



IN THE NAME OF GOD





PATHOGENESIS OF PPH & ASSESSMENT OF BLEEDING IN PPH

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PATHOGENESIS OF PPH

Obstetrics is a bloody business.

Dr. Jack Pritchard (1976b)





PATHOGENESIS OF PPH

- **Atony**

Retained placenta

Abnormally adherent placenta (accreta)

Uterine inversion

- **Trauma**

- **Coagulopathy**



ATONY

- The most common cause of PPH is uterine atony , which complicates 1 in 40 births and is responsible for at least 75 percent of cases of PPH
- Placental disorders (morbidly adherent placenta, placenta previa, abruptio placentae), retained products of conception, and uterine inversion result in PPH because they inhibit effective uterine contraction



ATONY

- With diffuse atony, blood loss can be much greater than observed because a flaccid and dilated uterus may contain a significant amount of blood.
- With **focal localized atony**, the fundal region may be well contracted while the lower uterine segment is dilated (ballooning) and atonic, which is difficult to appreciate on abdominal examination, but may be detected on vaginal examination.



TRAUMA

- Trauma-related bleeding can be due to lacerations (including uterine rupture) or surgical incisions
- Cervical and vaginal lacerations may develop as a result of the natural processes of delivery or may be related to provider interventions.
- Corpus lacerations may be complete transmyometrial ruptures or incomplete lacerations of the inner myometrium



TRAUMA

- At cesarean delivery, hemorrhage from the uterine incision is generally caused by **lateral extension of the incision**

spontaneous tearing of an edematous lower segment during an otherwise uneventful cesarean delivery after prolonged labor

from delivery of the fetus through an incision that is too small



TRAUMA

- Bleeding from lateral extension of the uterine incision is readily ascertained by **inspection of the incision, lateral pelvic sidewalls, and broad ligament.** **Retroperitoneal enlargement and bulging of the broad ligament at cesarean delivery can be signs of retroperitoneal hemorrhage.**



COAGULOPATHY

Coagulopathy is a cause of PPH in women with an **inherited or acquired** bleeding diathesis, and a result of PPH when there is a severe reduction of clotting factors due to **persistent heavy bleeding** and **hemodilution** of the remaining clotting factors.



Assessment of severity of hemorrhage

Significant drops in blood pressure are generally not manifested until substantial bleeding has occurred, and up to 30 percent of a patient's blood volume can be lost before blood pressure falls.

Hemoglobin and hematocrit values are poor indicators of acute blood loss since they may not decline immediately after an acute bleed



California maternal quality care collaborative staging

- **Stage 0:** Blood loss <500 mL with NVD or <1000 mL with C/S. Stable vital signs.
- **Stage 1:** Blood loss >500 mL with NVD or >1000 mL with C/S or change in vital signs (by >15% or heart rate \geq 110 beats/minute, blood pressure \leq 85/45 mmHg, O₂ saturation <95%)
- **Stage 2:** Continued bleeding with total blood loss <1500 mL
- **Stage 3:** Continued bleeding with total blood loss >1500 mL or transfusion of more than 2 units packed red blood cells or unstable vital signs or suspicion of disseminated intravascular coagulation



Advanced trauma life support classification

Class I hemorrhage involves a blood volume loss of up to 15 %. The HR is minimally elevated or normal, and there is no change in BP, pulse pressure, RR.

Class II hemorrhage occurs when there is a 15 to 30 % blood volume loss and is manifested clinically as tachycardia (HR of 100 to 120), tachypnea (RR of 20 to 24), and a decreased pulse pressure, although systolic blood pressure changes minimally if at all. The skin may be cool, and capillary refill may be delayed.

An increasing maternal heart rate and tachypnea with stable systolic blood pressure should be regarded as evidence of compensated shock and should prompt investigation and institution of a PPH protocol, even if only light vaginal bleeding is observed.



Advanced trauma life support classification

- **Class III** hemorrhage involves a 30 to 40 % blood volume loss, resulting in a significant drop in BP and changes in mental status. Any hypotension (systolic BP less than 90 mmHg) or drop in BP greater than 20 to 30 % of the measurement at presentation is cause for concern. HR (≥ 120 and "thread") and RR are markedly elevated, while urine output is diminished. Capillary refill is delayed.



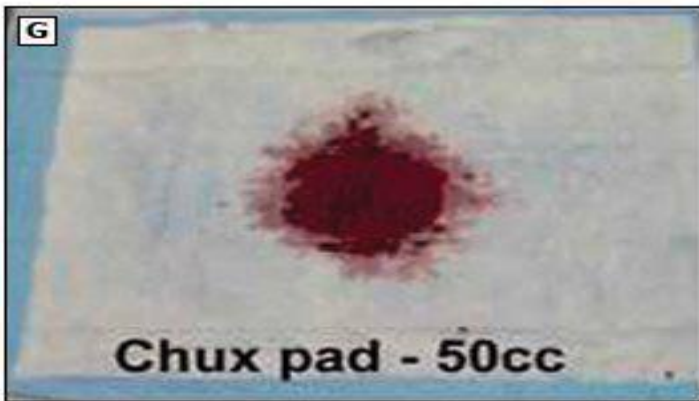
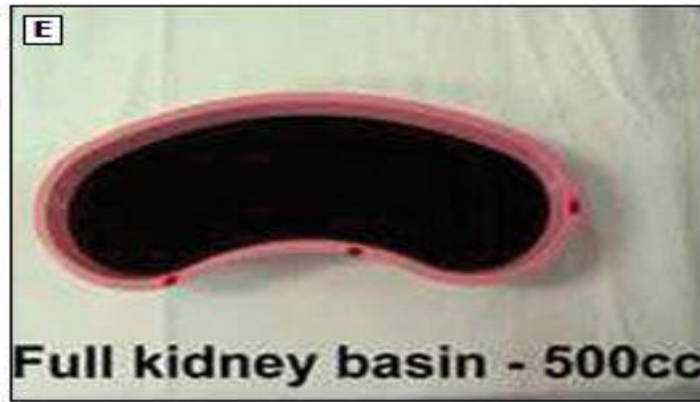
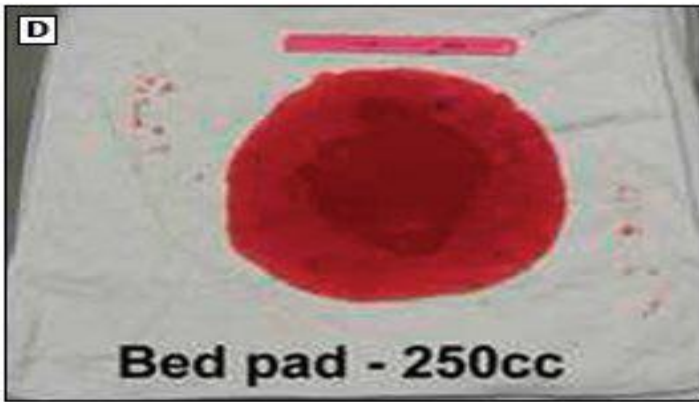
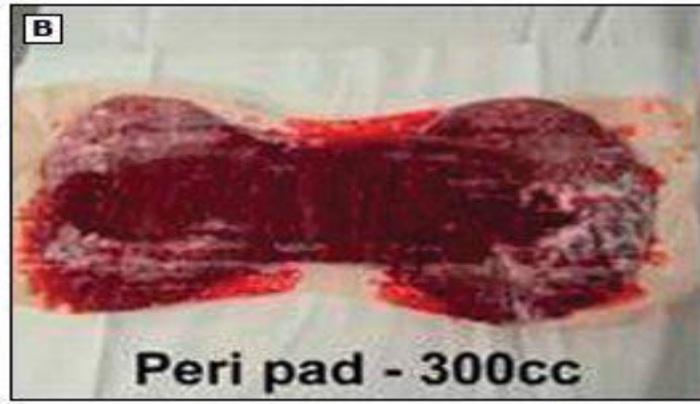
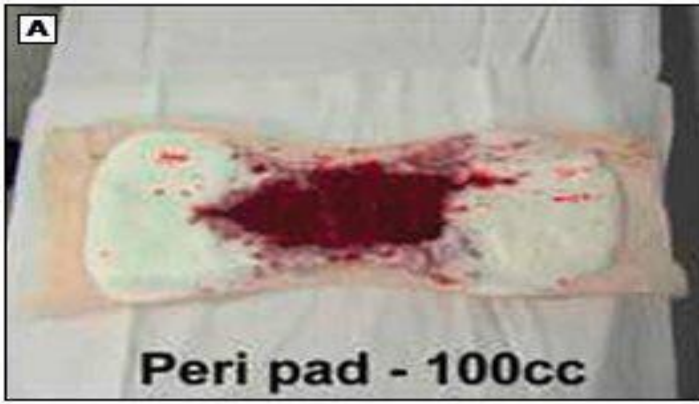
Advanced trauma life support classification

Class IV hemorrhage involves more than 40 % blood volume loss leading to significant depression in BP and mental status. Most patients in class IV shock are hypotensive (systolic BP less than 90 mmHg). Pulse pressure is narrowed (≤ 25 mmHg), and tachycardia is marked (> 120). Urine output is minimal or absent. The skin is cold and pale, and capillary refill is delayed.



Objective measurement of blood loss

- Collect blood in graduated measurement containers, including drapes with calibrated pockets.
- Use visual aids (eg, posters) that correlate the size and appearance of blood on specific surfaces (eg, maternity pad, bed sheet, lap sponge) with the volume of blood absorbed by that surface .
- Measure the total weight of bloody materials and subtract the known weight of the same materials when dry. The difference in weight between wet and dry in grams approximates the volume of blood in milliliters.
- For all of these methods, the clinician should attempt to account for fluids other than blood (eg, amniotic fluid, irrigation fluid, urine) that are collected or absorbed.





THANKS FOR YOUR ATTENTION

