SURGICAL MANAGEMENT OF POSTPARTUM HEMORRHAGE

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POSTPARTUM HEMORRHAGE (PPH)

• WHO
  • Hemorrhage ≥500mL in 24 hours
  • Serious PPH: ≥1000mL

• ACOG: Hemorrhage
  • ≥500mL after vaginal delivery
  • ≥1000mL after cesarean
  • Early (primary)
    • First 24 hours
    • 90% of PPH
  • Late (secondary)
    • 24 hours-12 weeks
<table>
<thead>
<tr>
<th>Blood Loss % (ml)</th>
<th>Blood Pressure mmHg</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 15 (500 to 1000)</td>
<td>Normal</td>
<td>Palpitation, dizziness, very low increase in heart rate</td>
</tr>
<tr>
<td>15 to 25 (1000 to 1500)</td>
<td>Slightly low</td>
<td>Sweating, tachycardia (100-120 beat / min )</td>
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<tr>
<td>25 to 35 (1500 to 2000)</td>
<td>70-80</td>
<td>Restlessness, pallor, oliguria, tachycardia (120-140 beat / min )</td>
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<tr>
<td>35 to 40 (2000 to 3000)</td>
<td>50-70</td>
<td>Lethargy, air hunger, anuria, collapse, tachycardia (&gt;140 beat / min )</td>
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CAUSES OF PPH

- Uterine atony
- Lacerations
- Remain of Conception products in the uterine cavity
- Placenta invasion anomalies
- Uterine inversion
- Coagulation disorders

- Rare causes
  - Genetic / acquired bleeding diathesis
  - Arteriovenous malformations
  - Choriocarcinoma
  - Cesarean scar dehiscence
  - Adenomyosis
  - Infected polyp or submucous myoma
  - Unrecognized cervix ca
PPH Management

• Postpartum hemorrhage (PPH) is an obstetric emergency

• Massage X compression X vaginal examination

• Medical approach

• Surgical approach
LACERATIONS

- Vulvar-vaginal-cervical lacerations

- Myometrial laceration
  - Lateral extension of the caesarean section
    - The corner of the laceration is seen clearly and tied
    - Ureter and bladder removal should be considered
  - Laceration of uterine and utero-ovarian artery branches
    - Binding of bilateral uterine arteries
      - Uterine necrosis-placental insufficiency was not detected
ATONY

- Multiple Initiatives
- Uterine Massage
- Uterine manual compression
- Uterotonics
- Tranexamic acid
- If the patient does not benefit
  - Patient is stable, uterine compression sutures
ATONY

• If the patient is not hemodynamically stable

• Temporary measures
  • Placing tourniquet to Uterus
  • Placing an intrauterine balloon
  • Binding of uterine and utero-ovarian arteries
Uterine Compression Sutures

• Many sutures are available for this purpose
  • B-Lynch sutures
  • No advantage over each other
• Complications are rare
  • Uterine necrosis
  • Uterine erosion
  • Pyometra
  • Intrauterine synechia
• No adverse effects on pregnancy
• **B-Lynch suture**
  - Effective in atony
  - Is not effective in Plasenta acreata
  - Absorbable 1-2 number suture
  - Uterine sandwich
    - If uterine balloon is used
• **Hayman**
  - Front to back 2-4 vertical compression sutures on the uterine wall
  - Hysteretomy is not required
  - Transverse cervicoisomic suture in lower segment bleeding

• **Pereira**
  - Transverse and longitudinal sutures
  - Subserous and sutures not reaching the cavity
  - Rotates the uterus and compresses

• **Cho**
  - Multiple square sutures
MEYDANLI COMPRESSION SUTURE TECHNIQUE
RETROPERITONEAL HEMORRHAGE

- Ligate the bleeding vessel
- Hypogastric artery ligation
  - Unilateral X Bilateral
- Pelvic packing
- Attention to ureters
- To find isolated bleeding location is often impossible
- Non-growing hematoma is untouchable
- Couagulopathic-unstable and growing hematoma is untouchable
PLACENTAL ABNORMALITIES

• Plasenta accreta

• Plasenta previa
GENERAL APPROACH TO PPH
ABDOMINAL EVALUATION

• Midline incision if the abdomen is evaluated after vaginal delivery
  • Provides better evaluation and treatment of pelvis and abdomen
  • Automatic retractors (Balfour, Bookwalter, Omni) may be useful

• Posterior rupture may not appear immediately

• Whole uterus should be carefully evaluated

• If there is intraabdominal bleeding, the abdomen should be thoroughly washed
  • The source of bleeding should be determined
GENERAL APPROACH TO PPH
ABDOMINAL EVALUATION

• The source of bleeding may not be detected immediately
  • It can be limited into the uterine cavity
  • Retroperitoneal hemorrhage
    • Cervical-uterine-vaginal lacerations
• Intraabdominal hemorrhage
  • Uterine Rupture
  • Bleeding vessel
    • Spleen-liver rupture
    • Rupture of a visceral artery aneurysm or pseudo aneurysm
TEMPORARY MEASURES IN UNSTABLE PATIENTS

• Severe bleeding continues preparing the operation

• Surgical procedures are difficult in severe cuagulopathy

• Alongside fluid delivery

• Transfusion of blood products
PATIENTS WITH INCREASED RISK OF BLEEDING

• Manual aortic compression
  • Life-threatening bleeding in a few minutes
  • Aorta is applied pressure towards the vertebra
    • Over a few inches of sacral promontorium
    • Just below the renal arteries
      • Also controls collateral circulation

• Occlusion of aorta with balloon
  • Direct application
  • Percutaneous femoral application
PATIENTS HAVE NO RISK EXCESSIVE BLEEDING IN A SHORT TIME

• Uterine tourniquet Application
  • Can be used as a temporary measure in PPK
    • Pernous drain and urine catheter can be used
    • Applied to uterine lower segment
      • Attention to the bladder

• Intrauterine balloon application
  • Alone
  • With compression sutures
PATIENTS HAVE NO RISK EXCESSIVE BLEEDING IN A SHORT TIME

- Binding of uterine and utero-ovarian arteries
  - Reduces perfusion pressure in myometrium
  - Can not control bleeding alone in atony and plasenta accreta
  - It does not harm to uterus and reproductive functions

- Wide clamping of utero-ovarian ligaments

- Pelvic packing
  - To stop bleeding from small pelvic vessels
  - Prevents arterial bleeding with pressure
PATIENTS HAVE NO RISK EXCESSIVE BLEEDING IN A SHORT TIME

- Binding internal iliac arteries
- Large uterus
  - Difficulty of transverse incision
  - Continuous pelvic hemorrhage
  - Difficult in Obese patients
PERIPARTUM HYSTERECTOMY

• Hysterectomy performed at delivery or within 24 hours

• 1/1000 delivery

• it should be implemented neither early nor late

• Risk factors
  • Abnormal placentation
  • Advanced maternal age
  • Multiparity
  • Multiple gestation
  • Antepartum hemorrhage
  • Preeclampsia
  • Bleeding disorders
  • Use of assisted reproductive techniques
PERIPARTUM HYSTERECTOMY

• Urgent
  • Uncontrollable PPH
    • Placental anomalies
      • Peripartum hysterectomy in 60% of placental insertion anomalies
      • %5 in Plasenta previa
    • Atony
    • Uterine rupture
    • Vascular laceration...

• Can be planned
  • Antepartum diagnosed plesental anomalies
  • Cervix ca
  • Large fibroids
PERIPARTUM HYSTERECTOMY

- Total hysterectomy
  - Cervical laceration
  - Placentation anomalies
  - Bladder-ureter, vascular injuries are more frequent
  - Pulmonary complications are more frequent
  - More frequent trasfusion

- In Supracervical hysterectomy
  - Reoperation is more frequent
  - Perioperative death is more frequent
CHALLENGES IN PERIPARTUM HYSTERECTOMY

- Cervix is soft
  - Can be difficult to detect
- Pelvic vessels are dilated and varicose
- Uterus is large and fills the pelvis
- Vaginal cuff and ligaments are fragile
  - Laseration can be seen when clamped
- The myometrium surrounding the invasive placenta may be quite thin or not
  - Clamping this tissue may cause serious bleeding
PERIPARTUM HYSTERECTOMY

- The surgical team and anesthesiologist should be experienced in PPH
- Adequate vascular access and arterial path should be opened,
- Prophylactic antibiotic within 1 hour after skin incision
  - Repeat dose, If the bleeding exceeds 1500 ml or the operation exceeds 4 hours
  - In Placenta accreta
    - 4 unit erythrocyte 4 unit fresh frozen plasma
- There must be enough surgical equipment
- Ureter catheter
  - Can be attached in placenta accreta
- Thromboembolism prophylaxis
- Patient should be in lithotomy position
- There must be patient and fluid heaters
OPERATION

• Median incision is preferred
  • If pfannensteil insicion applied
    • Maylard insicion may be performed

• Classic (fundal) uterine incision
  • Placental abnormality
  • Large front wall fibroids
  • Venous veins between bladder-cervix
  • Significant anterior uterin adhesions

• Adherent placenta is left inside
  • Until hysterectomy
  • Intrauterine Paking
OPERATION

- The ligaments are not ligating until the controlled the bleeding
- If the bladder is attached to the cervix separated by sharp dissection
- Posterior hysterectomy
  - If there is invasion to the bladder
- Ureteral imaging is very important
- Uterine arteries are bound away from uterus in the placental invasion anomalies
- Cervix is cut under the placental bed performing subtotal hysterectomy
OPERATION

• The area is well evaluated when closing

• No need drain
  • If there is no ongoing bleeding
  • If no suspicion of leakage of bladder

• Continuous bleeding
  • Coagulation factors are evaluated
  • Blood and blood products are supplemented
  • Bleeding areas can be applied to «eight sutures»
  • Cauterization
  • Hemostatic agents
  • Pelvic packing
PERIPARTUM HYSTERECTOMY COMPLICATIONS

- Mortality <1%
- Hemorrhage
- Febrile morbidity
- Urinary system complications
- GIS complications
- Reoperation
- Coagulopathy
- Transfusion of blood-blood products
- Wound opening
- Thromboembolism
- Cuff abscess
• Evaluating of bladder damage
  • Bladder filled with 200 ml serum / or with 2-3 ampoules methylene blue

• Evaluation of Ureters
  • Integrity is observed
  • Diameter-peristalsis is controlled
  • 1-2 amp. indigo carmine IV
    • In 10-15 min leakage from demaging area

• Cystoscopy
• Ureteral catheterization
PERSISTENT BLEEDING AFTER Hysterectomy

• Bleeding after hysterectomy can be fatal
  • Hypothermia <35°C
  • Coagulopathy
  • Metabolic acidosis pH <7.30
  • Resuscitation time and interventions >90 dk
  • Need of transfusion >10 units

• To get rid of fatality
  • Packing done firmly to bleeding area
  • We close skin
    • Large sutures, towel clamps
  • The patient is held in the operation room until stabilized
  • When the patient is stable, it is followed up in intensive care until definitive surgical procedure
  • To get rid of fatality X Compartment syndrome
PERSISTENT BLEEDING AFTER HYSTERECTOMY

• Wide drain X chest tube

• Three hours per hour ≥2 units of erythrocyte need, means serious bleeding
  • Operation room X Arterial embolization

• When the patient is stable within 48 hours, if the clotting factors are normal, packing is terminated

• Of the 53 patients who underwent packing, 20 of them continue to bleeding
  • 6 of them went repeated surgery
  • 6 pelvic artery embolization
  • 8 further initiatives
Embolization

- Pelvic hemorrhages that cannot be corrected surgically
- Hybrid operating room
RESULT

• Proper and timely treatment in postpartum hemorrhage is life-saving

• An experienced team is vital to control postpartum hemorrhage
THANKS FOR YOUR ATTENTION