consultant Obstetrician &amp; Gynaecologist, Hospital Universiti Sains Malaysia</td>
</tr>
<tr>
<td>Dr. Mohd Zulkifli bin Mohd Kassim</td>
<td>Consultant Obstetrician &amp; Gynaecologist, Hospital Sultanah Nur Zahirah, Kuala Terengganu, Terengganu</td>
</tr>
<tr>
<td>Prof. (Dr.) Muhd Abdul Jamil bin Mohd Yassin</td>
<td>Deputy Dean and Senior Consultant, Obstetrician &amp; Gynaecologist, Hospital Universiti Kebangsaan Malaysia</td>
</tr>
<tr>
<td>Dato’ (Dr.) Mukudan Krishnan</td>
<td>Senior Consultant Obstetrician &amp; Gynaecologist and Head of Department of Obstetrics and Gynaecology, Hospital Raja Permaisuri Bainun, Ipoh, Perak</td>
</tr>
<tr>
<td>Dr. Nik Mazlina bt. Mohamed</td>
<td>Family Medicine Specialist, Klinik Kesihatan Kelana Jaya, Selangor</td>
</tr>
<tr>
<td>Dr. Noor Aziah bt. Zainal Abidin</td>
<td>Senior Principal Assistant Director, Medical Development Division, Ministry of Health</td>
</tr>
<tr>
<td>Dr. Norliza bt. Rusli</td>
<td>Consultant Obstetrician &amp; Gynaecologist, Hospital Miri, Sarawak</td>
</tr>
<tr>
<td>Dr. J. Ravichandran</td>
<td>Senior Consultant Obstetrician &amp; Gynaecologist and Head of Department of Obstetrics and Gynaecology,</td>
</tr>
<tr>
<td></td>
<td>Hospital Sultanah Aminah, Johor Bharu, Johor</td>
</tr>
<tr>
<td>Dato’ (Dr.) Ravindran Jegasothy</td>
<td>Senior Consultant Obstetrician &amp; Gynaecologist and Dean Faculty of Medicine, MAHSA University</td>
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<tr>
<td>Dr. Rokiah bt. Mohd</td>
<td>Public Health Physician, Family Health Officer, Penang State Health Department</td>
</tr>
<tr>
<td>To’ Puan Dr. Safurah bt. Jaafar</td>
<td>Senior Consultant Public Health Physician and Director, Family Health Development Division, Ministry of Health</td>
</tr>
<tr>
<td>Dato’ (Dr.) Sapari Satwi</td>
<td>Senior Consultant Physician and Head of Department of Medicine, Hospital Tengku Ampuan Afzan, Kuantan, Pahang</td>
</tr>
<tr>
<td>Dr. Saravanan a/l Krishinan</td>
<td>Consultant Cardiologist, Hospital Sultanah Bahiyah, Alor Setar, Kedah</td>
</tr>
<tr>
<td>Dr. Sharmini Diana Parampalam</td>
<td>Consultant Obstetrician &amp; Gynaecologist, Hospital Pulau Pinang</td>
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<tr>
<td>Dr. Siew Sheue Feng</td>
<td>Senior Consultant Forensic Pathologist, Department of Forensic Medicine, Hospital Kuala Lumpur</td>
</tr>
<tr>
<td>Datin (Dr.) V. Sivasakthi</td>
<td>Senior Consultant Anaesthesiologist and Head of Department of Anaesthesiology and Intensive Care, Hospital Kuala Lumpur</td>
</tr>
</tbody>
</table>
Dr. Soon Ruey
Senior Consultant
Obstetrician and Gynaecologist &
Head of Department of Obstetrics and Gynaecology,
Hospital Likas, Sabah

Pn. Suzana bt. Kipli
Health Sister,
Family Health Development Division,
Ministry of Health

Dr. Tham Seng Woh
Senior Consultant
Obstetrician and Gynaecologist &
Head of Department of Obstetrics and Gynaecology,
Hospital Melaka

Brig. Gen (Dr.) T. Thavachelvi
Senior Consultant
Obstetrician & Gynaecologist,
Hospital Angkatan Tentera Tuanku Mizan,
Kuala Lumpur

Dr. Tuty Aridzan Irdawati bt. Mohsinon
Senior Principal Assistant Director,
Family Health Development Division,
Ministry of Health

Dr. Zul Azuin bt. Zulkifli
Principal Assistant Director,
Family Health Development Division,
Ministry of Health
EDITORIAL COMMITTEE

ADVISOR
Dr. J. Ravichandran Jeganathan
Advisor of National Obstetrics & Gynaecological Services, Senior Consultant & Head, Department of Obstetrics & Gynaecology, Hospital Sultanah Aminah, Johor Bahru

EDITORS
Dr. Sharmini Diana Parampalam (Chairman)
Consultant Obstetrician & Gynaecologist, Head of Department of Obstetric & Gynaecology, Hospital Pulau Pinang

Dr. Mairin Dulasi
Obstetrician & Gynaecologist, Hospital Seberang Jaya, Pulau Pinang

Dr. Muniswaran Ganeshan
Obstetrician & Gynaecologist, Hospital Raja Permaisuri Bainun, Ipoh, Perak

FACULTY MEMBERS
Dr. Mohd Rohisham bin Zainal Abidin
Consultant Anaesthetist & Intensivist, Hospital Tengku Ampuan Rahimah, Klang

Dr. Mohd Azam bin Mohd Yusoff
Consultant Obstetrician & Gynaecologist, Hospital Pekan, Pahang Darul Makmur

Dr. Norliza bt. Rusli
Consultant Obstetrician & Gynaecologist, Hospital Miri, Sarawak

Dr. Adlina bt. Bakar
Family Medicine Specialist, Klinik Kesihatan Butterworth, Pulau Pinang
Dr. Tan Chew Khang
Consultant Obstetrician & Gynaecologist,
Hospital Seri Manjung, Perak

Matron Scholistica Lee
Head of Public Health Nursing Supervisor,
Pejabat Kesihatan Kawasan Kota Kinabalu,
Kota Kinabalu, Sabah

Dr. Zaridah bt. Shafie
Consultant Obstetrician & Gynaecologist,
Hospital Tuanku Fauziah, Perlis

Dr. Yuzainov bt. Ahmad
Consultant Obstetrician & Gynaecologist,
Hospital Pulau Pinang

Matron Rasilah bt. Ramli
Head of Public Health Nursing Supervisor,
Jabatan Kesihatan Negeri Pulau Pinang, Pulau Pinang

Dr. Abdul Rahim bin Abdul Ghani
Consultant Obstetrician & Gynaecologist,
Hospital Muar, Johor

Dr. Nor Azura bt. Dintan
Consultant Anaesthetist & Intensivist,
Hospital Kuala Lumpur

Dr. Norazlina bt. Hamzah
Transfusion Medicine Specialist,
Hospital Ampuan Afzan, Kuantan, Pahang
Introduction

Postpartum haemorrhage is the leading cause of maternal death in many countries across the globe. In Malaysia, it remains the leading cause of death till date. Despite numerous efforts to curtail this debilitating death, many women who carry a pregnancy beyond 22 weeks of gestation still die during pregnancy, at childbirth and in the puerperium from bleeding.

Women who bleed 500ml or more are included in this death. There are numerous causes leading to this bleeding event. Many are preventable. Hence, it is prudent to intervene as early as possible as every minute matter in saving a life during bleeding. The attending personnel must be familiar with the management of this condition. Recognising risk factors and identifying the cause for the bleeding is important. Prioritising the various steps is crucial in the management of this condition.

This quick reference guide comes with a manual which is furnished with the A to Z in managing PPH which may occur at home, in a district hospital or in a facility with a specialist. This quick reference guide should be read together with the training manual that has simplified systematic flow charts and tables addressing the various topics from the manual.

This is a revised edition of the previous guide as there has been new developments and evidence in managing postpartum haemorrhage such as drugs, manoeuvre and equipment.
THIRD STAGE OF LABOUR: DEFINITION

Time from the birth of the baby to the expulsion of the placenta and membranes

PHYSIOLOGY OF 3rd STAGE OF LABOUR

After delivery of baby

- Contraction & Retraction of the uterus
- Reduce uterine volume + area of placental detachment
- Placental separation
- Bleeding uterine sinuses from retroplacental clots

Expulsion of placenta

Options in the management of 3rd stage of labour

Combination of active and physiological management

- Modified active management of 3rd stage
- Physiological management of 3rd stage

Modified Active Management

- Prophylactic IM 10IU Oxytocin
- Deferred clamping and cutting of the cord (after 1 minute but before 5 minutes from fetal delivery)
- Controlled cord traction after signs of placental separation

Physiological Management

- No routine uterotonic agents
- No cord clamping until cessation of cord pulsation
- Spontaneous delivery of placenta

Advantage

- Shortens the 3rd stage of labour
- Reduced incidence of haemorrhage, anaemia and blood transfusion

Disadvantage

- Increase risk of haemorrhage
- Require active management if bleeding or delayed 3rd stage
THIRD STAGE OF LABOUR (2)

OPTIONS OF UTEROTONIC AGENTS

**SYNTOCINON**
(Oxytocin)
- IM 10IU, IV, 5IU
- Associated with less side effects of nausea & vomiting.
- No difference in blood loss beyond 1,000mls

**SYNTOMETRINE**
(Oxytocin 5IU + Ergometrine 0.5mg)
- IM 1 ampoule (1ml)
- Contraindicated in patients with cardiac disease or hypertension
- Reduces blood loss below 500mls

**Diagnose Delayed 3rd Stage of Labour IF**

<table>
<thead>
<tr>
<th>Active Management</th>
<th>Physiological Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd stage not completed within 30 minutes</td>
<td>3rd stage not completed within 60 minutes</td>
</tr>
</tbody>
</table>

**Observations after completion of the 3rd stage of labour**

- General Appearance
- Blood Pressure
- Pulse Rate
- Respiratory Rate
- Uterine Contractility
- Vaginal Blood Loss

Identify any complications that requires referral to hospital and **COMMUNICATE**
POSTPARTUM HAEMORRHAGE – DEFINITION

• Blood loss >500mls (vaginal delivery)
• Blood loss >1,000mls (abdominal delivery)
• ANY blood loss sufficient enough to cause haemodynamic instability

- Defined as PPH with blood loss >1,500ml
- Essential factor to consider apart from the amount of loss is the RATE of loss

The MORE the blood loss is, the MORE it ends to be UNDERESTIMATED

Patient who are anaemic or who are volume depleted (e.g. dehydration, pre-eclampsia) may not be able to cope with excessive blood loss and are more prone to haemodynamic instability.
POSTPARTUM HAEMORRHAGE – RISK FACTORS

CAUSES OF PPH (the 4 ‘T’s)

<table>
<thead>
<tr>
<th>TONE (70%)</th>
<th>TRAUMA (20%)</th>
<th>TISSUE (10%)</th>
<th>THROMBIN (&lt;1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Atonic uterus, distended bladder)</td>
<td>(Uterine, cervical or vaginal injury)</td>
<td>(Retained products of conception)</td>
<td>(Pre-existing or acquired coagulopathy)</td>
</tr>
</tbody>
</table>

Be on the lookout for RISK FACTORS associated with each ‘T’s during ante-, intra- & postpartum: refer PPH Manual.

Table 1: Risk factor for ‘Tone’

<table>
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<tr>
<th>Aetiology</th>
<th>Process</th>
<th>Clinical Risk Factors</th>
</tr>
</thead>
</table>
| Abnormalities of uterine contraction (Tone) 70% | • Over distended uterus | • Polyhydramnios  
• Multiple pregnancy  
• Macrosomia |
| | • Uterine muscle exhaustion | • Precipitated labour  
• Prolonged labour (1st or 2nd stage)  
• Multiparity  
• Prolonged 3rd stage (>30mins)  
• Labour augmented with oxytocin |
| | • Intra-amniotic infection | • Endometritis, chorioamnionitis |
| | • Drug-induced hypotonia | • Magnesium sulphate, nifedipine, salbutamol  
• “Oxytocin desensitization”  
• General anaesthesia |
### Abnormalities of uterine contraction (Tone) 70%

- Functional or anatomic distortion of the uterus
- Bladder distension, may prevent uterine contraction
- Idiopathic

- Fibroid uterus
- Uterine anomalies
- Placenta praevia
- Placental abruption
- Urinary retention
- Previous PPH

### Genital tract trauma (Trauma) 20%

- Episiotomy or lacerations (cervix, vagina or perineum)
- Extensions/ lacerations at caesarean section
- Uterine rupture
- Uterine inversion

- Instrumental delivery
- Precipitous labour
- Difficult vaginal deliveries
- Second stage caesarean section
- Fetal malposition
- Deeply engaged fetal head/ failed instrumental delivery
- Mismanagement of third stage of labour
- Multiparity
- Fundal placenta
- Excessive cord traction
- Short umbilical cord

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**POSTPARTUM HAEMORRHAGE – RISK FACTORS 2**

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**Table 2: Risk factors for ‘Trauma’**
Table 3: Risk factors for ‘Tissue’ and ‘Thrombin’

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Process</th>
<th>Clinical Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained products of conception (Tissue) 10%</td>
<td>• Retained cotyledon or succenturiate lobe</td>
<td>• Incomplete placenta at delivery</td>
</tr>
<tr>
<td></td>
<td>• Morbidly adherent placenta</td>
<td>• Previous uterine surgery</td>
</tr>
<tr>
<td>Abnormalities of coagulation (Thrombin) &lt;1%</td>
<td>Pre-existing states:</td>
<td>• History of hereditary coagulopathies or liver disease</td>
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<td></td>
<td>• Hemophilia A</td>
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<td></td>
<td>• Von Willebrand’s disease</td>
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<td>• Idiopathic Thrombocyticopenic Purpura (ITP)</td>
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<td></td>
<td>• Acquired in pregnancy</td>
<td>• Gestational thrombocytopenia</td>
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<td>• HELLP syndrome</td>
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<td></td>
<td></td>
<td>• Disseminated Intravascular Coagulation (DIC)</td>
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<tr>
<td></td>
<td></td>
<td>• Underlying thrombotic disease</td>
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<td></td>
<td></td>
<td>• Thromboprophylaxis</td>
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### MANAGEMENT OF PRIMARY PPH IN HOSPITAL

## RISK REDUCTION MEASURES

**Table 4: Antenatal (booking and admission) Risk Reduction Measures**

<table>
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<th>Clinical Aspects</th>
<th>Risk Reduction Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALL PREGNANT WOMEN</strong></td>
<td>Documented risk assessment at booking, admission and in labour with appropriate risk stratification (based on risk factors for PPH)</td>
</tr>
</tbody>
</table>
| **ROUTINE CARE**              | Optimise pre-delivery haemoglobin  
  i. Screen for anemia at booking: Investigate and treat appropriately
  ii. Ensure anemia corrected by 36 weeks
  iii. Pre-delivery haemoglobin ≥11g/dl for high risk group of patient
  iv. Documented plan of delivery |
| **MATERNAL BLOOD DISORDERS**  | Involve haematologist/physicians/combined clinic  
  i. Optimise blood disorders
  ii. Documented plan of care |
| **PREVIOUS CAESAREAN SECTION**| Ultrasound scan for placental localization  
If placenta praevia – do colour Doppler ultrasound scan to look for morbidly adherent placenta. |
| **ELECTIVE CAESAREAN SECTION & INDUCTION OF LABOUR (IOL)** | • Ensure procedure is indicated
• Check FBC
• Do group, screen & hold (GSH) |
<table>
<thead>
<tr>
<th>Clinical Aspects</th>
<th>Risk Reduction Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EPISIOTOMY</strong></td>
<td>• Selective use of episiotomy</td>
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<td></td>
<td>• Caution in patients with prominent vulval varicosities</td>
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<tr>
<td><strong>3rd STAGE OF LABOUR</strong></td>
<td>• Institute modified active management</td>
</tr>
<tr>
<td><strong>1 OR MORE IDENTIFIED RISK FACTORS FOR PPH</strong></td>
<td>• Deliver in hospital with specialist</td>
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<td></td>
<td>• IV access in active labour</td>
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<td></td>
<td>• Send blood sample for FBC and GSH</td>
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<td></td>
<td>• Active management of the 3rd stage</td>
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<tr>
<td><strong>CHORIOAMNIONITIS</strong></td>
<td>• Broad spectrum antibiotics</td>
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<td>• Close BP, PR, RR and temperature monitoring</td>
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<tr>
<td><strong>EMERGENCY CAESAREAN SECTION</strong></td>
<td>• Ensure IV access</td>
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<td>• Send group and cross-match (GXM)</td>
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<td>Ensure registrar/specialist present if:</td>
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<td></td>
<td>• Increased risk of extended uterine tears</td>
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<td>• Deeply engaged fetal head (e.g. prolonged second stage, failed instrumental delivery)</td>
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<td>• Transverse lie</td>
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<td>• Placenta praevia/abruptio</td>
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<td></td>
<td>• Evidence of abnormal coagulation</td>
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<tr>
<td><strong>INSTRUMENTAL DELIVERY</strong></td>
<td>• Ensure valid indication</td>
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<td>• Ensure prerequisites are fulfilled</td>
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<td></td>
<td>• Performed by a trained personnel</td>
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<tr>
<td><strong>TRIAL OF VAGINAL BIRTH AFTER CAESAREAN SECTION (VBAC)</strong></td>
<td>• Close monitoring for any early signs of uterine scar dehiscence/rupture</td>
</tr>
</tbody>
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Table 6: Postpartum Risk Reduction Measures

<table>
<thead>
<tr>
<th>Clinical Aspects</th>
<th>Risk Reduction Measures</th>
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<tbody>
<tr>
<td>1 OR MORE RISK FACTORS FOR PPH – OBSERVATION FOLLOWING VAGINAL DELIVERY AND CAESAREAN SECTION</td>
<td>- Monitor in HDU/labour room (at least for first 2 hours) using the MOMS Chart</td>
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<td>- Oxytocin infusion</td>
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<td>- Consider carbetocin in selected patients if available</td>
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<td>- Actively encourage/assist women to void soon after birth</td>
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<td>- Facilitate skin-to-skin contact with baby, under supervision</td>
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<td>- Promote endogenous release of oxytocin by:</td>
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<td>- Keeping the woman warm and calm</td>
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<td>- Assisting early breast feeding</td>
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<tr>
<td>EARLY RECOGNITION OF PERINEAL HAEMATOMA</td>
<td>Look for perineal haematoma if:</td>
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<tr>
<td></td>
<td>- Hypovolaemic shock disproportionate to the revealed blood loss</td>
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<td>- Feelings of pelvic pressure</td>
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<td>- Urinary retention</td>
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<td>- Excessive or persistent perineal pain</td>
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FLOWCHART MANAGEMENT OF PPH IN HOSPITAL

PREVENTION/EARLY RECOGNITION
Risk assessment for risk reduction measures (See Table 4-6)

EARLY DIAGNOSIS OF PPH
EBL >500ml (SVD)/>1L (CS) and/or haemodynamic compromise

GENERAL MEASURES:
To be done SIMULTANEOUSLY

COMMUNICATION
• Call for HELP: Activate ‘RED ALERT’, Address patient

INITIAL, ASSESSMENT & RESUSCITATION
Assess ‘ABC’ & resuscitate
• ‘A&B’ (Airway & Breathing):
  - High flow facial O2@15L/min
  - Consciousness level - if impaired, protect airway
• ‘C’ (Circulation):
  - Insert 2 14-16C cannulas, send urgent FBC/GXM/Coags/BUSE ±Ca²⁺ and lactate
  - IV fluid & blood component replacement
  - Insert CBD - monitor output

MONITORING & INVESTIGATION
• Monitor vital signs AT LEAST every 15 minutes & document - condition; BP/PR/RR/T/Pain score
• Assess on-going blood loss - rate & amount; I/O chart
• Keep patient warm
• Ensure investigations done + REVIEW result and TREAT accordingly

ARRESTING THE BLEEDING
Assess cause (remember 4 T’s below) & TREAT accordingly

Retained Placenta/POC (10%)
• Ensure 3rd stage uterotonic given
• Apply CCT & attempt delivery:
  - Successful: Check placenta is complete
• If unsuccessful/missing cotyledon or membranes:
  For MRP/digital evacuation (preferably in OT) with prophylactic broad-spectrum antibiotics
• Post-evacuation:
  - Massage uterus – assess tone
  - Give prophylactic oxytocin infusion

*continue to the next page
Uterine Atony (70%)
- Massage uterus
- Ensure 3rd stage oxytocin given
- Expel any blood clots; ensure bladder empty
- Administer IV drug (uterotonics):
  - IV oxytocin 5IU slowly, then oxytocin infusion
  - IM Syntometrine 1 ampoule
  - IM Carborprost 250mcg
  - PR Misoprostol

Genital Tract Trauma (20%)
- Massage uterus
- Ensure 3rd stage oxytocin given
- Expel any blood clots; ensure bladder empty
- Administer IV drug (uterotonics):
  - IV oxytocin 5IU slowly, then oxytocin infusion
  - IM Syntometrine 1 ampoule
  - IM Carborprost 250mcg
  - PR Misoprostol

Coagulopathy (<1%)
- Send FBC, Coags, LFTs, ABG
- Do not wait for blood result to treat
- Give
  - RBC, FFP, platelets
  - Cryoprecipitate if fibrinogen <2.5g/dL
  - Ca Glucnate if Ca<sup>2+</sup> <1.1mmol/L
- Avoid hypothermia and acidosis

Other Causes
- Look for other causes (not immediately obvious earlier)
- Consider
  - Uterine rupture
  - Uterine inversion (irregular fundus)
  - Puerperal haematoma
  - Non-genital cause (e.g. amniotic fluid embolism, subcapsular liver rupture)
- Repeat assessment of the 4 T's

TRAUMA

THROMBIN

SURGICAL INTERVENTIONS

Tissue
- Manual removal ± curettage

Tone
Consider:
- Intrauterine balloon tamponade
- Angiographic embolization
- Laparotomy:
  - B-Lynch suture
  - Pelvic devascularisation
  - Hysterectomy (consider early)

Trauma
- Optimise exposure with retractors
- Inspect cervix, vagina, perineum
- Assess uterus intact
- Repair – secure apex

Thrombin
Consider:
- Pelvic devascularisation
- Hysterectomy (consider early)

Unknown Cause
- EUA
- Laparotomy

Interim Care (during transfer to OT)
- Bimanual/aortic compression
- Lie patient flat/lateral
- Maintain facial oxygen
- Consider Massive Transfusion Protocol activation

Monitor:
- Vital signs - use MOMS chart
- Uterine tone
- Vaginal blood loss

Promote:
- Mother and baby bonding

Transfer to (as needed):
- Postnatal ward - once stable
- ICU or HDU

Documentation:
- Meticulous intrapartum + PPH event record
- Incident reporting/RCA

Post-natal Care:
- Patient support
  - Debrief patient post event and before discharge
  - Counsel husband/next-of-kin
- Treat anaemia
- VTE prophylaxis
  - Monitor for DVT/Pulmonary Embolism
- Arrange for follow-up
**PPH RESUSCITATION AND ANAESTHETIC MANAGEMENT (1)**

**Key to PPH management**

**Prompt restoration** of circulatory blood volume to restore tissue perfusion and oxygenation

1. Importance of **EARLY** recognition of major blood loss.
2. Need for **EFFECTIVE** action to **PREVENT** shock and its consequences.

**REMEMBER:** Visual estimation of blood loss is always **UNDERESTIMATED** - look for symptoms/signs in the tables below:

### CLINICAL CORRELATION OF BLOOD LOSS

<table>
<thead>
<tr>
<th>BLOOD LOSS (% blood volume) in 50 kg patient</th>
<th>MEAN ARTERIAL BLOOD PRESSURE (mmHg)</th>
<th>SYMPTOMS/SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15% (500ml)</td>
<td>Normal</td>
<td>Postural hypotension, Mild tachycardia (90-100bpm)</td>
</tr>
<tr>
<td>15-30% (1,000-1,500ml)</td>
<td>Slight fall</td>
<td>Tachycardia (110-120bpm) - Thirst - Weakness</td>
</tr>
<tr>
<td>30-40% (1,500-2,000ml)</td>
<td>50-70</td>
<td>Tachycardia (120-140bpm) - Pallor - Oliguria (&lt;30ml/hr) - Confusion - Restlessness</td>
</tr>
<tr>
<td>&gt;40% (&gt;2,000ml)</td>
<td>&lt;50</td>
<td>Tachycardia &gt;140bpm - Anuria - Air hunger - Coma - Death</td>
</tr>
</tbody>
</table>
### SIGN OF SHOCK

<table>
<thead>
<tr>
<th>EARLY SHOCK</th>
<th>LATE SHOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awake, aware, anxious</td>
<td>Confused or unconscious</td>
</tr>
<tr>
<td>Slightly fast pulse (110 per minute or greater)</td>
<td>Very fast and weak pulse</td>
</tr>
<tr>
<td>Slightly fast breathing (30 respirations per minute or greater)</td>
<td>Extremely fast and shallow breathing</td>
</tr>
<tr>
<td>Pale</td>
<td>Pale and cold</td>
</tr>
<tr>
<td>Mild low blood pressure (systolic less than 90mmHg)</td>
<td>Very low blood pressure</td>
</tr>
<tr>
<td>Urine output of 30ml per hour or greater</td>
<td>Urine output less than 30ml per hour</td>
</tr>
</tbody>
</table>

**N.B.** Physiological changes renders BP & PR relatively insensitive during pregnancy. Tachycardia does not develop until blood loss ≥15% of total blood volume. BP only drops after blood loss exceeds 30-40% of total blood volume - presence of hypotension indicates massive blood loss.
PPH RESUSCITATION AND ANAESTHETIC MANAGEMENT (2)

PRINCIPLES OF MANAGEMENT

All FOUR components of management **MUST** be done **SIMULTANEOUSLY**
(See also ‘Management of Primary PPH in Hospital’)

COMMUNICATION

RESUSCITATION

MONITORING AND INVESTIGATION

ARRESTING THE BLEEDING

RESUSCITATION

PROMPT and ADEQUATE resuscitation must be done BEFORE patient decompensated

**Assess ‘ABC’**

- Airway
- Breathing
- Circulation

**‘A&B’**

- Give 15l/min $O_2$ (via face mask)
- Protect airway

**‘C’**

IV access - 2 large bore cannulas & send blood for FBC, GXM, Coags, BUSE ± Ca$^{2+}$ + lactate

**Fluid Resuscitation**

- Warmed fluid via rapid infuser or pressure bags while awaiting for bloods:
  - Crystalloids (Ringer’s Lactate) up to 2 litres
  - Colloids (Gelofusine) up to 1-2 litres
- Replace 1ml of blood loss by infusing 3ml of crystalloid or 1.5ml of colloid

**Blood & Blood Products**

- Consider activation of ‘Massive Transfusion Protocol’ (MTP)
- Clinical judgement for transfusion must not be hampered by lab results

**Drugs**

- Consider pharmacological means depending on patient’s condition
  - 10ml 10% Ca Gluconate
  - Uterotonics
  - IV tranexamic acid, rFVIIa
  - Vasopressor or inotropic drugs

BLOOD LOSS FLUID REPLACEMENT GUIDE

Replace 1ml of blood loss with 3ml of crystalloid or 1.5ml of colloid.
E.g. 500ml of blood loss requires 1,500ml of Ringer’s Lactate or 750ml of Gelofusine.
RAPID replacement is pertinent to prevent multi-organ impairment/failure.
PPH RESUSCITATION AND ANAESTHETIC MANAGEMENT (3)

MONITORING AND INVESTIGATION

- BP, PR, RR, SpO2, Temperature (avoid hypothermia), Pain score
- Fluid balance - urine output
- Early invasive monitoring - arterial line, beat to beat blood pressure (guide to response and transfusion therapy + frequent blood sampling)

N.B. Central venous line is not imperative and can wait until the situation is under control. It should not interfere with prompt resuscitation. It may be necessary for infusion of inotropes/vasopressors or help with rapid fluid transfusion rather than to measure numbers e.g. CVP

ANAESTHETIC MANAGEMENT

If surgical management is indicated in PPH cases

PRE-OPERATIVE CARE
Address haemodynamic compromise and coagulopathy whenever possible - surgical control may be at times required to enable effective resuscitation.

CHOICE OF ANAESTHESIA
- If haemodynamically compromised - general anaesthesia is usually indicated.
- Regional anaesthesia may be contraindicated due to maternal coagulopathy - risk of neuraxial haematoma + haemodynamic compromise.
- Rapid sequence induction, following antacid prophylaxis.
- Suitable induction agent: IV Ketamine (0.7-1.5mg/kg).

INTRA-OPERATIVE CARE

DO
During surgical haemostasis - aim for optimal mean arterial pressure; once haemostasis secured - can push BP up to patient’s normal baseline.
Fluid management is MOST important - ensure RAPID replacement in massive blood loss while awaiting for blood.
If blood loss is >30% - BLOOD transfusion MUST be started.
REMEMBER that blood loss is often UNDERESTIMATED.

BE CAUTION on FLUID BALANCE
- Over transfusion and dilution before surgical haemostasis is associated with proper outcome.
Avoid the vicious cycle of hypothermia, acidosis and coagulopathy in the massively transfused patient - give warm fluids & use blanket warmer.
Correct electrolyte imbalance - especially hyperkalaemia & hypocalcaemia.

POST-OPERATIVE CARE

If patient has lost a massive amount of blood leading to massive fluid shift, it is safer not to reverse the patient and to continue postoperative management in ICU.
Placenta not expelled within 30 minutes after delivery of baby.

**Initial Management:**
- Assess patient and resuscitate
  - 2 large bore IV access
  - Take FBC & GXM
- Insert CBD - empty the bladder.
- Uterine massage ± uterotonic.

**Caution:**
- Avoid excessive cord traction - may cause uterine inversion or the cord to be snapped.
- Monitor vital signs and blood loss every 15 minutes.

**Prepare for ‘Manual Removal of Placenta’ (MRP):**
- Take consent from patient + explain to partner/next-of-kin.
- Give single dose prophylactic antibiotic before MRP.
  - Ideally to be done in OT.

**POST MRP CARE:**
- Monitor pulse rate, blood pressure, respiratory and check the amount of vaginal bleeding hourly.
- If necessary, correct dehydration or shock by giving intravenous fluids. If the woman is in shock, start blood transfusion.
- Ensure adequate analgesia.
MANAGEMENT OF RETAINED PLACENTA (2)

Step 1
Introduce hand into the vagina along cord up to the uterus

- Use MRP gloves
- Clamp the umbilical cord
- Insert hand into vagina and up into the uterus along the cord

Step 2
Detach the placenta while supporting the fundus

- Use non-dominant hand to support the uterus
- Move fingers laterally and locate edge of placenta
- Identify line of cleavage between placenta and uterine wall
- Detach placenta manually

Step 3
Proceed slowly until whole placenta is detached

- Provide counter-traction to the fundus with the other hand
- If placenta does not separate by gentle movement of fingertips, suspect morbidly adherent placenta and STOP further attempt

Step 4
Deliver the placenta

- Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with the hand
- Ensure uterine cavity is empty and placenta is complete
- Start IV Oxytocin infusion
MANAGEMENT OF GENITAL TRACT TRAUMA

SUSPECT GENITAL TRACT TRAUMA IF BLEEDING CONTINUES DESPITE A WELL-CONTRACTED UTERUS

Bleeding can be profuse due to vascularity of vagina and cervix.

EXAMINATION FOR GENITAL TRACT TRAUMA

Preparation:
- Ideally in OT
- Good lighting + at least 2 assistants

Examination:
- First, the cervix
- Then, the fornices
- Followed by the lateral vaginal walls
- Finally, the perineum

Fornices: If extended lacerations upwards & pelvic mass felt beside uterus - SUSPECT bleeding into broad ligament (may be extensive)

One Trauma Identified:

VAGINAL WALL LACERATION
- Secure any arterial bleeding
- If apex high - use stay sutures placed as high as possible
- If vagina too firable - consider vaginal packing for 12-24 hours + antibiotic + CBD

DO NOT FORGET to administer prophylactic antibiotic

VAGINAL WALL LACERATION

Infra-Levator Haematoma:
- <5cm - conservative management
- >5cm or expanding - surgical intervention

Supra-Levator Haematoma:
- Suspect if patient’s condition is disproportionate to visible blood loss
- Patient stable, size ↔ - conservative management
- Patient unstable, size ↑ - surgical management

Source: Google Image
MANAGEMENT OF UTERINE INVERSION

ACUTE UTERINE INVERSION MAY PRESENT WITH SUDDEN COLLAPSE DURING THE THIRD STAGE OF LABOUR DUE TO NEUROGENIC SHOCK

- Mass in the vagina or outside the introitus is found.
- The uterine fundus may be indented or not palpable per abdomen.

REPLACEMENT FOR UTERINE INVERSION

If replacement is delayed, it will be more difficult due to the constricting ring around the uterus

Hydrostatic Replacement
- Resuscitation +
- Adequate Analgesia +
- Manual Replacement

O’ Sullivan’s Technique
- Remind!
- Do not remove the placenta until replacement of the uterus

Huntington’s procedure
- Haultain’s procedure

Surgical Replacement

“Last thing out, first thing in”

After replacement:

Commence IV infusion of 40 units oxytocin in 1 pint Hartman/NaCl for 4-6 hours - to prevent recurrence and uterine atony + start prophylactic antibiotics.
MANAGEMENT OF UTERINE RUPTURE

INCREASED RISK IN PATIENT WITH:

- Previous uterine surgeries - e.g. myomectomy, caesarean section, previous cornual ectopic resection.
- Short pregnancy interval and prostaglandin induction.

CLINICAL PRESENTATION

- Persistent pain in between contractions or cessation of contraction
- Fresh vaginal bleeding/haematuria
- Uterine scar tenderness
- Maternal tachycardia
- Fetal heart rate abnormality
- Sudden collapse
- Intrauterine death
- Disengaged fetal head

MANAGEMENT OF UTERINE RUPTURE

RESUSCITATION

LAPAROTOMY

Repair rupture is possible

HYSTERECTOMY IF:

- Rupture is beyond repair
- Unable to secure haemostasis
MANAGEMENT OF TRAUMA DURING CAESAREAN SECTION (CS)

**RISK FACTORS**
- Deeply engaged head - e.g. failed instrumentation, 2nd stage CS
- Difficult delivery
- Obstructed labour
- Fetal malposition
- Transverse lie requiring surgical extension

**PREVENTION**

**PRE-DELIVERY**
- Valid indication for CS
- Trained & experience surgeon
- Assistant available to aid in fetal head disengagement
- Reassess VE before under anaesthesia - exclude impending vaginal delivery
- Perform CS in modified lithotomy position

**INTRA-OPERATIVELY:**
- Adequate exposure and incision size
- Bladder may be distended - enter peritoneal cavity as high as possible
- Slightly higher incision at the lower segment
- AVOID blunt lateral extension - use scissor to extend incision laterally with curve and upwards incision

**REMEMBER:** Deliver the fetal head in between contractions

**POST-DELIVERY**
- Give prophylactic uterotonics (IV oxytocin 5IU)
- Exteriorize the uterus if extended tears are suspected (see management of extended tear)

**AVOID** blunt lateral extension - use scissor to extend incision laterally with curve and upwards incision

Worst case scenario:
- Consider ‘inverted T’, ‘J’ or ‘U’ incision
- Grab fetal legs and deliver as breech

Use left/non-dominant hand to assist disimpaction of the fetal head with an assistant dislodging it from below

If unsuccessful - consider SC Salbutamol 0.25mg

If still fails - use right hand to push fetal shoulders upwards until fetal head accessible to left hand
Consider the use of Tranexamic Acid for bleeding from genital tract trauma
MANAGEMENT OF TRAUMA DURING CAESAREAN SECTION

MANAGEMENT OF ‘BLEEDERS FROM PLACENTAL BED’

**COMMON** following CS for placenta praevia (especially posterior praevia)  
Uterine tamponade: E.g. Bakri Balloon insertion (abdominal approach)

**Initial Management**
- EXTERIORIZE the uterus
- Administer UTEROTONICS

**Secure Bleeders**
- Apply multiple figure of ‘8’ sutures (polyglycolic 2/0) at placental bed

**Consider**
- Vertical compression sutures & bilateral uterine artery ligation

**REPAIR OF CERVICAL TEAR**

**USE SIM’S SPECULUM TO VISUALISE CERVIX AND IDENTIFY TEAR**

- Place sponge forcep on each side of the tear
- Pull both forceps with one hand toward you to hold it steady during repair
- Start suturing from the apex (top) of the tear

Holding the cervix steady with forceps for repair

- If apex high, place stay suture below it & pull on it to help you reach the apex
- Apply interrupted sutures (taking whole thickness of each lip of cervix), 1cm apart
- After suturing; Observe for few minutes to ensure haemostasis secured

Repairing the tear along the length of the wound
MANAGEMENT OF ADHERENT PLACENTA – DIAGNOSIS

Antenatal Care

Risk Assessment (Risk Factors for Adherent Placenta)
E.g. placenta praevia, previous CS, previous curetage/myomectomy, advanced maternal age, multiparity.

Ultrasound scan (USS) at 20 weeks and 32 weeks for placental localisation. Look for USS signs of adherent placenta - consider MRI.

<table>
<thead>
<tr>
<th>Ultrasonographic Signs of Placenta Accreta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey Scale Signs</td>
</tr>
<tr>
<td>Loss of retroplacental hypoechoic zone</td>
</tr>
<tr>
<td>Progressive thinning of the retroplacental hypoechoic zone (myometrium) &lt;2mm</td>
</tr>
<tr>
<td>Multiple placental lakes</td>
</tr>
<tr>
<td>Thinning of the uterine serosa-bladder wall complex (percreta)</td>
</tr>
<tr>
<td>Elevation of the tissue beyond the uterine serosa-extension of the placenta beyond the myometrium (percreta)</td>
</tr>
</tbody>
</table>

Diagnosis of ‘Adherent Placenta’

- **Accreta**: Placental villi are attached directly but does not invade the myometrium
- **Increta**: Placental villi invade the myometrium
- **Percreta**: Placental villi invade beyond the whole myometrium, into the uterine serosa and possibly into the adjacent organs
MANAGEMENT OF ADHERENT PLACENTA DURING DELIVERY

PRE-DELIVERY

- Brief patient and husband/next-of-kin:
  - On-going, documented communication on decision-making
  - Inform risks involved/plan to reduce risks
- Brief team involved:
  - O&G - may need gynae-oncologist back-up (if available)
  - Anaesthetist - ensure effective on-going communication
  - Paediatrician - preterm delivery, anticipate difficult delivery
  - Urologist/surgeon - standby if percreta suspected
  - Interventional radiologist (if available) - pelvic artery balloon placement
  - Blood bank - ensure at least 4 - 6 units of blood available in OT before surgery, may need more + other blood products
- ‘Map’ out the placenta - assist plan for uterine incision
- Corticosteroid cover if delivery before 37 completed weeks

AT DELIVERY - TO BE DONE IN MAIN OT COMPLEX

MULTIDISCIPLINARY TEAM MANAGEMENT

- O&G specialist (senior obstetrician/gynae-oncologist input)
- Anaesthetist
- Paediatrician
- Surgeon/urologist, interventional radiologist
- Blood bank team

Uterine Incision

| Away from placental site | Consider classical CS |
Careful attempt* at spontaneous placental delivery
(If interventional radiology available - consider prophylactic balloon placement/embolization)

Deliver placenta with usual measures

Easy separation?

YES → Deliver placenta with usual measures

NO → STOP attempt!

AFTER DELIVERY OF BABY

Bleeding?

YES → Leave placenta in situ, close the uterus and proceed with hysterectomy
Consider ligation of uterine blood supply

NO → Want to preserve fertility?

YES → Leave placenta in situ, close the uterus and proceed with hysterectomy
Consider ligation of uterine blood supply

NO → Consider ligation of uterine blood supply

*Attempt for placental delivery may result in excessive bleeding - reasonable to attempt if diagnosis of adherent placenta cannot be made with 100% certainty.

• βhCG monitoring - only an ancillary aid
• Often methotrexate is not required - placenta ceases to function after delivery
• In some cases, hysterectomy may need to be performed for late occurring haemorrhage

Expectant/medical management:
- Leave placenta in situ
- Antibiotics prophylaxis
- Uterotonics
- Serial ultrasound scans
### MANAGEMENT FLOWCHART FOR SECONDARY PPH

**Initial Response: Resuscitate & Establish Cause**

<table>
<thead>
<tr>
<th>Resuscitation</th>
<th>Look for cause &amp; temporarily arrest bleeding</th>
<th>Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Call for HELP&lt;br&gt;• Remember ‘ABC’&lt;br&gt;• $O_2$ by face mask 15l/min&lt;br&gt;• IV access (2 large bore $\geq 16G$): Fluid ± blood&lt;br&gt;• BP/PR/RR/Temp, I/O chart, other symptoms (e.g. pain)</td>
<td>• Possible causes: Subinvolution of uterus (due to retained POC, endometritis) lower genital tract trauma&lt;br&gt;• History, clinical signs/symptoms, vital signs&lt;br&gt;• Estimate blood loss, arrest bleeding as feasible</td>
<td>• FBC&lt;br&gt;• Coagulation profile&lt;br&gt;• GSH/GXM&lt;br&gt;• C&amp;S: Vaginal, blood, urine&lt;br&gt;• Ultrasound scan</td>
</tr>
</tbody>
</table>

**Directed Therapy**

<table>
<thead>
<tr>
<th>Tone (Subinvolution of uterus)</th>
<th>Tissue (Retained POC, infection)</th>
<th>Trauma (Missed vaginal lacerations, haematomas)</th>
<th>Thrombin (Coagulopathy, anticoagulants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Uterine massage&lt;br&gt;• Bimanual compression&lt;br&gt;• Uterotonic drugs</td>
<td>• If complicated with atonic uterus, see under ‘Tone’&lt;br&gt;• Antibiotics&lt;br&gt;• Evacuation of retained POC</td>
<td>• Uterine massage&lt;br&gt;• Bimanual compression&lt;br&gt;• Uterotonic drugs</td>
<td>• Replace factors&lt;br&gt;• Reverse anticoagulation</td>
</tr>
</tbody>
</table>

**Intractable Bleeding**

<table>
<thead>
<tr>
<th>Extra Help &amp; Resuscitation</th>
<th>Local Control</th>
<th>Surgery (Locate source, stem bleeding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activate RED ALERT&lt;br&gt;• Continue resuscitation (fluid ± blood products)&lt;br&gt;• Close vital signs monitoring&lt;br&gt;• Consider other uterotonic, IV tranexamic acid, rFVIIa</td>
<td>• Bimanual compression&lt;br&gt;• Ballon tamponade&lt;br&gt;• Uterine/vaginal packing before definitive surgery&lt;br&gt;• Selective arterial embolisation (if available)</td>
<td>• EUA, repair laceration&lt;br&gt;• Pelvic devascularisation&lt;br&gt;• Hysterectomy</td>
</tr>
</tbody>
</table>
**IMMEDIATE MEASURES**  
(Ideally should be done SIMULTANEOUSLY)

<table>
<thead>
<tr>
<th>Call for HELP</th>
<th>Assessment</th>
<th>Resuscitation</th>
</tr>
</thead>
</table>
| • ‘Obstetric Retrieval Team’ and/or nearest health facility  
• State CLEARLY on need for help  
• INFORM that this is a case of PPH | • General condition (awareness level/pallor)  
• BP, PR, RR every 15 mins  
• Assess blood loss  
• Palpate uterus  
• Check bladder, catheterise  
• Examine placenta | • Keep patient flat with leg elevated  
• Assess ‘ABC’  
• Set 2 large bore cannula (18G or larger): Run fluid fast  
• Consider uterotonics  
• Keep patient warm |

---

**Establish Cause**

1. **Check Placenta**
   - Retained Placenta?  
   - **YES**  
   - Do not attempt to remove the placenta if it is retained unless there is evidence of complete separation  
   - **NO**

2. **Check Uterus**
   - Atonic Uterus?  
   - **YES**  
   - Repeat uterotonics  
   - Consider IV oxytocin infusion  
   - Minimise further bleeding - uterine massage, bimanual/aortic compression  
   - **NO**

3. **Check Genital Tract**
   - Genital Tract Trauma?  
   - **YES**  
   - Suspect if contracted uterus but patient is still bleeding  
   - Suture tear/ clamp bleeders if feasible  
   - If not feasible, vaginal packing  
   - **NO**

---

**Waiting/During Transfer:**

- Continue to access and resuscitate patient  
- Proper documentation - use referral checklist  
- Consider balloon tamponade/anti shock garment if available  
- Proper handover to receiving team
REFERRAL AND DOCUMENTATION FOR PPH PATIENTS

Referral

1. Health clinic: to Sister or Medical Officer (MO)
2. Hospital without specialist: to the O&G MO on-call
3. Hospital with specialist: to the O&G MO/Specialist on-call

Telephone Call

- Alert the receiving hospital about the case, so due preparation can be taken:
  - Inform OT to standby
  - Inform blood bank
- Provide opportunity for more senior personnel to give advice on pre-transfer care:
  - Optimal resuscitation
  - Reduce further blood loss
  - If further assistance required pre-transfer (e.g. obstetric retrieval team to site)

FILL-UP FORMAL REFERRAL/MONITORING FORM (SEE BELOW)

Pre-Transfer

Communicate
Inform patient
Inform husband/next-of-kind on patient’s condition and need for transfer

During Transfer

Continue
Patient’s monitoring and ENSURE documentation pre – and during transfer

<table>
<thead>
<tr>
<th>Care</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraction of uterus</td>
<td>• Massage the uterus</td>
</tr>
<tr>
<td></td>
<td>• Bimanual compression of the uterus</td>
</tr>
<tr>
<td></td>
<td>• Repeat oxytocin (IV or IM) if necessary</td>
</tr>
<tr>
<td>To reduce further blood loss</td>
<td>• Intrauterine balloon</td>
</tr>
<tr>
<td></td>
<td>• Vaginal packing for genital tract trauma</td>
</tr>
<tr>
<td></td>
<td>• Manual compression of the aorta</td>
</tr>
<tr>
<td></td>
<td>• Anti-shock garment when available</td>
</tr>
<tr>
<td>Maintaining haemodynamic stability</td>
<td>• Administer O₂</td>
</tr>
<tr>
<td></td>
<td>• IV fluid, plasma expanders</td>
</tr>
<tr>
<td></td>
<td>• Blood transfusion when available</td>
</tr>
<tr>
<td>Observation</td>
<td>• Check level of consciousness, colour, pulse, BP, RR, blood loss, pain score</td>
</tr>
<tr>
<td></td>
<td>• CBD – I/O chart</td>
</tr>
<tr>
<td>Hypothermia prevention</td>
<td>• Blankets</td>
</tr>
<tr>
<td>Accurate documentation</td>
<td>• Use monitoring/referral checklist</td>
</tr>
<tr>
<td>Communication</td>
<td>• Receiving hospital</td>
</tr>
<tr>
<td></td>
<td>• Family members</td>
</tr>
</tbody>
</table>
# PPH Referral/Monitoring Form

**Patient's Name:** ____________________________  **Date:** ________

**I/C No:** ____________________________  **Parity:** ____________  **Time:** ________

<table>
<thead>
<tr>
<th>Place of Delivery</th>
<th>Home/Health Clinic/ABC:</th>
<th>District Hospital:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Arrival to site @ _______/Admission on _________; Referral made @ ________; Transport arrive @ _________ &amp; leave site @ _________ &amp; arrive @ _________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mode/Time of Delivery</th>
<th>SVD/ BBA @ _______ Conducted by: JM/ SN/Others</th>
<th>SVD/ BBA/Instrumental/ CS @ ________ Conducted by: JM/SN/DR/ Others</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Baby's Details</th>
<th>POG: _______; Number of baby(ies): 1/2/3/ _____; Sex: ___________ Weight: ___________; Apgar Score: _____@ 1 min, _____ @ 5 min, _____@ 10 min</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Delivery of Placenta</th>
<th>Placenta delivered? Yes/No If YES: ▪ Method of delivery? CCT/MRP ▪ Time of delivery? ▪ Complete? Yes/No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Delivery of Placenta</th>
<th>Placenta delivered? Yes/No If YES: ▪ Method of delivery? CCT/MRP ▪ Time of delivery? ▪ Complete? Yes/No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Perineum</th>
<th>Perineum intact? Yes/No If NO: ▪ Episiotomy done? Yes/No ▪ Type of perineal tear? 1st degree/2nd degree/3rd degree/4th degree ▪ Repaired? Yes/No/Partially</th>
</tr>
</thead>
</table>

| Estimated Blood Loss (ml) | |
|---------------------------| |

<table>
<thead>
<tr>
<th>Time</th>
<th>C=Conscious; U=Unconscious; D= Drowsy + P=Pale; N=Not Pale (Pink), e.g. C/NP (Conscious/Not Pale)</th>
</tr>
</thead>
</table>

| BP | |
|----| |

| PR | |
|----| |

| RR | |
|----| |

| Temperature | |
|-------------| |

<p>| Pain Score (0–10) | |
|------------------| |</p>
<table>
<thead>
<tr>
<th>Drugs*</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxytocin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntometrine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misoprostol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carboprost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Saline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hartmann’s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gelofusine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB/PC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFP’s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Fluids*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood &amp; Blood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Products*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Treatment/ Emergency Procedures Done:

- ☐ Balloon tamponade:
- ☐ CPR:

Additional Remarks

*Please includes time, dose/units and routes of administration where applicable.

Name, Stamp & Signature:
## MANAGEMENT OF COAGULATION DISORDERS (1)

### GENERAL MANAGEMENT

Patients should ideally be managed by a multidisciplinary team involving a consultant obstetrician, haematologist and anaesthetist.

### BLEEDING DISORDERS IN PREGNANCY

**A) Coagulation**

<table>
<thead>
<tr>
<th>Inherited (Rare – consider in patient with atypical presentation)</th>
<th>Acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Von Willebrand’s disease</td>
<td>• Obstetric causes:</td>
</tr>
<tr>
<td></td>
<td>a) HELLP Syndrome</td>
</tr>
<tr>
<td></td>
<td>b) Placental abruption</td>
</tr>
<tr>
<td></td>
<td>c) Amniotic fluid embolism</td>
</tr>
<tr>
<td></td>
<td>d) Sepsis/chorioamnionitis</td>
</tr>
<tr>
<td></td>
<td>e) Intra-uterine death</td>
</tr>
<tr>
<td>• Haemophilia</td>
<td>• Consumptive coagulopathy from massive blood loss (occurs when almost 80% of total blood volume is lost – LEADING cause of DIC in obstetrics)</td>
</tr>
<tr>
<td>• Prothrombin/fibrinogen deficiency</td>
<td>• Drug-induced – including anticoagulants, traditional medications</td>
</tr>
</tbody>
</table>

**B) Thrombocytopenia/platelet dysfunction – e.g. ITP, dengue**

**C) Vessel wall – e.g. connective tissue, drugs, hereditary defects, vasculitis**
DISSEMINATED INTRAVASCULAR COAGULOPATHY (DIC)

- Characterized by systemic activation of blood coagulation system
- This results in deposition of fibrin, leading to microvascular thrombi in various organs, causing multi-organ dysfunction
- Consumption and severe exhaustion of clotting factors may induce severe bleeding

PRINCIPLE OF MANAGEMENT

**CLINICAL JUDGEMENT** of DIC is essential.
**DO NOT DELAY** intervention until laboratory confirmation!

- **IDENTIFY** the coagulopathy
- **CORRECT** the coagulopathy/REPLACE blood and blood products
- **TREAT** the underlying cause/REMOVE trigger factors
- **MANAGE** complications

Consider use of Recombinant Factor Vlla (rFVlla) in refactory DIC or as an adjuvant - see below

See reference on blood and blood products transfusion + therapeutic aim of management
MANAGEMENT OF COAGULATION DISORDERS (2)

CONTINUATION OF DIC MANAGEMENT

RECOMBINANT FACTOR VLLA (rFVIIa)

- Off-license use in PPH cases - see also section on drugs.

PRE-REQUISITE

- Hct >24%
- Fibrinogen >0.5-1.0 g/l (where available)
- Platelets >50x10⁹/l
- pH ≥7.2

PREPARATION

Available as NOVO 7
2 available preparations:
- 1,000mcg vial
- 2,000mcg vial

DOSE

Recommended dose:
- 90mcg/kg rounded up to a whole vial
- E.g. a 70kg patient, need 6,300mcg - use 6 vials of 1,000mcg/vial or 3 vials of 2,000mcg/vial

May be repeated in 15-30 mins if no response

DELIVERY OF PATIENTS IN DIC

- Vaginal delivery is NOT a contraindication but MUST anticipate PPH.

Vaginal Delivery (VD)

1.5 x mean control
- Conducted by the seniormost personnel
- Avoid intramuscular injections, internal scalp electrodes, fetal blood sampling, episiotomies and instrumental deliveries

Caesarean Section (CS)

- Should be performed for obstetric indications, done by specialist:
  - Midline skin incision
  - Consider use of intra-peritoneal and sub-rectus drains
  - Skin closure - interrupted sutures
- Transfuse platelets (just prior to skin incision) to achieve desired range of safe surgery:
  - Platelet >80 x 10⁹/l
  - INR <1.5 x mean control
MANAGEMENT OF COAGULATION DISORDERS (3)

PATIENTS ON ANTICOAGULANT TREATMENT

• Patients on anticoagulation treatment should deliver in tertiary hospitals.

ASPIRIN

• Aspirin DOES NOT increase the risk of haemorrhage.
• The benefits of continuing aspirin till delivery outweighs the risk of haemorrhage - should not be routinely stopped at 36 weeks due to concern of haemorrhage.

Unfractionated Heparin (UH)

<table>
<thead>
<tr>
<th>IV heparin</th>
<th>should be withheld 6 hours prior to CS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/C heparin</td>
<td>should be withheld 12 hours prior to CS.</td>
</tr>
</tbody>
</table>

Antidote: Protamine sulphate, ONLY used if patient had massive bleeding. 1mg of protamine sulphate is used per 100 units of heparin.

Low Molecular Weight Heparin (LMWH)

Pre-Delivery
If any signs/symptoms of labour, advise patient to STOP LMWH & present themselves to the nearest hospital ASAP for review.
If elective delivery is planned, prophylactic LMWH treatment should be withheld at least 12 hours and 24 hours for therapeutic treatment.

In Labour/Delivery
Ensure patients have 2 large bore branula and GSH done. Avoid intramuscular injections, routine episiotomies, internal fetal scalp monitoring, fetal blood sampling or instrumental deliveries.
If CS required - should be performed by a specialist; consider intraperitoneal and subrectus drains + close the skin with interrupted sutures.

Post-Delivery
Initiate LMWH 4 hours after the delivery.
Epidural catheter should not be removed within 12 hours of administration & LMWH can be re-initiated 6 hours after removal of epidural.

Warfarin

Pre-Delivery
Ideally, revert patient to LWMH/ UH by 36 weeks and planned for an elective delivery.

Labour/Delivery
CS limited to obstetric indications.
Manage patients on warfarin in labour with high INR by their symptoms:
• If no bleeding tendencies, give IV Vitamin K 1mg od
• If has bleeding tendencies, give higher dosages of Vitamin K (5mg) + 15mls/kg FFP + 30-50 units/kg prothrombin complex

Post-Delivery
Initiate warfarin on day 3 post-delivery (once the patient has no more substantial risk of bleeding).
Initiate LMWH 4 hours post-delivery and overlap with warfarin until desired INR is achieved.
Breastfeeding is not a contraindication.
BLOOD TRANSFUSION IN PPH CASES (1)

INFORMATION ON VARIOUS BLOOD PRODUCTS

<table>
<thead>
<tr>
<th>Blood Products</th>
<th>Volume (mL/unit)</th>
<th>Contents</th>
<th>Effects</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packed Red Cells</td>
<td>280±50</td>
<td>Red blood cells, White blood cells &amp; plasma</td>
<td>Increase haematocrit by 3% Increase Haemoglobin by 1gm/dl</td>
<td>ABO and Rhesus</td>
</tr>
<tr>
<td>Platelets</td>
<td>50±10</td>
<td>Platelets, Red blood cells, White blood cells &amp; plasma</td>
<td>Increase platelets counts between 5-10 x 10⁹/l</td>
<td>ABO and Rhesus</td>
</tr>
<tr>
<td>Fresh Frozen Plasma (FFP)</td>
<td>200-250</td>
<td>Fibrinogen, antithrombin III, factor V and VIII</td>
<td>Increase fibrinogen by 10mg/dl</td>
<td>ABO No need Rhesus compatibility</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>40±10</td>
<td>Fibrinogen, factors III and XIII, Von Willebrand factor</td>
<td>Increase fibrinogen by 10mg/dl</td>
<td>ABO No need Rhesus compatibility</td>
</tr>
</tbody>
</table>

THERAPEUTICS AIMS OF MANAGEMENT
(Adapted from Malaysian CPG on Blood Transfusion)

- **HAEMOGLOBIN**: >8 g/dL
- **PLATELET COUNT**: 75 x 10⁹/L
- **PROTHROMBIN TIME (PT)**: 1.5 x mean control
- **ACTIVATED PROTHROMBIN TIME (APTT)**: <1.5 x mean control
- **FIBRINOGEN LEVEL**: >1.0g/L

GUIDE TO BLOOD PRODUCT REPLACEMENT 1

Red Cells

- Decision for transfusion should be based on CLINICAL judgement (lab confirmation may not be immediately available).
- Haemodynamic instability and rapid, on-going blood loss are essential factors of consideration, rather than the estimated blood loss.
- If no record of red cell antibodies, ABO and Rh compatible, cross matched blood should be available within 30 minutes (maximum of 45 minutes).
- Packed red cell is preferable. In emergency setting, consider fresh whole blood transfusion while awaiting for DIC regime.
- Depending on rate/severity of bleeding, consider safe ‘O’ red cells transfusion first while awaiting for cross matched blood.
BLOOD TRANSFUSION IN PPH CASES (2)

GUIDE TO BLOOD PRODUCT REPLACEMENT 2

FRESH FROZEN PLASMA
- Used to correct PT or APTT.
- Takes 30 minutes to thaw.
- Dosage: 12-15ml/kg. Rough guide - use 1L of FFP.

CRYOPRECIPITATE
- Contains more fibrinogen.
  Beneficial in correcting hypofibrinogenemia—
  which is common in patients with massive haemorrhage.
- Takes 30 minutes to thaw.
  Dosage: 1-2 units/10kg.

PLATELETS
- Consider transfusion if levels <50 x 10^9/l.
- One unit will increase the count by 5-10 x 10^9/l.
  - i.e. 6 units of platelets will increase the total platelets by 30-60 x 10^9/l.
- Desired target for vaginal delivery is >50 x 10^9/l and >80 x 10^9/l for epidural and caesarean delivery.

VARIOUS DIC REGIMES

<table>
<thead>
<tr>
<th>REGIME</th>
<th>COMPONENTS</th>
</tr>
</thead>
</table>
| STANDARD REGIME (60 KG PATIENT) | 12-15ml/kg FFP = 4 units  
1-2 units/10kg of cryoprecipitate = 6 units  
2 units of platelets = increase platelets by 10-20 x 10^9/l  
(recommended 4 units) |
| REGIME RATIO | RBC:Plasma:Platelets = 4:1:1  
(*massive transfusion protocol = 4:2:2)  
i.e. for every 4 units of RBC, give 1 (2*) unit of FFP + 1 (2*) unit of platelets |
| ALTERNATIVE REGIME** | RBC:Plasma:Platelets = 1:1:1  
i.e. for every unit of red cell = 1 unit of FFP + 1 unit of platelets  
(**can be considered in massive or refractory DIC) |

REMEMBER: DIC or NOT a fixed regime of 6:4:2. It should be BASED on the patient’s weight, severity and ongoing blood loss. It can be repeated every 15-30 minutes for ongoing blood loss. Check FBC, PT/APTT and Fibrin Degradation Products.
### Adverse Effects of Transfusion

Can be associated with acute or delayed adverse effects - ranging from brief episodes of fever to life threatening haemolysis.

Personnel involved **MUST** be able to **RECOGNIZE** its signs/symptoms and **MANAGE** them.

Checklist and consent form **MUST** be **COMPLETED** **BEFORE** transfusion.

### Adverse Effects of Transfusion

#### Acute Adverse Effects (≤24 Hours of Transfusion)
- **Immune**
  - Acute Hemolytic Transfusion Reaction
  - Transfusion Related Acute Lung Injury
  - Anaphylaxis/Anaphylactoid Reactions
  - Febrile Non Hemolytic Transfusion Reaction
  - Allergic Reaction

- **Non-Immune**
  - Bacterial Contamination
  - Transfusion Associated Circulatory Overload (TACO)

#### Delayed Adverse Effects (>24 Hours of Transfusion)
- **Immune**
  - Delayed Hemolytic Transfusion Reaction
  - Transfusion Associated Graft Versus Host Disease (TaGVHD)
  - Post Transfusion Purpura (PTP)
  - Immunomodulation/ Suppression
  - Alloimmunization

- **Non-Immune**
  - Transfusion Transmitted Infection
  - Iron Overload

### Signs and Symptoms of Transfusion Reaction

**LOOK OUT** for signs and symptoms below – may be indicators of a transfusion reaction

- Feeling of apprehension/restlessness
- Fever (1°C rise in temperature)
- Chills with or without rigors
- Pain at infusion site, abdomen or flanks
- Hypotension or hypertension
- Respiratory distress (wheezing, dyspnoea and cyanosis)

- Skin manifestations (urticaria, rash, flushing, pruritus, and localized edema).
- Nausea/vomiting
- Acute onset of sepsis
- Anaphylaxis
- Renal shutdown
- Abnormal bleeding
MANAGEMENT OF BLOOD TRANSFUSION REACTION

Symptoms and signs of transfusion reaction

STOP TRANSFUSION IMMEDIATELY

- Clinical assessment
- Check patient identity and blood compatibility label
- Visually assess blood unit
- Keep IV line open with normal saline
- Inform doctor

MILD REACTION

- Isolated temperature $\geq 38^\circ C$ and rise of 1-2$^\circ C$ and/or
- Pruritus/rash only

Symptomatic/appropriate treatment

Continue transfusion with close monitoring if symptoms resolved

MODERATE/SEVERE REACTION

- Isolated temperature $\geq 39^\circ C$ or rise $\geq 2^\circ C$ and/or
- Other symptoms/signs apart from pruritus/rash only

If symptoms worsened, manage as moderate/severe reaction

DO NOT CONTINUE TRANSFUSION

- Treat according to symptoms/signs and close monitoring
- For severe/life threatening reaction, call for URGENT medical help and prompt resuscitation

- Standard investigations* and specific investigation (guided by clinical symptoms and signs)
- Return all blood bags, used (together with infusion set) and unused blood bags to blood bank
MASSIVE BLOOD TRANSFUSION PROTOCOL (MTP)

**MTP CRITERIA**

- Patient is actively bleeding
- Estimated loss of >40% (= 2L) of blood volume
- Blood loss >1.5L with haemodynamic instability despite initial resuscitation
- Clinical/laboratory coagulopathy

**If criteria met: ACTIVATE MTP**

Contact blood bank MO
Specify time frame for product delivery (urgent/standby)

Send personnel to blood bank to give patient's blood form and collect ‘Pack’

**MTP Pack 1:**
- 4 packed cells
- 4 FFP

**MTP Pack 2:**
Inform blood bank to supply this 2nd pack if bleeding continues

If Ca²⁺ <1.1 mmol/L or after 8 packed cells, include:
IV Calcium gluconate 10% 10ml

**REPEAT CYCLE AS NEEDED**

**MANAGEMENT GOALS:**

- Temp >35°C
- pH >7.2
- Base excess >-6
- Lactate <4mmol/L

- Ca²⁺ >1.1mmol/L
- Platelets >50 × 10⁹/L
- PT/APTT <1.5 × normal
- INR ≤1.5
- Fibrinogen >1g/L

**SEEK HAEMATOLOGIST ADVICE ON:**

- Repeating blood products
- Administer: - rFVIIa

Bleeding controlled?

- YES
  - DEACTIVATE MTP
  - Notify blood bank immediately

- NO
  - Repeating blood products
  - Administer: - rFVIIa

Ensure on-going active resuscitation and monitoring of patient’s response is done throughout.
POSTPARTUM CARE FOR PPH (1)

COMPLICATIONS FOLLOWING PPH

<table>
<thead>
<tr>
<th>Immediate</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute pulmonary edema</td>
<td>Future fertility Sheehan’s Syndrome</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>Psychological sequelae Post-traumatic stress</td>
</tr>
<tr>
<td>Risk of peri-partum hysterectomy and associated complications</td>
<td>Delayed bonding</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>Neurological sequelae 2 secondary prolonged hypoxia</td>
</tr>
<tr>
<td>ICU care-related complications</td>
<td>Blood transfusion and associated complications e.g. infections/acute lung injury</td>
</tr>
<tr>
<td></td>
<td>Death</td>
</tr>
</tbody>
</table>

IMMEDIATE CARE

- Immediate care following PPH is just as essential as the acute phase.
- Multidisciplinary team management - ideally in ICU or HDU depending on severity of patient’s clinical condition.

Monitor

- Close monitoring for further bleeding - use MOMS chart
  - Strict I/O chart, consider CVP monitoring
  - Maintain sufficient MAP
- Be CAUTIONS/ALERT:
  - Overzealous fluid resuscitation
  - Coagulopathy
  - Look out possible COMPLICATIONS (see table above)

Drugs

- Broad spectrum antibiotics (if abdominal packs/drains, balloon tamponades in-situ)
- Ensure adequate analgesia - avoid NSAIDS (↑ risk of bleeding)
- Consider Proton Pump Inhibitor to prevent stress induced upper GIT bleed
- Thromboprophylaxis - see below

Documentation

- CLEAR documentation of plan of care
- E.g. timing for removal of abdominal packs/balloon tamponades - ideally after coagulopathy is corrected

THROMBOPROPHYLAXIS

While correcting coagulopathy

Intermittent calf compressor may be useful

Once coagulopathy corrected

- Give pharmacological thromboprophylaxis
- Duration depends on ongoing risk for Pulmonary Embolism
POSTPARTUM CARE FOR PPH (2)

CONTINUATION OF POSTPARTUM CARE

RISK MANAGEMENT

Documentation

- COMPLETE and LEGIBLE documentation in the medical notes of:
  - Diagnosis, sequence of events, the personnel involved, adverse events and management plans
- CLEAR and COMPLETE operative notes and consent forms.

Communication

- Documented, on-going and timely communication between healthcare team, patient, husband/next-of-kin:
  - Formal debriefing by managing specialist/consultant on sequence of events and progress
- Counseling of patients who underwent caesarean hysterectomy.

Audit

- Audit cases with massive obstetric haemorrhage.
- Perform ‘root-cause analysis’:
  - To identify preventive measures effectively
  - Aid in improving the quality of patient care

LONG-TERM CARE

Support

- Psychological consequence can be dramatic and often goes unnoticed - other support.
- Make arrangements for bonding as soon as possible - child and mother should not be separated unnecessarily.
- Arrange for midwifery support to support in breastfeeding.

Follow-up

- Arrange for personalised follow up plans and home visits - ensure patient and family are coping well.
- Provide a concise but informative discharge summary - should state the follow up plans and implications in future pregnancies.
- Look out for possible longterm COMPLICATIONS (see Table above).

Contraception

- REMEMBER: Certain causes of PPH may be recurrent in subsequent pregnancies.
- Allocate specific time to discuss (may not be appropriate to do immediately post-event) on contraception - document in the patient’s notes.
- Essential to involve the partner in decision.
BIMANUAL UTERINE COMPRESSION

- Inform the patient prior to procedure and provide analgesia.
- Wash and scrub hands, wear sterile glove. Insert the lubricated gloved hand into the vagina, form a fist in the anterior vagina fornix.
- Apply pressure against the anterior wall of the uterus.
- The other hand, identify the fundus of the uterus. Then pushed it deeply into the abdomen, behind the fundus of the uterus. Apply pressure to the posterior uterine wall.
- Maintain until bleeding is controlled and uterus is contracted.

AORTIC COMPRESSION

- It is downward pressure thorough the abdominal wall with a closed fist over the abdominal aorta. Point of pressure is just above the umbilicus, slightly to the patient’s left.
• The other hand palpate the femoral pulse to ensure the femoral pulse is not palpable. If the femoral pulse is still palpable, it indicate the compression is not effective. Check the position of the fist and exert more pressure till the femoral pulse is no longer palpable. It can be performed until help arises.

**VENOUS CUT-DOWN**

**Indications**
When venous access is urgently needed but no other intravenous sites are available for the insertion of percutaneous cannulae and the operator is not experienced in central vein cannulation.

**Equipment**
- Curved/mosquito artery forceps
- Dissecting forceps
- Needle holder
- Scalpel and blades
- Scissors
- Vicryl 2/0 or Chromic 2/0
- Local anaesthetic

**Sites**
- Ankle: Long saphenous vein (2cm anterior and 2cm superior to the medial malleolus).
- Antecubital fossa: Median cubital vein or cephalic vein.
- Wrist: Cephalic vein (as it crosses the radio-carpal joint in anatomical snuff box).

**Technique**
- Apply a venous tourniquet proximal to the intended cannulation site.
- Shave the area and cleanse the skin with an antiseptic solution.
- Infiltrate the area with local anaesthetic.
- Make a 2 to 3cm transverse incision through the skin over the expected site of vein.
- By blunt dissection, identify and dissect the vein clear from surrounding tissue.
- Elevate a 2cm length vein and ligate the distal end, leaving the suture in place for traction.
- Loosely tie the proximal end and hold with forceps to control bleeding.
- Make a small transverse venotomy with sharp-pointed scissors/blade.
- Introduce the plastic cannula (without trocar) through the venotomy and secure it in place by tying the proximal ligature.
- Connect the cannula to the giving set and commence infusion.
- Close the skin incision with 3/0 silk and cover with a sterile dressing.
Complications

- Haemorrhage or haematoma
- Perforation of the posterior wall of the vein
- Phlebitis/Venous thrombosis
- Nerve damage

Fig 17: Venous Cut Down
(Source: dc344.4shared.com)
UTERINE TAMPONADE - BAKRI BALLOON

A. Insertion following vaginal delivery-transvaginal placement
   • Ensure uterus is clear of any retained placental fragments, blood clots, arterial bleeding or laceration before inflating balloon.
   • Insert vaginal speculum, use sponge forceps to insert balloon catheter transvaginally into the uterine cavity. If possible, perform this under ultrasound guidance. Avoid excessive force during insertion.
   • Once in place, inflate balloon with warm normal saline in increments of 50-100ml, until no further vaginal bleeding is seen in the Bakri drainage catheter tubing or vagina. Do not inflate >500ml. Connect catheter drainage tubing to a urine bag for monitoring.
   • If tamponade fails (i.e. bleeding continues even after inserting the tamponade balloon), the patient will require surgical intervention.
   • Document amount of fluid in balloon.
   • Pack the vagina to ensure the balloon stays in place.
   • Place a Foley catheter for bladder drainage if not already indwelling.

B. Insertion following caesarean section-transabdominal placement
   • The tamponade catheter is passed from above with the inflation port/ tubing end inserted through the uterine incision.
   • The shaft of the balloon will then be pushed through the cervix, to be pulled out by the assistance via the vagina. This will allow the balloon to be positioned within the uterine cavity. Inflate just enough to retain the balloon within the uterus.
   • Close the uterine incision as per normal procedure, taking care to avoid puncturing the balloon during suturing.
   • After closure of the uterus and before closing the abdomen, the assistant will then inflate the balloon from below until a positive tamponade test is achieved (reaching the desired volume to create tamponade and stop further bleeding per vagina).
   • Document amount of fluid in balloon.
• Close abdomen as per normal procedure.
• Pack the vagina to ensure the balloon stays in place.

C. Post-insertion care
• Monitoring has to be in the high dependency or intensive care unit.
• Close monitoring of vital signs, fundal height, blood loss from Bakri drainage catheter, vaginal blood loss and urine output.
• Patient has to be kept nil by mouth until removal of Bakri balloon in case of need to return to theatre.
• Start antibiotics IV Cefuroxime 750mg tds & IV Metronidazole 500mg tds.
• Continue oxytocin infusion for 4-6 hours after insertion.

D. Removal
• Leave the Bakri balloon in place for 8-24 hours (not >24 hours) to allow time for blood transfusion and coagulopathy correction.
• Once coagulopathy is corrected, deflate the balloon in 2 stages – withdraw half the normal saline in the first stage. If there is no significant bleeding after 30 minutes, withdraw the remaining volume to deflate and remove the balloon.
• Continue to observe for any active per vaginal bleeding.

Note:
• Tamponade balloon must be available in Labour Room at all times and the staff must be aware of its location.
• Tamponade balloon is NOT first line therapy – MEDICAL TREATMENT remains the first option for treating PPH.
UTERINE COMPRESSION SUTURES

- Used in cases of postpartum haemorrhage caused by uterine atony.
- Aims to exert continuous compression on the uterine vascular system.

Materials

- Based on local experiences
- Vicryl 1.0/Liver sutures

1) B-LYNCH COMPRESSION SUTURE

Fig 19: B-Lynch Compression Suture
(Source: medertainer.blogspot.com)

Fig 20: Technique to Perform B Lynch Compression Sutures
(Source: obmanagement.com)
Technique

- A lower segment transverse incision is made on the uterus or the recent LSCS suture removed to check the cavity for retained placental fragments.
- The first stitch is placed 3cm below the right lower edge of the uterine incision and 3cm from the right lateral border (point A).
- The suture is rethreaded through the uterine cavity to emerge at the upper incision margin, 3cm above and 4cm from the lateral border (point B).
- The suture is then passed over to compress the uterine fundus approximately 3-4cm from the right cornual border, and fed posteriorly and vertically to enter the posterior wall of the uterine cavity (point C) at the same level as the upper anterior entry point (point B).
- Rethreaded through the uterine cavity horizontally to emerge on the left side (point D) through the same surface marking as on the right.
- The suture is passed over to compress the uterine fundus approximately 3-4 cm from the left cornual border and fed anteriorly on the left (point E and F) through the same surface marking as on the right.
- The two lengths of suture are pulled taut, assisted by bimanual compression to aid the compression.
- The two ends are then knotted and the uterine incision is closed.

2) HAYMAN COMPRESSION SUTURE

Fig 21: Hayman Compression Sutures
(Source: glowm.com)
Technique
- May be placed without opening the lower uterine segment or uterine cavity.
- Ensure downward bladder retraction.
- The suture is passed directly from the anterior uterine wall through the posterior uterine wall, just above the reflection of the bladder.
- The suture is then tied at the fundus of the uterus using a three-knot technique.
- This can be done as one suture on each side of the uterus or more than one suture if uterus is particularly broad.
- Two to four longitudinal/vertical sutures can be placed.
- A transverse cervicoisthmic suture also can be placed, if needed, to control bleeding from the lower uterine segment.

Note: There are other compression sutures that had been described, e.g. Cho multiple square, U sutures with varying success/complications rate.

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**UTERINE ARTERY LIGATION**

- Exteriorize the uterus.
- Feel for pulsations of the uterine artery near the junction of the uterus and cervix.
- Using 0 chromic catgut suture on a large needle, pass the needle around the artery and through 2–3cm of myometrium (uterine muscle) at the level where a transverse lower uterine segment incision would be made. Tie the suture securely.
- Place the sutures as close to the uterus as possible, as the ureter is generally only 1cm lateral to the uterine artery.
• Repeat on the other side.
• If the artery has been torn, clamp and tie the bleeding ends.
• Ligate the utero-ovarian artery just below the point where the ovarian suspensory ligament joins the uterus.
• Repeat on the other side.
• Observe for continued bleeding or formation of haematoma.

INTERNAL ILIAC ARTERY LIGATION

NOTE: Internal iliac artery ligation should be performed by trained gynaecologist or under supervision.

Fig 23: Internal Iliac Artery Ligation
(Source: med.uc.edu)

• Exteriorise the uterus.
• Identify the ‘right adnexal triangle’.
• Use 2 long artery forceps to hold the peritoneum around 1cm from the round ligament and make a superficial incision on the peritoneum, parallel to the IP ligament. Dissect the loose areola tissue and identify the common iliac artery.

• Use a small Dever retractor to retract along the common iliac artery, till the bifurcation of the common iliac artery is visualised.

Note: On the left side, it is sometimes necessary to incise the sigmoid mesocolon and mobilise the sigmoid colon medially in order to expose the area overlying the iliac vessels adequately.
A right-angled clamp is passed beneath the internal iliac artery from lateral to medial side about 4cm distal to its origin.

Using absorbable suture 1-0, the internal iliac artery is ligated. Check and ensure the femoral and dorsalis pedis artery pulsations are present.
PICTOGRAPH OF ESTIMATED BLOOD LOSS

SANITARY PAD
- 1/4 Soaked
  - 20ml
- 1/2 Soaked
  - 50ml
- Fully Soaked
  - 100ml

KIDNEY DISH
- 1/4 Filled
  - 100ml
- 1/2 Filled
  - 250ml
- Completely Filled
  - 500ml

LINEN PROTECTOR
- 1/4 Soaked
  - 500ml
- 1/2 Soaked
  - 1,000ml
- Almost Fully Soaked
  - 1,500ml

SARONG
- 1/2 Soaked
  - 400ml
- Fully Soaked
  - 700ml
- Fully Soaked
  - 80ml

Vaginal Pack
MALAYSIAN OBSTETRICS MONITORING SYSTEM (MOOS)
# DRUG REGIMENS FOR PREVENTION AND TREATMENT FOR PPH

## PPH Prevention
**Prophylaxis Options**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oxytocin</strong></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; line prophylaxis, 10IU/ml IM or 5IU slow IV push within the first minute after delivery</td>
</tr>
<tr>
<td><strong>Syntometrine</strong>&lt;sup&gt;*&lt;/sup&gt;</td>
<td>(combination of oxytocin 5IU and ergometrine 0.5 mg): 1 ampoule IM within the first minute after delivery</td>
</tr>
<tr>
<td><strong>Misoprostol</strong></td>
<td>If oxytocin is not available or cannot be safely used, 600 μg rectally within the first minute after delivery</td>
</tr>
<tr>
<td><strong>Carbetocin</strong>&lt;sup&gt;**&lt;/sup&gt;</td>
<td>100 μg IM or IV over 1 minute</td>
</tr>
</tbody>
</table>

## PPH Treatment
**Treatment Options**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Oxytocin</strong></td>
<td>10IU IM or 5IU slow IV push, or 20-4 IU/l IV fluid infusion</td>
</tr>
<tr>
<td><strong>Misoprostol</strong></td>
<td>800 μg rectally (4x200-μg tablets)</td>
</tr>
<tr>
<td><strong>Syntometrine</strong>&lt;sup&gt;*&lt;/sup&gt;</td>
<td>(combination of oxytocin 5IU and ergometrine 0.5 mg): Give 1 ampoule IM</td>
</tr>
<tr>
<td><strong>Carboprost</strong>&lt;sup&gt;**&lt;/sup&gt;</td>
<td>0.25 mg IM q15 minutes (maximum 2 mg)</td>
</tr>
</tbody>
</table>

*Warning: Ergot alkaloids are contraindicated for women with high blood pressure, cardiac disease, pre-eclampsia, or eclampsia because they increase blood pressure.

**See PPH Drug Table for its limited indication.**

NB: If one of the listed treatment options is not effective, another can be administered depending on the severity of the haemorrhage and consider non-pharmaceutical interventions.
<table>
<thead>
<tr>
<th>Order of Administration</th>
<th>Dose</th>
<th>Route</th>
<th>Mechanism of Action</th>
<th>Side Effects</th>
<th>Contraindications/ Cautions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Oxytocin (Pitocin®, Syntocinon®)</td>
<td>5IU</td>
<td>IV slowly over 1-2 minutes</td>
<td>Stimulates the upper segment of the myometrium to contract rhythmically, constricting spiral arteries decreasing blood flow through the uterus.</td>
<td>Rare Painful contraction, nausea and vomiting, water intoxication, transient vasodilatation and hypotension.</td>
<td>Hypersensitivity to Oxytocin. Overdose or prolonged use can cause water intoxication. IV push dosing may cause hypotension.</td>
<td>In place of Syntometrine if BP elevated. Ensure placenta is expelled.</td>
</tr>
<tr>
<td></td>
<td>5-10IU/hour (125-250mL/hour)</td>
<td>IV infusion (40IU in 500mL – 1L crystalloid/ 0.9% NaCl)</td>
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<td></td>
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<tr>
<td>2. Syntometrine (Oxytocin combined with Ergometrine)</td>
<td>1 ampoule (1ml) (Combination of Oxytocin 5IU and Ergometrine 0.5mg)</td>
<td>Repeat dose of 1ml after no less than 2 hours if necessary</td>
<td>Combines rapid uterine action of Oxytocin and the sustained uterotonic effects of Ergometrine.</td>
<td>Tonic uterine contraction and abdominal pain; nausea, vomiting; headache, dizziness; skin rashes; hypertension; bradycardia; cardiac arrhythmia; anaphylactoid reaction.</td>
<td>Retained placenta; severe hypertension; hepatic, renal or cardiac disease; sepsis; hypersensitivity to Ergometrine.</td>
<td>Administer with anti-emetic (e.g. Metoclopramide 10mg IV) Avoid use if placenta not expelled.</td>
</tr>
<tr>
<td></td>
<td>0.5mg of Ergometrine* (for information only – see comments)</td>
<td>IV, onset 40 sec IM, onset 7 mins; effect marked at 45 mins; lasts for 2 – 4 hours</td>
<td>Vasoconstriction and contracts smooth muscles upper and lower segments of the uterus tetanically.</td>
<td></td>
<td></td>
<td>*Ergometrine maleate (single preparation) is not recommended as first line therapy due to its significant adverse effects.</td>
</tr>
<tr>
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<tr>
<td>3. Carbetocin (Duratocin®) Long-acting synthetic analogue of oxytocin</td>
<td>100 µg</td>
<td>IV bolus over 1 minute, rapid onset; firm contraction within 2 minutes; lasts about 1 hour</td>
<td>As per Oxytocin</td>
<td>As per Oxytocin</td>
<td>Hypersensitivity to Oxytocin/ Carbetocin; serious cardiovascular disease, especially coronary heart disease. Because of its long duration of action, uterine contractions produced by Carbetocin cannot be stopped simply by discontinuation – DO NOT GIVE prior to delivery of fetus.</td>
<td>Currently only licensed in elective caesarean section under epidural or spinal anaesthesia for the prevention of PPH and to decrease the need for therapeutic uterotonic. Trials are underway for its use in vaginal delivery, till consensus reached – decision to use in other setting rest with prescribing clinician.</td>
</tr>
<tr>
<td>4. Carboprost (Hemabate®) Prostaglandin F-2α analogue</td>
<td>250 µg</td>
<td>Repeat as required every 15-90 minutes (Max total dose: 2mg or 8 doses)</td>
<td>Improves uterine contractility by increasing the number of oxytocin receptors and causes vasoconstriction.</td>
<td>Fever with chills, headache, paraesthesia, diarrhoea, nausea and vomiting, breast tenderness, extremely high BP, dystonia, pulmonary oedema.</td>
<td>Cardiac, pulmonary, renal, or hepatic disease, hypersensitivity to prostaglandin Caution: Asthma, anaemia, diabetes, epilepsy, hyper/hypotension, jaundice, uterine surgery.</td>
<td>**Intramyometrial use – responsibility rests with administering clinicians as it is not recommended, act faster but carries risk of IV injection which may lead to severe CVS side effects including cardiac arrest.</td>
</tr>
<tr>
<td>Order of Administration</td>
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<tr>
<td>5. Misoprostol (Cytotec®) Prostaglandin E1 analogue</td>
<td>800 to 1,000µg (4 to 5 tablets)</td>
<td>Rectal Slow onset of action – consider early administration</td>
<td>Generalised smooth muscle contraction.</td>
<td>Nausea, vomiting, diarrhoea, headache, abdominal pain, pyrexia.</td>
<td>Hypersensitivity to misoprostol, cardiovascular disease.</td>
<td>Use when oxytocin and ergometrine are not successful or not readily available. Off-label use</td>
</tr>
<tr>
<td>6. Tranexamic Acid (TA) Anti-fibrinolytic agent</td>
<td>Loading dose infusion of 1g, then infusion of 1g 30 minutes later if required</td>
<td>Loading: Infusion over 10 minutes (1g in 100ml 0.9% NaCl) Maintenance: Infusion over 8 hours (1g in 100ml 0.9% NaCl)</td>
<td>Inhibit clot breakdown by blocking the lysine binding sites on plasminogen molecules.</td>
<td>Gastrointestinal disturbances (nausea, vomiting, diarrhoea) may occur.</td>
<td>Active thromboembolism including DVT, pulmonary embolism, cerebral thrombosis; thrombosis risk. Precaution in renal impairment and DIVC.</td>
<td>WHO recommendation: Suggests TA use when 1st and 2nd line drugs are ineffective at controlling PPH or when bleeding is thought to be due to trauma. A large WOMAN Trial is on-going on TA use in PPH.</td>
</tr>
</tbody>
</table>
### 7. Recombinant Activated Factor VII (rFVIIa)

- **Order of Administration:** Consult haematologist.
- **Dose:** 90µg/kg (rounded to the nearest vial) after checking exclusion criteria (optimise).
- **Route:** IV, over 3-5 minutes, if effective improvement in bleeding seen within 10-15 mins.
- **Mechanism of Action:** Increases the already higher risk of VTE in obstetric women – risk of life-threatening situations – off licence: may be problematic, need clinician prescribing.
- **Contraindications/Cautions:** Inadequate platelets (<20,000 – 50,000) and fibrinogen (<1g/l), pH <7.2 and temperature of <34°C; to be optimised before administration.
- **Side Effects:** Risk of life-threatening VTE. In life threatening situations – ‘off licence’ consent may be problematic, decision to use rest with the clinician.
- **Comments:** In the face of life-threatening PPH, and in consultation with haematologist, rFVIIa may be used as an adjuvant to standard pharmacological and surgical treatments. Expensive.

### 8. Gemeprost (Cervagem®)

- **Order of Administration:** Consult haematologist.
- **Dose:** 1-2 mg intrauterine; 1mg per rectal.
- **Route:** Intra-uterine, Per vaginal, Per rectal.
- **Mechanism of Action:** Resembles PGF2α.
- **Contraindications/Cautions:** See Carboprost & Misoprostol for side-effects, contraindications and cautions.
- **Comments:** Case reports from a decade ago or more suggested it may be efficacious in the management of PPH, but no RCTs to demonstrate its safety or effectiveness.
PATIENT INFORMATION LEAFLET

Heavy bleeding after birth
(Postpartum Haemorrhage, PPH)

Who is this information for?
This information is for you if you wish to know about heavy bleeding after birth. It may be helpful if your delivery was complicated with heavy bleeding.

Is it normal to bleed after delivery?
Yes it is, especially just after birth. The bleeding comes from the womb where the placenta was attached. Cuts and tears from the birth passage may also cause bleeding.

This bleeding is not heavy and becomes less over the next few hours. The colour will change from fresh red to brown over the next few weeks and should stop by 6 weeks after delivery.

If the bleeding is heavier than normal, it is called postpartum haemorrhage.

What is postpartum haemorrhage, PPH?
1) **Primary PPH** - When you lose more than 500mls of blood within the first 24 hours after birth. It is common, affecting 1 in 20 pregnant women.

   Severe PPH is less common, affecting 6 in 1,000 women and can be life threatening.

2) **Secondary PPH** - When you have abnormal or heavy bleeding between 24 hours to 6 weeks of delivery. It is less common, affects 1 in 50 women.

How can PPH affect me?
A major haemorrhage can be life threatening.
Primary PPH

A. Who is at risk?

i. Before delivery
   a) Obesity (BMI >30kg/m²)
   b) Previous PPH
   c) Had four or more deliveries
   d) Twins or triplets
   e) Having a low lying placenta (praevia)
   f) Placental separation before delivery (abruption)

ii. During labour
   a) Caesarean delivery
   b) Forceps or ventouse delivery
   c) Retained placenta
   d) Having a big baby
   e) Prolonged labour beyond 12 hours

It may also occur in patients without identifiable risk factors.

B. What can you do to reduce the risk?

If you are anemic, taking iron supplementations may reduce the need for blood transfusions.

If you had a previous caesarean section, it is important to have an ultrasound to ensure you do not have a low lying placenta or a placenta which is attached to the previous operation site.

If you are at high risk, it is best you deliver in a specialist hospital. You may require blood transfusions if you have major haemorrhage.

C. What is done to reduce the chance of you having PPH?

If you had a vaginal birth, you will be given an injection in your thigh (syntometrine/oxytocin) to reduce blood loss.

After delivery, you will be examined for tears and if it bleeds heavily, it will be repaired to reduce blood loss. You may also be given oxytocin into a drip in your vein.
If you had a caesarean delivery, oxytocin will be given via injections and in the drip in your vein.

What happens if you had PPH?
This is an emergency and it can happen quickly.

The midwife or doctor may:
a) Massage your womb through the abdomen to help it contract
b) Give you further injections
c) Put a drip in your arm and take some blood for testing
d) Put a tube in your bladder to help the womb contract
e) Check to ensure the placenta is complete, if it is still inside your womb, you may have it removed in the operation theatre under anaesthesia
f) Examine to look for further tears and if you require stitches

Your blood pressure and pulse will be monitored closely and you will stay in the labour ward until the bleeding has settled.

What happens if you continue to bleed?
You may feel unwell, dizzy, light headed, faint or nauseous. You will be given oxygen and drips.

Senior medical staffs will be involved in your care. You will be given more medication, either injections or through the drips.

You may be taken to the operating theatre to look for the cause and to stop the bleeding. Your partner will stay in the waiting area and will be informed about your condition. Your baby will be taken care by the nurse.

What procedures might be done to stop the bleeding?
a) A “balloon” may be inserted in your womb to put pressure on the bleeding.
b) You may require an operation and stitches will be placed on your womb to help it contract.
c) In dire circumstances, if other measures have failed, your womb may be removed (hysterectomy) to arrest the bleeding.
d) You may have drains or packs in your tummy which will be removed once the bleeding has stopped.
You will be observed in the intensive care or high dependency unit. You will be monitored closely.

**How will you feel afterwards?**

You may require longer hospital stay. You may be given some medications to treat your anemia and antibiotics.

Your doctor will discuss what has happened before you leave the hospital and you will be given appropriate follow up.

You should recover over the following weeks.

If you feel unwell, upset or if you develop anxiety or depression, return to the hospital immediately to see your doctor.

**Secondary PPH**

Heavy or prolonged bleeding after delivery is not normal. If you do experience it, seek medical attention as soon as possible. An ultrasound scan will be performed or you may be given some antibiotics. It usually resolves with simple measures.

**Future pregnancies after a PPH?**

There is a small risk of recurrence in your next pregnancy if you had PPH. The doctor will discuss this with you and will advise you accordingly.

**References & further information**

RCOG patient information leaflet.

If you have further questions, kindly ask your doctor or Obstetrician.

**This information leaflet is prepared by the Malaysian PPH training Module Committee**
NOTES: