PPH

POSTPARTUM HAEMORRHAGE

MODERATOR: Prof. Dr. Sukanta Misra

SPEAKER: Dr. Tuhin Dutta
DEFINITION OF PPH

CLINICAL:
Any amount of bleeding from or into the genital tract following birth of the baby up to the end of puerperium which adversely affect the general condition of the mother evidenced by rise in pulse rate and fall in blood pressure.

QUANTITATIVE
• Blood loss more than 500 ml following vaginal delivery
• Blood loss more than 1000 ml following caesarean section
TYPES OF PPH

- **Primary PPH** – blood loss of 500ml or more within 24 hours of delivery.

- **Secondary PPH** – significant blood loss between 24 hours and 12 weeks after delivery.
WHY DO WE CARE?

Major obstetric haemorrhage – more than 1000ml

Very rapidly leads to maternal death
Causes of Maternal Death

- Haemorrhage: 24.8%
- Infection: 14.9%
- Indirect causes: 19.8%
- Other direct causes: 7.9%
- Unsafe abortion: 12.9%
- Eclampsia: 12.9%
- Obstructed labour: 6.9%

Haemorrhage is the biggest and fastest killer.
Severe bleeding is primary worldwide cause of maternal death
- 140,000 women die each year from hemorrhage
- 1 every 4 minutes

Morbidity and mortality from PPH
- Shock and DIC
- Renal failure
- Puerperal sepsis
- Lactational failure
- Blood transfusion reaction
- Thromboembolism
- Sheehan’s syndrome
- ARDS
- loss of fertility

Hemorrhage frequently occurs without any warning
Postpartum Hemorrhage

- PPH is a serious, life-threatening obstetric problem.
- One of the leading causes of maternal morbidity and mortality.
- In developing countries mainly due to three delays:
  1. Delay in seeking care.
  2. Delay in reaching care.
  3. Delay in receiving care.
IDENTIFICATION OF PPH

Mrs. X G3P2+0 (previous two uneventful vaginal deliveries at term) with uncomplicated present pregnancy delivered her baby vaginally at 39 weeks 3 days of her pregnancy. Immediately following delivery of baby she started having profuse bleeding per vagina.
CASE NO 2

• Mrs. X G3P1+1 had vaginal delivery at term with right medio lateral episiotomy along with expulsion of placenta & its membranes. **Half an hour after delivery** started having excessive bleeding per vagina & labor room sister calls you...
CASE NO 3

• Mrs. X G2P1+0 with previous h/o caesarean section got admitted with *uncontrolled APH* and had undergone an emergency caesarean section. But there was profuse bleeding following removal of placenta from placental bed.
PREVENTION OF PPH

• Identify predisposing factors
• Treat anaemia and educate patients regarding PPH
• High risk patient to be managed in tertiary care
• I/V access, arrange blood if assessed as at risk
PPH is a very unpredictable condition and every parturient woman is at risk of having PPH.
• Blood vessels supplying placental bed pass through an interlacing network of muscle fibers (myometrium)

• Myometrial contraction is main driving force for placental separation & constriction of blood vessels

• This hemostatic mechanism –
  ‘Living ligatures’ or ‘physiological sutures’
## RISK FACTORS FOR PPH

<table>
<thead>
<tr>
<th>FACTORS IN HISTORY</th>
<th>ANTEPARTUM FACTORS</th>
<th>INTRAPARTUM FACTORS</th>
<th>MISCELLNEOUS CAUSES</th>
</tr>
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<tbody>
<tr>
<td>Advanced maternal age</td>
<td>Overdistended uterus</td>
<td>Induction of labor</td>
<td>sepsis</td>
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<tr>
<td>Multiparity</td>
<td>APH</td>
<td>Prolonged labor</td>
<td></td>
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<tr>
<td>Malnutrition/anaemia</td>
<td>chorioamnionitis</td>
<td>Precipitate labor</td>
<td></td>
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<tr>
<td>Previous PPH</td>
<td></td>
<td>Instrumental delivery/operative manipulation</td>
<td></td>
</tr>
<tr>
<td>Previous placenta previa/accrete</td>
<td></td>
<td>Rupture uterus</td>
<td></td>
</tr>
<tr>
<td>Bleeding and coagulation disorders</td>
<td></td>
<td>Genital tract trauma</td>
<td></td>
</tr>
<tr>
<td>Fibroid uterus</td>
<td></td>
<td>Non judicious use of oxytocics/sedatives</td>
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</tbody>
</table>
PREVENTION OF PPH

ACTIVE MANAGEMENT OF THIRD STAGE OF LABOUR
The use of uterotonic for the prevention of PPH during the third stage of labour is recommended for all births.

- Oxytocin (10 IU, IV/IM) is the recommended uterotonic drug for the prevention of PPH.

- In settings where oxytocin is unavailable, the use of other injectable uterotonics (if appropriate ergometrine/methylergometrine or the fixed drug combination of oxytocin and ergometrine) or oral misoprostol (600 μg) is recommended.

- In settings where skilled birth attendants are not present and oxytocin is unavailable, the administration of misoprostol (600 μg PO) by community health care workers and lay health workers is recommended for the prevention of PPH.
• In settings where skilled birth attendants are available, **CCT is recommended** for vaginal births if the care provider and the parturient woman regard a small reduction in blood loss and a small reduction in the duration of the third stage of labour as important.

• In settings where skilled birth attendants are unavailable, CCT is not recommended.

• Late cord clamping (performed after 1 to 3 minutes after birth)
• Early cord clamping (<1 minute after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation.

• Sustained uterine massage is not recommended as an intervention to prevent PPH in women who have received prophylactic oxytocin.
• Postpartum abdominal uterine tonus assessment for early identification of uterine atony is recommended for all women.

• **Oxytocin (IV or IM)** is the recommended uterotonic drug for the prevention of PPH in caesarean section.

• **Controlled cord traction** is the recommended method for removal of the placenta in caesarean section.
COMPONENTS OF AMTSL

Past
- Prophylactic oxytocics
- Early cord clamping
- CCT
- Uterine massage

Latest (WHO 2012)
- Prophylactic oxytocics
- Early cord clamping
- CCT: not mandatory
- Uterine massage
4 T’S

Tone

Tissue

Trauma

Thrombin
## IMMEDIATE CAUSE OF PPH

<table>
<thead>
<tr>
<th>TONE</th>
<th>TISSUE</th>
<th>TRAUMA</th>
<th>THROMBIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterine atony</td>
<td>Retained placental tissue</td>
<td>Large episiotomy/extensions</td>
<td>Congenital/acquired bleeding/coagulation disorders</td>
</tr>
<tr>
<td>General anaesthetic drugs</td>
<td>Avulsed cotyledons</td>
<td>Laceration of perineum</td>
<td></td>
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<tr>
<td>High parity</td>
<td>Succenturiate lobe</td>
<td>Rupture uterus</td>
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<tr>
<td>Induction/augmentation</td>
<td>Morbidly adherent placenta</td>
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<tr>
<td>Precipitated labor</td>
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<tr>
<td>Hypotension</td>
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<tr>
<td>Overdistended uterus</td>
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<tr>
<td>Prolonged labor</td>
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</tbody>
</table>
• CALL FOR HELP.....

• INCLUDE SENIOR DOCTORS

• ALERT CONSULTANT OBSTETRICIAN
  /HAEMATOLOGIST/ANAESTHESIST

• SENIOR MIDWIVES OR NURSE

• CATHETERISE WITH FOLEY’S CATHETER
ASSESSMENT OF BLOOD LOSS AFTER DELIVERY

- DIFFICULT
- Mostly visual estimation (So subjective and inaccurate)
- Underestimation is common
- Clinical picture – misleading
- Our mothers – malnourished, anaemic, small built, less blood volume
A conical calibrated drape **BRASSS V DRAPE**: 

- For objective assessment of blood loss (decreases error by 15-33%)

**BRASSS V DRAPE** is being used in low resource setting
MANAGEMENT OF PPH

- GOLDEN HOUR OF RESUSCITATION
- RULE OF 30
- HAEMOSTASIS ALGORITHYM
DOCUMENTATION IN PPH

• SEQUENCE OF EVENTS

• TIME AND SEQUENCE OF ADMINISTRATION OF PHARMACOLOGICAL AGENTS /FLUID /BLOOD PRODUCTS

• TIME OF SURGICAL INTERVENTION

• THE CONDITION OF MOTHER THROUGHOUT
The Golden Hour refers to the first 60 minutes from the time of RECOGNITION of PPH.

The “Golden Hour” is the time in which resuscitation must begin to achieve maximum survival – with arrest of bleeding.

As more time elapses between the point of severe shock and the beginning of resuscitation, the percentage of surviving patient decreases (metabolic acidosis).
• Uterine blood flow at term is 700 – 800 mL per minute

• The uterus can simply pour and lead to death within minutes

• Even smaller blood loss matters in women with
  - Low BMI
  - Anaemia
  - Pre eclampsia (shrunken intravascular compartment)
CONFIDENTIAL ENQUIRY INTO MATERNAL DEATHS

• TOO LITTLE - TOO LATE

  • Too Little (IV fluids, Oxytocics, BLOOD, Clotting factors)

  • Too Late (Resuscitation - blood replacement, more uterotonics, decision for surgery + to get senior surgeon & anaesthetist involved)
GUIDELINES OF RCOG MAY 2009

• COMMUNICATE

• RESUSCITATE

• MONITOR/INVESTIGATE

• STOP THE BLEEDING
COMMUNICATE

• With patient – she can even help by doing uterine massage

• With family – to keep them informed, to alert them for getting blood or to transfer to higher center

• With staff – assign specific duties to each of them

• With seniors – Head of department, Senior consultant, Head of institution

• With support system – Lab., blood bank
<table>
<thead>
<tr>
<th>Hemorrhage class</th>
<th>Acute blood loss (ml)</th>
<th>Blood loss %</th>
<th>Clinical signs &amp; symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>500-1000</td>
<td>15 %</td>
<td>Mild tachycardia, Tachypnea, Diaphoresis</td>
<td>Marks Action line, Observation +/- Replacement Therapy</td>
</tr>
<tr>
<td>2</td>
<td>1200-1500</td>
<td>20-25 %</td>
<td>Postural Hypotension, Tachycardia, Tachypnea, Decrease urine output</td>
<td>Fluid Replacement with oxytocics</td>
</tr>
<tr>
<td>3</td>
<td>1800-2100</td>
<td>30-35 %</td>
<td>Overt hypotension, Tachycardia, Tachypnea, Oliguria, Cold clammy extremities</td>
<td>Urgent active management</td>
</tr>
<tr>
<td>4</td>
<td>2400</td>
<td>40 %</td>
<td>Profound shock</td>
<td>Critical active management</td>
</tr>
</tbody>
</table>
**Shock Index:** Heart rate/ Systolic BP

- Normal value – 0.5-0.7
- In significant Haemorrhage – 0.9- 1.1
- Change in SI – A better correlate in identifying acute blood loss
RULE OF 30

- PATIENT HAS PROBABLY LOST MORE THAN 30% BLOOD VOLUME
- FALL IN SYSTOLIC BP BY 30 mm OF Hg
- HEART RATE RISE BY 30 BEATS /MIN
- RESPIRATORY RATE RISE MORE THAN 30/MIN
- Hb OR Hct DROPS BY 30%
- URINE OUTPUT < 30 ml/hr
- SHE IS IN MODERATE TO SEVERE SHOCK
JOINT STATEMENT AND ACTION PLAN LAUNCHED IN 2004 BY ICM/FIGO

• AN ALGORHYTHM HAS BEEN SUGGESTED FOR MANAGEMENT OF PPH

H.A.E.M.O.S.T.A.S.I.S
GENERAL MEDICAL

• **H**: ASK FOR HELP
• **A**: ASSESS(vitals, blood loss) & resuscitate
• **E**: Establish etiology and check ecbolics
  (synometrin/ergometrin/bolus syntocinon)
• **M**: Massage uterus
• **O**: Oxytocin infusion, prostaglandins
SPECIFIC SURGICAL

• **S**: shift to theatre/exclude RPOC & trauma/bimanual compression/antishock garment if transfer required

• **T**: tissue and trauma to be excluded, proceed for tamponade balloon, uterine packing

• **A**: apply compression sutures

• **S**: systematic pelvic devascularization

• **I**: intervention radiologist, uterine artery embolization if appropriate

• **S**: subtotal or total abdominal hysterectomy
RESUSCITATION

• MINOR PPH:( blood loss 500-1000 ml ,no clinical shock)
  IV access(14 gauze cannula one in number)
  Crystalloid infusion

MAJOR PPH( BLOOD LOSS >1000 ml and continuing to bleed or clinical shock)

  ❑ ASSESS AIRWAY: Assess breathing /Oxygen by mask at 10-15 lt/min
  ❑ INTRAVENOUS ACCESS: by two 14 gauze cannula
  ❑ POSITION: flat. Keep the woman warm using appropriate available measures
  ❑ BLOOD TRANSFUSION: as early as possible
  ❑ UNTIL BLOOD IS AVAILABLE: infuse upto 3.5 lt of warmed crystalloid Hartmann’s solution(2lt) and /or colloid 1-2 lt as fast as required
  ❑ The best equipment available should be used to achieve RAPID WARMED infusion
  ❑ Special blood filters should not be used as they slow infusion
  ❑ Recombinant factor VIIa therapy should be based on the result of coagulation
<table>
<thead>
<tr>
<th>Size</th>
<th>Color</th>
<th>Length</th>
<th>Flow Rate (ml/min)</th>
<th>Uses</th>
<th>Nursing Consideration</th>
</tr>
</thead>
</table>
| 14G  | ORANGE  | 45     | 250-300           | • Used for adolescent and adult major surgery and trauma  
• Infusion of large amount of fluids or colloids | • Painful insertion  
• Required large insertion |
| 16G  | GREY    | 45     | 150-240           | • Adolescent and adult major surgery and trauma  
• Infusion of large amount of fluids or colloids | • Painful insertion  
• Required large insertion |
| 18G  | GREEN   | 45     | 100-120           | • Adolescent and adult major surgery and trauma  
• Infusion of large amount of fluids or colloids | • Commonly used |
| 20G  | PINK    | 32     | 55-80             | • Older children, adolescent and adult  
• Ideal for I.V. infusion and blood infusion  
• Medication administration  
• Emergency management | • Easy to insert into small, thin, fragile veins  
• Difficult to insert into thorough skin |
| 22G  | BLUE    | 25     | 22-50             | • Older children, adolescent and elderly adult  
• I.V. infusion with moderate flow rates  
• Medication administration | • Insertion to thorough skin is difficult |
| 24G  | YELLOW  | 19     | 23                | • Infant toddler, older children  
• Major surgery and trauma among children  
• Can administer fluids and medication | • Less painful insertion to thorough skin is difficult |
| 26G  | VIOLET  | 19     | 10-15             | • Neonate, infant and elderly adults  
• Suitable for infusion but infusion rate is low | • Insertion to thorough skin is difficult and less painful |

**Flow Rate Calculation:**

When calculating the flow rate of IV solutions, remember that the number of drops required to deliver 1 ml varies with the type of administration set. Administration sets are of two types:
- Macro drip set (delivers 10-20 drops/ml)
- Micro drip set (60 drops/ml).

Flow rate = \( \frac{\text{Volume of infusion in ml}}{\text{Time of infusion in minutes}} \times \text{Drip factor (in drops/ml)} \)
DIFFERENT TYPES OF IV CANNULA
FLUID THERAPY AND BLOOD PRODUCT

- **Crystalloid**: up to 2 lt of Hartmann’s solution
- **Colloid**: up to 1-2 lt until blood arrives
- **Blood**: cross matched. If cross matched blood is still unavailable give uncross matched group specific blood or give O RhD negative blood
- **Fresh frozen plasma**: four units for every six units of red blood cells or prothrombin time/activated partial thromboplastin time > 1.5 times than normal (12- 15 ml/kg or total one lt)
- **Platelets concentrate**: if PLT count < 50×10^9
- **Cryoprecipitate**: if fibrinogen < 1g/l
Main therapeutic goals of management of massive blood loss is to maintain:

- Haemoglobin >8g/dl
- Platelet count: $>75 \times 10^9/l$
- Prothrombin: $<1.5 \times \text{mean control}$
- Fibrinogen $>2.0 \text{ g/l}$
HAEMATOLOGICAL MANAGEMENT

DIC

• Transfuse without delay

• Involve haematology service at an early stage

• Correct coagulopathy

• Liaise with consultant haematologist for use of recombinant Factor VII (Novoseven©) and Fibrinogen.
MASSIVE BLOOD TRANSFUSION

• DEFINITIONS: replacement of one entire blood volume within 24 hrs
  • transfusion of >10 units of PRBC in 24 hrs
  • transfusion of > 20 units of PRBCs in 24 hrs
  • transfusion of > 4 units of PRBCs in 1 hr (ongoing need is foreseeable)
  • replacement of 50% of total blood volume within 3 hrs
RECOMBINANAT FACTOR VIIA THERAPY

- Synthetic vit k dependent protein
- Available: NOVOSEVEN
- Risk: arterial > venous thrombosis
- In obstetrics: used to control severe haemorrhage with/without haemophilia
- Used with: uterine atoy/lacerations/placental abruption or previa
- MOA: binds to exposed tissue factors – activates platelets and coagulation cascade
- Not effective: fibrinogen level < 50 mg/dL, platelet count < 30,000/µL
MONITORING

• Keep position flat
• Keep the woman warm
• Temperature: every 15 min interval
• Continuous pulse, BP, RR recording
• Catheter to monitor urine output
INVESTIGATIONS

• MINOR PPH (blood loss 500-1000 ml/no clinical shock/bleeding ceasing)
  • Blood grouping
  • Complete blood count
  • Coagulation screening including fibrinogen
  • Pulse and blood pressure monitoring every 15 min interval

• MAJOR PPH (blood loss >1000ml/continuing to bleed/clinical shock)
  • Cross matching: 4 units PRBC minimum
  • Complete blood count
  • Coagulation screening including fibrinogen
  • Renal and liver function for baseline
FIRST T....TONE
## Table 1. Drug doses for management of PPH

<table>
<thead>
<tr>
<th></th>
<th>Oxytocin</th>
<th>Ergometrine/ Methyl-ergometrine</th>
<th>15-Methyl prostaglandin F2a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dose and route</strong></td>
<td>IV: Infuse 20 units in 1 l IV fluids at 60 drops per minute</td>
<td>IM or IV (slowly): 0.2 mg</td>
<td>IM: 0.25 mg</td>
</tr>
<tr>
<td><strong>Continuing dose</strong></td>
<td>IV: Infuse 20 units in 1 l IV fluids at 40 drops per minute</td>
<td>Repeat 0.2 mg IM after 15 minutes If required, give 0.2 mg IM or IV (slowly every 4 hours)</td>
<td>0.25 mg every 15 minutes</td>
</tr>
<tr>
<td><strong>Maximum dose</strong></td>
<td>Not more than 3 l of IV fluids containing oxytocin</td>
<td>5 doses (Total 1.0 mg)</td>
<td>8 doses (Total 2 mg)</td>
</tr>
<tr>
<td><strong>Precautions/ contraindications</strong></td>
<td>Do not give as an IV bolus</td>
<td>Pre-eclampsia, hypertension, heart disease</td>
<td>Asthma</td>
</tr>
</tbody>
</table>


*IV intravenous  
IM intramuscular*
## Retaining effectiveness and potency

<table>
<thead>
<tr>
<th>Uterotonic</th>
<th>Recommended temperature</th>
<th>Shelf-life outside refrigerator</th>
<th>Recommended light exposure</th>
<th>Effects of light exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ergometrine</td>
<td>• Injectable form best kept in a refrigerator, between 2–8°C</td>
<td>May be kept outside the refrigerator in closed boxes and protected from light for up to one month at 30°C</td>
<td>Should be kept out of light</td>
<td>When exposed to light, even indirect light, ergometrine and methylergometrine rapidly lose potency.</td>
</tr>
<tr>
<td></td>
<td>• Should not be frozen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxytocin</td>
<td>• Injectable form best kept in a refrigerator, between 2–8°C</td>
<td>May be kept outside the refrigerator at a maximum of 30°C for up to three months</td>
<td></td>
<td>When exposed to light oxytocin loses negligible amounts of potency.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syntometrine</td>
<td>• Should not be frozen</td>
<td>May be kept outside the refrigerator in closed boxes and protected from light for up to one month at 30°C</td>
<td>Should be kept out of light</td>
<td></td>
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</tbody>
</table>
Misoprostol

- Synthetic prostaglandin E1 analogue
- Initially developed for oral use
- Other routes of administration
  Sub-lingual, Rectal, vaginal & Buccal

- India
- Bangladesh
- Nepal
- Russia
- Uganda

--- Countries ---

- Nigeria
- Ethiopia
- Somalia
- Ghana
- Kenya

*Med Res Rev. 1990 Apr-Jun;10(2):149-72*
Misoprostol Advantages

- Thermostable
- Affordable uterotonic agent compared with other
- Ease of administration
- Useful in poor resource sources – skilled workers

- Standard management with 600mcg Misoprostol lowered maternal mortality by 81%.
- Oral Misoprostol was associated with significant ↓ in the rate of acute PPH and mean blood loss.

#Standard management defined as delivery attendance by a village health worker without administration of medication.

***Lancet.2006;368(9543):1248-53
Clinical Guidance

The WHO recommends the use of Misoprostol in settings where it is not possible to use Oxytocin or another injectable uterotonic such as Ergometrine or an Oxytocin and Ergometrine fixed-dose combination.

In the absence of personnel to offer active management of the 3rd stage of labour, it is recommended that the trained health worker should offer Misoprostol 600mcg orally immediately after the birth of the baby.

WHO Statement regarding the use of misoprostol for postpartum haemorrhage prevention and treatment. 2009. Ref No: WHO/RHR/09.22
TRANEXAMIC ACID IN THE TREATMENT OF PPH

• WHO Recommendation (2009):
  • (Quality of evidence: very low. Strength of recommendation: weak.)
  • Tranexamic acid may be offered as a treatment for PPH if:
    (i) administration of uterotonics has failed to stop the bleeding; or
    • (ii) it is thought that the bleeding may be partly due to trauma.
Interventional Therapies
S – Shift to OT or higher center

- If initial medical therapy fails within Golden Hour, shift to a center where multidisciplinary approach available – “PPH precedes Death by 2 hours”
- Two important life savior methods to transfer include
  - Aortic compression by Skilled Birth Attendant
  - Non Pneumatic Anti Shock Garment
Compression of Abdominal Aorta

- Apply downward pressure with closed fist over abdominal aorta through abdominal wall (just above umbilicus slightly to patient’s left)
- With other hand, palpate femoral pulse to check adequacy of compression
  - Pulse palpable = inadequate
  - Pulse not palpable = adequate
- Maintain compression until bleeding is controlled or until she reaches the operation theatre
Non-Inflatable Anti-Shock Garment
The non-pneumatic anti-shock garment (NASG)

The NASG shunts blood accumulating in the lower extremities back up to the vital organs, including the brain, heart, and lungs.

Women in shock are placed in the garment to temporarily stabilize them during transportation or while waiting for surgery / other treatment.

It is made of neoprene and Velcro, with a firm ball at the abdomen which compresses the uterus to decrease bleeding.

It can be used at all levels of health facilities (public and private) and in ambulances.
Challenges in implementing the NASG

Implementation of the garment requires frequent training and supportive supervision.

A danger of using the garment lies in the potential for untrained providers to remove it at the wrong time, causing rapid decompression and shock.

Logistic issues include getting the garment returned to its "home" site, properly cleaned, dried and stored, for use by the next PPH emergency case.
Bimanual Compression

Figure 1 Illustration showing bi-manual compression of the uterus.
UTERINE TAMPOONADE

**Uterine tamponade**

- Packing with gauze
- Intrauterine foley’s catheter
  - One or more bulbs, 60-80ml of saline
- Bakri tamponade balloon
  - 300-500ml of saline

- The intervention described as the ‘tamponade test’
- A ‘positive test’: able to control PPH following inflation of the balloon,
  indicate that laparotomy is not required
- A ‘negative test’: continued bleeding following inflation of the balloon,
  indication to proceed to laparotomy
INTRAUTERINE PACKING

• Uterine tamponade
• Done under general anaesthesia
• Uncontrolled PPH: for transport to tertiary centre
• WHO now do not recommend uterine packing due to uterine atony after vaginal delivery
• TECHNIQUE: a five meter long and eight cm wide folded strip of gauze soaked in antiseptic cream or betadine lotion is placed high up and packed into the fundal area and uterine packing is done
• Antibiotic should be given
• Pack removed after 24 hrs
BALOONTAMPONADE

- SENGSTAKEN-BLAKEMORE ESOPHAGEAL CATHETER
  - Gastric balloon of the catheter filled with *200-500 ml of warm saline* until the distended balloon is felt per abdomen and just visible at the cervical canal
  - Can also be used to perform tamponade test
  - Catheter should be removed in 12-24 hrs
  - In rural areas, no 24 Foley’s catheter is used (30 ml balloon) is inflated with 60-80 ml saline
- Rush urological hydrostatic balloon
- Bakri balloon
- Condom catheter pack
TAMPOONADE TOOLS

- 24F Foley’s Catheter
- Uterine Gauze
- Bakri Balloon
- Glove Balloon
- Sengstaken Blakemore Tube
- Condom
Internal Uterine Tamponade

Figure 1 Inflated Bakri Balloon max capacity 500mls.
Procedure

- Balloon portion is placed directly into uterus [entire balloon (500ml capacity) has to be inserted past the cervical canal & internal os].
- Gentle traction on balloon shaft ensures proper contact between balloon & tissue surface & enhances tamponade effect.
- Success is judged by a declining loss of blood from cervix & that seen through drainage port.
- Mean time for leaving the tamponade balloon - 8 to 48 hours.
- Gradual deflation of the balloon is advised to reduce the potential risk of further bleeding.
Surgical Interventions
Conservative Surgical Management

Mode of Actions:

- Controls PPH
- Preserves reproductive functions
- Avoids hysterectomy and related complications and consequences
SURGICAL MANAGEMENT

• COMPRESSION SUTURES
• STEPWISE DEVASCULARIZATION OF UTERUS
• UTERINE ARTERY EMBOLIZATION
• OBSTETRIC HYTERECTOMY
B-Lynch Suture

- Exerts continuous vertical compression on uterine vascular system
- Before proceeding to place the suture into uterus, potential efficacy of B-Lynch suture should be tested for by performing open bimanual compression to see if bleeding stops
- The assistant performs compression & maintains it with 2 hands during the placement of the suture by the surgeon
- Monocryl suture or Vicryl number 2 should be used
SURGICAL MANAGEMENT
HAYMAN’S SUTURES

- **Hayman suture**, describe in 2002 with modified compressive suture which does not require hysterotomy
- **Vertical compression sutures**

  * Effective technique to controlling severe PPH and reducing the need for hysterectomy
  * Cx: pyometria, partial uterine necrosis
Cho Multiple Square Compression Sutures

- Multiple square sutures are used to cover the whole body of uterus using a straight 10-cm needle.
- May be useful in placenta previa.
OTHER COMPRESION SUTURES

Gunasheela’s Global Stitch
STEPWISE DEVASCULARISATION OF UTERUS
STEPWISE UTERINE DEVASCULARIZATION

1. Unilateral high uterine artery ligation
2. Bilateral high uterine artery ligation
3. Bilateral low uterine artery ligation
4. Unilateral tubal branch of ovarian vessel ligation
5. Bilateral tubal branch of ovarian vessel ligation
6. Bilateral internal iliac artery ligation (anterior division)
Uterine Artery Ligation

- 90% blood supply of uterus in pregnancy is from uterine vessels
- Ligation of uterine arteries result into significant reduction in blood flow to the uterus
Ovarian Artery Ligation

- Ovarian artery directly arises from the aorta
- Anastomosis with the uterine artery in the region of the uterine aspect of the utero-ovarian ligament
Internal Iliac Artery Ligation

Therapeutic indications

- Before or after hysterectomy for PPH
- Continuous bleeding from the broad ligament base; profuse bleeding from pelvic side-wall or vaginal angle
- Diffuse bleeding without, clearly identifiable vascular bed
- Ruptured uterus in which uterine artery may be torn at its origin from internal iliac artery
- Where extensive lacerations of cervix have occurred following difficult instrumental delivery
Uterine Artery Embolization

- Highly feasible, safe & beneficial procedure, possibly precluding further laparotomy & hysterectomy
- If successful, not only saves the patient’s life, but also preserves the functions of uterus, tubes and ovaries.
- Should be the procedure of choice for PPH prior to surgical intervention
SELECTIVE ARTERIAL EMBOLIZATION

• Femoral artery is punctured and stepwise catheterisation of internal iliac, uterine, ovarian arteries done

• Embolization is performed by using POLYURETHANE FOAM OR POLYVINYL ALCOHOL

• Above materials absorbed within 10 days
## ARTERIAL EMBOLIZATION

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Less invasive than laparotomy</td>
<td>• Available in fewer centres</td>
</tr>
<tr>
<td>• Help to preserve fertility</td>
<td>• May not be possible to get required equipment at obstetric OT or transfer</td>
</tr>
<tr>
<td>• Quicker recovery than laparotomy</td>
<td>patient to radiology department</td>
</tr>
<tr>
<td></td>
<td>• Appropriately trained interventional radiologists must be available</td>
</tr>
</tbody>
</table>
Embollisation

Figure 2d: Left internal iliac arteriography in the left anterior oblique position (LAO).
Hysterectomy

Best immediate option
- When uterine atony is unresponsive to uterotonic
- Where facilities for embolization are not available
- Obstetrician not well versed with technical aspects of conservative surgical procedures or iliac artery ligation

Indications
- Uterine rupture secondary to obstructed labor
- Previous Caesarean section
- If rupture is extensive & hemorrhage cannot be contained by suture of ruptured area
Internal iliac ligation will help in controlling both the uterine & vaginal branch bleeding (B/L ligation results in 85% reduction of pulse pressure & 50% reduction blood flow & bleeding reduced by 50%).

Hysterectomy is the last option. Subtotal hysterectomy is safer & quicker to perform.

If the bleeding is from the lower segment (placenta previa, accreta or tears) then total hysterectomy is carried out.

The decision for hysterectomy should not be unduly delayed as this can result in the death of the mother.
At present there is no evidence to suggest that anyone method is better for the management for severe PPH.

RCT of various treatment options may be difficult to perform in practice.

Balloon tamponade is the least invasive and the most rapid approach, it would be logical to use this as the 1st step in the management.
2nd T Surgical Treatment of Traumatic PPH

Causes

1. Cervical Tear - Lateral, annular, bucket handle type detachment.
2. Vaginal Tear - Circular / Vertical, colporrhaxis.
3. Extended Episiotomy — upwards towards posterior fornix, downwards involving anus and rectum.
4. Vulval Hematoma.
5. Perineal lacerations.
6. Para Urethral tear, clitoral tear.
7. Uterine Rupture – complete / incomplete
8. Broad Ligament hematoma
Cervical Tear Repair

- Recognition - unilateral / bilateral
- Stitching under good light,
Vulval hematoma
Treatment protocol of Uterine rupture

Pathway of care uterine rupture

Emergency care:
- Airway and breathing — Give 100% O₂ by face mask
- Circulation —
  - Insert 2 wide bore IV cannulae (14G)
  - Send blood for FBC, 4 units crossmatch, clotting
  - Give warmed crystalloid IV as rapidly as possible
  - Establish monitoring of pulse, BP, urine output (via catheter)

Transfer to theatre:
- Obtain consent for laparotomy and hysterectomy
- Perform laparotomy under anaesthesia
- Incision: depends on why rupture is suspected

Trauma involved or pathology uncertain?
- Midline incision:
  - Allows uterine exposure and Caesarean section, and then allows adequate exploratory laparotomy to identify other pathology

Surgery:
- Uterine repair where possible
- Hysterectomy (usually subtotal) is indicated if haemorrhage persists
- Prophylactic antibiotics should be given

Rupture during labour
- Low transverse incision
  - Adequate for delivery and uterine repair, but inadequate if other pathology suspected

8.7 Uterine rupture.
3rd T - TISSUE FACTOR

- Retained Placenta
  1. With Active Bleeding----MRP
     - Partially Separated.-----MRP
     - Retained Cotyledons.----Uterine Exploration and E&C
     - Retained piece of Membranes.—Uterine Exploration and E&C
  2. With No Bleeding.
     - Active Retention (Hour Glass Contraction)-G.A., Placental Delivery.
     - Placenta Accreta
     - Placenta Inccreta
     - Placenta Perccreta.

- Acute inversion of Uterus--Protocol
Retention of Placenta

Retention of Detached Placenta
- Uterine Inertia
- Hour glass contraction (constriction ring)

Retention of Adherent Placenta
- Simple Adhesion
- Morbid Adhesion
  - Placenta Accreta
  - Placenta Incrreta
  - Placenta Percrreta
MORBID ADHERENT PLACENTA

• **TYPES:** placenta accreta
  - Placenta increta
  - Placenta percreta

• **TREATMENT:** counselling of the women and her relatives for hysterectomy
  - **medical management** – six doses of methotrexate orally or parenterally at a dose of 50 mg methotrexate and 6 mg folinic acid on alternate day
  - **follow-up:** serial USG and MRI
INVERSION OF UTERUS

- Turning inside out of the uterus
- Causes: fundal placental implantation
  : uterine atony
  : cord traction before placental separation
  : abnormal adherent placenta
Types: degree of inversion
  : timing of inversion
Abdominal view of Inversion Of Uterus

- Bladder
- Fallopian tube
- Ovary
- Colon
MANAGEMENT

- immediate recognition
- call for help
- keep blood ready for transfusion
- evaluate under GA
- Recent inversion (no contraction/retraction of uterus & placenta already separated): replaced by simply pushing
- Placenta sill attached: uterine relaxant drugs (terbutaline/magnesium sulphate/nitroglycerine)
- After reposition: stop uterine relaxant and start oxytocin
- Surgical intervention:
- Inversion after reposition: compression sutures
**THROMBIN**

- Coagulation defects
- A rare cause of PPH
- Unlikely to respond to the measures described
- **E.g.**
  - HELLP syndrome
  - DIC
  - Idiopathic thrombocytopenic purpura
  - Thrombotic thrombocytopenic purpura
  - Von Willebrand’s disease
  - Hemophilia

- **Treatment**: treat the underlying disease process and correct the coagulation defect
ETIOLOGY – SECONDARY HEMORRHAGE

• Secondary hemorrhage occurs 24h to 6-12w after child birth
• Causes include:
  • Subinvolution of placental site
  • Retained POC
  • Infection: endometritis/myometritis/parametritis/infection of vulvo vaginal lacerations/infection and dehiscence of cesarean scar (usually occurs between 10-14 days due to separation of slough)
  • Chorio carcinoma: occurs beyond 4 weeks
  • Infected fibroid
  • Leiomyometous or placental polyp
  • Cervical cancer
  • Uterine inversion
  • Inherited coagulation defects
MANAGEMENT OF SECONDARY PPH

SUPPORTIVE THERAPY:

- Intravenous hydration and blood transfusion
- Ergometrine 0.25-0.5 mg or Methylergometrine 0.2-0.4 mg IM (bleeding of uterine origin)
- Broad spectrum antibiotics (ampicillin/gentamicin/metronidazole)
- Mild bleeding without retained bits: conservative treatment

ACTIVE TREATMENT

- Evacuation: by ovum forceps under GA and antibiotic coverage
- Ergometrine: 0.25 mg IM
- Products removed must be sent for HPE (rule out choriocarcinoma)
- EXCESSIVE OR CONTINOUS BLEEDING: surgical treatment
VACCUM SUCTION HAEMOSTATIC DEVICE FOR TREATING PPH
**Emergency Obstetric Kit**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>IV Cannula</td>
<td>Gray-1</td>
</tr>
<tr>
<td></td>
<td>Green-1</td>
</tr>
<tr>
<td>Blood sample bottles</td>
<td>Pink-1</td>
</tr>
<tr>
<td></td>
<td>Blue-1</td>
</tr>
<tr>
<td></td>
<td>Red-1</td>
</tr>
<tr>
<td>Syringes</td>
<td>10 ml- 4</td>
</tr>
<tr>
<td></td>
<td>5 ml-2</td>
</tr>
<tr>
<td></td>
<td>2 ml- 4</td>
</tr>
<tr>
<td>Plaster to fix the cannula</td>
<td>1</td>
</tr>
<tr>
<td>Catheter size 16</td>
<td>1</td>
</tr>
<tr>
<td>urobag</td>
<td>1</td>
</tr>
<tr>
<td>Distilled water 10 ml</td>
<td>1</td>
</tr>
<tr>
<td>Infusion set</td>
<td>1</td>
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### CONTD.....

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood set</td>
<td>1</td>
</tr>
<tr>
<td>Sterile gloves 6.5 or suitable size</td>
<td>1 pair each</td>
</tr>
<tr>
<td>Oxygen face mask</td>
<td>1</td>
</tr>
<tr>
<td>Cotton swab</td>
<td></td>
</tr>
<tr>
<td>Pair of scissors</td>
<td>1</td>
</tr>
<tr>
<td>Ringer lactate</td>
<td>1 unit</td>
</tr>
<tr>
<td>3 way connection</td>
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# PPH Drug Kit

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxytocin</td>
<td>5 AMPS</td>
</tr>
<tr>
<td>Methylergometrin (Methergin)</td>
<td>2 AMPS</td>
</tr>
<tr>
<td>Prostodin/15 Methyl PGF2α</td>
<td>2 AMPS</td>
</tr>
<tr>
<td>Misoprostol 600 microgram</td>
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# OTHER INSTRUMENTS AND SUPPLIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>LARGE SPECULAMS</td>
<td>3</td>
</tr>
<tr>
<td>SPONGE HOLDING FORCEPS</td>
<td>4</td>
</tr>
<tr>
<td>CONDOM TAMponade</td>
<td></td>
</tr>
<tr>
<td>UTERINE PACK</td>
<td>6 CM WIDE AND 3 METER – 2 IN NO</td>
</tr>
</tbody>
</table>
Save mother’s lives
THANK YOU