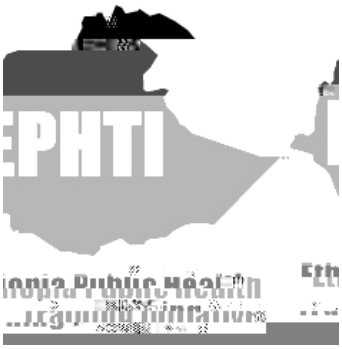
MODULE

Maternal Bleeding

Degree Program
For the Ethiopian Health Center Team



Zerai Kassaye, Bosena Tebeje, Ato Derege Ayele,

Ato Fentie Ambaw, Ato Yihun Assefa

Jimma University

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UNIT ONE

INTRODUCTION

1.1 Purpose and Use of this Module

This module is designed for Ethiopian health center teams who are expected to work at the district where there is no adequate facility for investigation and specialized professional for consultation. Therefore the information contained in this module will benefit the health professional who needs to review or improve their knowledge and skill as well as the inexperienced professional who needs refresher information to become capable in helping patients.

The goal of this self learning module is to provide the midlevel health professional with the knowledge and essential skills required to care a patient with maternal bleeding and recognize the severity of its potential problems.

In addition the module provides a basic foundation for understanding the key concept of maternal bleeding. The module is not intended to provide complete instruction. Thus, the team is expected to read further to pertaining to this broad topic to acquire and maintain adequate skills and enrich knowledge.

1.2 Direction for using the module:

Before starting to read this module, please follow the directions given below:

- Use a separate sheet of paper to write your answers and label it ‘pre-test’ answers.
- Try answering the questions twice, before and after going through the module and see your progress
- The pre-test has two parts: Part one and part two.
- **Part one**: contains common questions to be answered by all categories of the health center team
- **Part two**: contains questions for each category and work out the part specific to your professional category.
- When you are through with the core module proceed to the satellite module corresponding to your category.

UNIT TWO

CORE MODULE

2.1 Pre-tests for all categories

First attempt all the questions again after going through the module and then check your answers against the keys

2.1.1 Pre-test for all categories of Heath center Team

Read the following and answer Yes or No

1. Maternal bleeding is a minor public health problem in Ethiopia.

   A. Yes B. No

2. The laboratory test that should be performed in case of maternal bleeding is only ABO and RH determination:

   A. Yes B. No

3. The most common type of ectopic pregnancy is abdominal.

   A Yes B. No

4. Vaginal bleeding during pregnancy (after 28 completed weeks of gestation) is mainly due to placenta previa.

   A. Yes B. No

5. The commonest cause of induced abortion in our-set-up is congenital anomaly of the fetus

   A. Yes B. No

6. Hematuria is one of the laboratory markers of maternal bleeding.

   A. Yes B. No

7. The commonest cause of postpartum haemorrhage (PPH) is genital - injury during birth.

   A. Yes B. No

8. Ante partum hemorrhage (APH) is a risk factor for postpartum hemorrhage

   A. Yes B. No

9. If a pregnant mother delivers an alive healthy fetus and Expelled placenta, there is no need of further follow up.

   A. Yes B. No

10. Active management of third stage of labor includes use of uterotonic drugs and controlled cord traction with out awaiting signs of placental separation.

A. Yes B. No

2.1.2 Pre-test for Health Officers

Write True or False to each choice for the questions given below.

1. Management of Septic first trimester inevitable abortion includes:-

---------- a) Evacuation & curettage

---------- b) Culture & sensitivity of vaginal discharge

---------- c) Antibiotics

---------- d) Oxytocin to facilitate expulsion

---------- e) Progesterone therapy

2. Investigation for ectopic pregnancy include/s:

---------- a) HCG determination

---------- b) Dilatation and curettage

---------- c) Ultrasound examination of the pelvis

---------- d) Laparoscopy

---------- e) Colpotomy

3. Placenta Previa

---------- a) Cesarean section is the best mode of delivery

---------- b) Part of the placenta could be on the upper uterine segment

---------- c) The bleeding is usually painless, causeless, recurring and bright red.

---------- d) it is common in breech presentation and transverse lie.

---------- e) Vaginal examination is done under double set-up at any time after admission.

4. A patient with severe placental abruption and a dead fetus should be:

---------- a) given a liberal blood transfusion

---------- b) Given analgesics

---------- c) admitted and followed for a spontaneous onset of labour.

---------- d) need fore waters rupturing(Aminiotomy)

---------- e) kept on an intravenous oxytocin infusion.

5. Predisposing factors for ruptured uterus include(s):

--------- a) Past history of uterine perforation

--------- b) Previous cesarean section

--------- c) Chorioamionitis

--------- d) Myomectomy that had endometrial cavity entry

6. Vaginal tear

--------- a) May leads to postpartum haemorrhage.

--------- b) All tears should be sutured.

--------- c) Craniotomy may lead to such a tear.

--------- d) Paravaginal hematoma may lead to considerable pain &collapse.

--------- e) Occurs in the second stage of labour.

7. Postpartum haemorrhage is associated with:

------- a) History of trauma in pregnancy

------- b) Chorioamionitis

------- c) Operative vaginal deliveries

------- d) Cardiac disease

------- e) Pre-eclamsia

8. Which of the following is not true about Active management of third stage of labour?

------- a) Is indicated in distended uterus, multigravidity, APH & prolonged labour cases only.

------- b) Oxytocic drug is given Iv with the delivery of the anterior shoulder.

------- c) Controlled cord traction is started once uterine contraction occurs

------- d) There is a risk of retention of the placenta but Postpartum haemorhage due to traumatic cause is decreased

------- e) Manual removal of the placenta should be done to prevent retention of the placenta.

9. Complications of cephalopelvic disproportion include:

--------- a) Ruptured uterus

--------- b) Vesicovaginal fistula (VVF)

--------- c) Rectovaginal fistula (RVF)

-------- d) Obstructed labour

-------- e) Intrauterine fetal growth retardation

10. Obstructed labour:

--------a) is due to mismangament of labour

------- b) is due to bandle'sring

------- c) Some patients need augumentation of labour

------- d) In primigravidas, secondary uterine atonia is common

------- e) Clinically, severe moulding in face presentation is diagnostic

11. Which one of the following is/are the cause/s/ of maternal bleeding at early pregnancy

------- A. Ectopic pregnancy

------- B. Placenta previa

------- C. Pre mature labour

------- D. All

12. Vaginal bleeding can be diagnosed by

--------- A. Pelvic examination

--------- B. Ultra sound

--------- C. Pregnancy test in early pregnancy

--------- D. All

2.1.3 Pre-test for BSc Nurses

Chose the best answer for the following questions

1. Which one of the following sign is a late sign of obstructed labour?

A. Fetal heart rate will be 140/minute

B. Bandl's ring.

C. Maternal pulse rate of 80/minute

D. Clear amniotic fluid.

2. Unsafe abortion becomes one of the major causes of maternal death, however, it can be prevented and break its cycle by the following ways, **except.**

A. Information and provision of the available Family planning (FP) methods

B Providing post abortion counseling

C. Informing clients that fertility will return after 45 days.

D. Reminding clients that ovulation will occur shortly after abortion.

3. W/o Alemitu has a history of amenorrhea for the last 3 months; eventually she started to have vaginal bleeding, and backache. On vaginal examination the cervix was 3 Cms dilated. The possible diagnosis will be:-

A. Missed abortion
B. Inevitable abortion
C. Threatened abortion
D. Complete abortion

4. All of the followings are the nursing management of unclassified abortion at H/C **except:-**

A. Put on IV drip in case of severe bleeding
B. Assess V/S and FHB
C. Check cervical dilatation.
D. Check the pads to assess the amount of blood loss.

5. Which one of the following **is not** an indication for active management of 3rd stage of labour?

A. Multiple pregnancies
B. Polyhydramnious
C. Cardiac cases
D. None of the above

6. What would be the priority nursing management in a case of PPH?

A. Remove the placenta manually.
B. Massage the uterus.
C. Give ergometrine 0.5 mg IM.
D. Shout for help.

7. All of the following could be the causes of bleeding before 28th weeks of pregnancy **except:-**

A. Uterine atony
B. Abortion
C. Ectopic Pregnancy.
D Cancer of the cervix

8. A Women's death from unsafe abortion is considered as a double failure of the health system and a tragedy, this is because of the following reasons, **except: -**

A. Failure to prevent unprotected sex.
B. Failure to prevent unplanned pregnancy.
C. Failure to avoid sexual intercourse completely.
D. Failure to manage the complications of unsafe abortion.


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7. Which of the following is/are treponemal specific serologic tests for screening syphilis
    A. Treponema palladium hemaggiltination (TPHA) test
    B. Flourcent antibody absorption (FTA-AB) test
    C. RPR (Rapid plasma regain) test
    D. Enzyme immuno assay (EIA)
    E. A and D
    F. A and B
8. Urinary tract infection is the commonest complication of pregnancy in the second trimester. Thus laboratory investigation can reveal.
    A. Urine testing positive for nitrite
    B. Urine positive for leukocytes (WBCs)
    C. Urine positive for protein
    D. All of the above
    E. A and B only
9. For selection of suitable blood for a patient or mother, pretransfusion tests should include
    A. ABO and Rh (D) blood grouping
    B. Cross – matching
    C. ELISA for HIV
    D. VDRL
    E. All of the above
    F. A and B only
10. The reverse ABO blood grouping is performed
    A. By mixing red blood cells containing known antigen with unknown serum
    B. By mixing unknown red cells with serum containing know antibody
    C. By mixing unknown serum with red cells containing unknown antigen
    D. By mixing serum containing known antibody with red cells containing known antigen

2.2. Significance and brief description of maternal bleeding

According to the 1995 WHO report more than half a million (585,000) women dies yearly in the world due to pregnancy related complications that corresponds to a death of one woman for every minute of a day. Ninety nine percent of these deaths are estimated to occur in developing countries. Furthermore for every woman who survive those deaths 40 others suffer long-lasting disabilities or "social death"

Maternal bleeding defined as bleeding that occurs in the ante partum, intra-partum, or postpartum period. It is one of the major causes of maternal death in both developing and developed countries. As a result of poor health care system in the developing countries, maternal bleeding has more disastrous impact on maternal mortality and morbidity than that of developed countries.

Similar to other developing countries, Ethiopia has one of the high MMR, estimated to be more than 870 per 100,000 live births. Maternal bleeding due to abortion (mainly unsafely induced), uterine rupture and postpartum hemorrhage (PPH) …etc, contribute significantly as a direct cause of maternal deaths and to the related sequels of morbidities.
Like other causes of maternal deaths, maternal death due to maternal bleeding is preventable if locally available resources and appropriate techniques are used effectively during pregnancy, labour /delivery and postpartum care of a woman.

Thus, based on the above mentioned facts, this module is intended to help, the health team working at the rural areas, where most cases of maternal deaths occur, to acquire the basic knowledge and skills about causes & strategic Interventions to control and prevent maternal bleeding that contributes significantly in the effort done to reduce the prevailing high rate of maternal mortality and morbidity in the nation.

2.3 Learning Objectives:

Upon completion of this module, the health center team members will be able to:

- Define maternal bleeding.
- Identify the magnitude of maternal bleeding.
- List the clinical presentations of different etiologies of maternal bleeding
- Describe the initial essential management of common causes maternal bleeding.
- Explain the preventive and control strategies of maternal bleeding

2.4 Definition of crucial terms

- **Induced abortion**:- Termination of unwanted pregnancy before viability
- **Unsafe abortion**:- Is a procedure for terminating pregnancy either by person(s) lacking the necessary skills or in an environment lacking the minimum medical standards or both.
- **Post abortion Care**:- is an approach of reducing mortality and morbidity from incomplete and unsafe abortion and resulting complication for improving women's sexual and reproductive health and lives.
- **Active Management of third stage of labor**:- Consists an interventions designed to speed the delivery of the Placenta by increasing uterine contraction and to prevent post partum hemorrhage by averting uterine atony.
- **Standards of care**: - define as a specific level of performance based on state- of the art practices supported by current scientific knowledge.
- **Maternal mortality** is death of pregnant women during pregnancy, labour or postpartum due to condition related to or aggravated by Pregnancy.
- **Anemia:-** red cell disorder, which occurs when the concentration of hemoglobin falls below what is normal for a person's age, gender, environment, resulting in low oxygen-carying capacity
- **Hematuria:-** The presence of large no of intact RBCs in the urine.
- **Hemoglobinuria:-** The occurrence of free hemoglobin in the urine specimen
- **Bacteriuria:-** The presence of significantly large number of bacteria in urine specimen
- **Pyuria:-** The presence f 0 Td**[** The occurrence)6(of free he.005cTd(e496e.005cT2 1 Tf0.0w.84ri)se
    - **Hemoinuria:-**
    -

2.5 Epidemiology

Maternal bleeding is important cause mortality and Morbidity In Both developed and developing Countries. Abortion alone constitutes one of the five leading causes of maternal death in the developing world. Globally unsafe abortion claims the lives of 200 women daily. or 78,000 women yearly of these 34,000 are women African accounting 44% of the global figure. One community- based study done in Ethiopia revealed that abortion accounts for 32% of direct cause of maternal mortality. Besides, postpartum hemorrhage (PPH) accounts for 30% of direct cause of maternal mortality in developing countries.

Incidence of common causes of maternal bleeding

- Ectopic pregnancy:- one in 50 to 200 pregnancies.
- Spontaneous abortion:- 10-20% of all pregnancies.
- Molar pregnancy:- Varies and overall ranges between 1 in 1000 to 1 in 5000 pregnancies.
- Ante partum hemorrhage (APH): - 2-4% of all pregnancies
- Postpartum hemorrhage (PPH): - 3.9% of vaginal deliveries.
  - 6.49%. of C/S deliveries

2.6 Etiologies of maternal bleeding

Etiologies are broadly divided in to three:

A**) Bleeding in early pregnancy** (conception up to gestational age of less than 28 wks)

i) **Ectopic pregnancy:** is one in which implantation occurs outside the uterine cavity. The most common site is fallopian tube (in greater than 90% of cases)

ii) **Abortion:** It is a uterine bleeding before fetal viability, i.e, before 28 weeks of pregnancy.

- It could be spontaneous or induced abortion Induced abortion is divided as safe or unsafe abortion.

Types of Abortion

1. **Inevitable:** abortion with cervical dilatation but with out expulsion of products of conception (including amniotic fluid)
2. **Incomplete:** Abortion with partial expulsion of conceptus materials.
3. **Complete:** Abortion with complete expulsion of conceptus materials
4. **Threatened:** Abortion with out cervical dilatation.
5. **Missed:** when a dead fetus retained in the uterus at least for another one month.
6. **Habitual (recurrent):** is diagnosed if there is three or more consecutives spontaneous expulsion of conceptus.

iii) **Molar Pregnancy:** is characterized by abnormal proliferations of chorionic villi, and Vaginal bleeding with expulsion of conceptus tissue that have grape-like appearance.

B) Bleeding in late pregnancy and labor

i) Heavy show: - is Blood-stained mucus that herald onset of labor.

ii) Antepartum Hemorrhage (APH):- is bleeding from the genital tract of pregnant mother after the fetus reached the age of viability, i.e, 28 Completed weeks or fetal weight of ≥ 1000 grams and before delivery.

- Incidence: 2 –4% all pregnancies

V **Etiologies of Antepartum haemorrhage**

1. Placental

1.1 Abruption placenta

1.2 Placenta preavia

1.3 Marginal or sinus bleeding

1.4 Missillaneous: Vasa previae, placenta membranious, sercumvallet placenta

2. Non Placental

2.1 Local causes: Cervicitis , Cervical polyp , eversion , varices , infection , trauma , malignancies

2.2 Decidual bleeding

2.3 Heavy show

2.4 Ruptured uterus

2.5. Systemic illness leading to bleeding e.g. CLD, DIC …etc

2.6. Unknown Causes:- In many of cases no causes is found clinically or by investigation.

C) Bleeding after child birth (Postpartum hemorrhage)

Postpartum hemorrhage (PPH): - is defined as bleeding in excess of 500ml after vaginal birth or over 1000ml following c/s delivery.

- **Incidence:** 10% of all deliveries

Types:

- Immediate (primary) PPH: - Occur within 24 Hours of delivery.

- Late (Secondary) PPH: bleeding that occur after 24 hrs of delivery until 6 Wks of postpartum

V **Common etiologies of immediate PPH.**

1. Atonic Uterus:- bleeding occur due to failure of contraction and retraction of the uterus. Is the commonest & severe type of PPH.
2. Tears of Cervix, Vagina or perineum that occurred during difficult vaginal delivery.
3. Retained placenta is diagnosed if placenta is not delivered within 30 minutes after delivery of term fetus.
4. Retained products of concepts (RPC) - usually portion of maternal surface of placenta or torn membranes with vessels retained in the uterus.
5. Inverted uterus:- uterus is said to be inverted if uterine fundus is it turns Inside - out of cervical canal during delivery.
6. Others: - Systemic or hematologic disorders such as DIC…etc.

V **Common etiologies of late PPH**

1. Severe anemia: - Hgb less than 7g/dl or Hct <20%
2. Genital tract infections: - endometritis is the commonest.
3. Retained large clots or/and Placental fragments
4. Trophoblastic tumors:- such as gestational choriocarcinoma
5. Others: - Infections, systemic or malignant conditions.

2.7 Clinical Feature

Clinical manifestation of maternal bleeding depends on:

V the etiologies:

V

- Cardiovascular collapse
- Cardiac arrest
- Death

2.8. Complications of maternal bleeding

a) Immediate

I) Related to Bleeding - Hemorrhagic shock /sever anemia/

- Acute renal failure (ARF)
- Adult respiratory distress syndrome (ARDS)
- Infection
- Intra –abdominal organ Injury
- Death

II) Related to resuscitation & blood Transfusion

- Infection (HBV, HIV)
- Hemolytic anemia
- Fluid over load - pulmonary edema
- Acute lung Injury

b) Late: - Infertility secondary to amenorrhea (sheen syndrome)

2.9 Management of maternal bleeding

Improved standards of obstetric care have dramatically reduced mortality from hemorrhage due to largely to the readily availability of transfusion services and a more integrated team approach.

To engender an orderly and disciplined approach to management a mnemonic is offered as an “aide de memoir” called “REACT” that has a temporal pattern of therapeutic measures though in practice must be applied concurrently.

REACT: R = Resuscitation

E = Evaluation

A = Arrest bleeding

C = Consult

T = Treat Complications

i) Resuscitation

- is done successfully as a teamwork

V Air way and breathing:- the most important Initial step is to ensure adequate 0

iv) Refer to hospital if there is indication for referral after securing I.V line, & keeping indwelling urinary catheter with attending health personnel.

Complications such as the following warrants referral:

- Acute renal failure: -
- Adult Respiratory distress syndrome (ARDS):
- DIC
- Severe Infection with signs of sepsis
- Uncontrollable bleeding
- APH
- Refractory shock

NB. Specific management of common etiologies of maternal bleeding is listed in the Satellite module

UNIT THREE

SATELLITE MODULES

3.1 Satellite Module for Health officers

3.1.1. Directions for using this module

Before coming to this part of the module make sure that you have covered the pre test and the core module presented at the beginning.

3.1.2. Learning objectives

Up on the completion of this module, a health Officer Student will be able to:-

- V Define Maternal bleeding
- V List the various types of bleeding during pregnancy
- V differentiate the types by its clinical manifestation (sign and symptoms)
- V Identify the complications of bleeding during pregnancy
- V Describe the management of maternal bleeding and identify cases for prompt referral
- V Mention the control and prevention methods of maternal bleeding

3.1.3. Case – Study (Learning activity)

i) A 32 years old GVII mother came with history of 3 days labour associated with a distended abdomen and abdominal pain. On physical examination the pertinent findings were: - dehydrated and ketosis

V/s – B/P 40/20, pulse rate 130/min, Respiratory rate. 34 /Min, T- 38 ^{0}Centigrade. Abdomen – grossly distended and tender and easily palpable fetal part. FHB – absent, Contraction - absent GUS – On digital pelvic examination (PV) cervix is fully dilated, Station -0 and excessive molding and caput, blood - stained liquor and edematous vulva.

1. Outline the initial management required.

On physical examination, the pertinent findings were;

Generally - She is in labour pain

- V/s – With in normal limit
- Abdomen- Uterus of term size, longitudinal lie, cephalic presentation, contraction 2/10[1] /20-30[11] /, descent 2/5 , FHB-140 bpm
- GUS- PV Cx-5cms dilated, station -0, no caput or molding

Because of poor progress of labour she was augmented with pitocin according to the standard protocol and delivered 5 hours later to alive male neonate who weighs 3.5kg with APGAR score of 8&9 at 1st &5th minutes, placenta expelled completely within 5 minutes of delivery using controlled cord traction. Then 45 minutes later she started to bleed per vaginum profusely and went to shock.

1. What initial resuscitation measures does she required?

2. Give account on the possible clinical differential diagnoses of the problem.

3. Outline definitive management for the most likely diagnosis (dx).

3.1.4. Alternative Names for maternal bleeding

Bleeding during pregnancy, maternal blood loss, and maternal hemorrhage. Definition Maternal bleeding generally refers to bleeding that happens at any time during pregnancy, labour and with in 42 days post partum.

What are the signs and symptoms of the condition?

There are many causes of vaginal bleeding in pregnancy Women may experience vaginal bleeding or spotting, with or without cramping, backache, or labor pains. The bleeding can range from bright red and heavy to small amounts of dark blood clots, or can be even concealed.

What are the causes and risks of the condition?

Common causes of bleeding in early pregnancy includes

- Abnormal implantation of the fertilized egg into the wall of the uterus. This usually occurs in the very early days of pregnancy.
- Trauma to the cervix, which may occur after sex or an injury.
- Inflammation of the cervix.
- Miscarriage, or loss of the fetus in the first half of pregnancy.


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- Ultrasound, a special x-ray test that uses sound waves. This allows a doctor to see a possible ectopic pregnancy, fetal death, and molar pregnancy. It also helps to determine the location of the placenta or if the placental is detaching too early.
- Repeated testing of HCG levels, or pregnancy hormone levels, in early pregnancy.
- Blood tests to determine the amount of blood loss.

What are the treatments for the condition?

Not all vaginal bleeding in pregnancy requires treatment. If bleeding occurs, but a miscarriage or early delivery does not occur, observation is all that is needed.

Treatment for other causes include:

- Scraping of the lining of the uterus, also called a "E and C." This is done to remove the dead fetus or placenta after a miscarriage or molar pregnancy.
- Surgery to remove a fetus that implants outside the uterus.
- Cesarean delivery, or c-section. This may need to be performed in the event of heavy bleeding that threatens the health of the mother or child.
- Medications designed to relax the uterus, such as ritodrine. These are often used in the event of premature labor.
- Transfusions, which may be life-saving for the mother and fetus in the event of severe blood loss.

What are the side effects of the treatments?

All surgery is associated with a risk of bleeding, infection, and reactions to pain medication. Death may even occur in rare cases. Recovery from surgery may require 6 to 8 weeks of limited activity. Transfusions carry the risk of infection and allergic reactions. All medications have side effects, such as allergic reactions and stomach upset. Specific side effects depend on the drugs used.

What happens after treatment for the condition?

Most cases of bleeding will end up turning into pregnancies that continue without further problems. In the event of a miscarriage, a woman should wait 3 to 4 months before attempting another pregnancy. Significant blood loss may occur in some cases. This may require treatment with iron and vitamin pills to increase the blood counts. If premature labor started, medications to relax the uterus may be given to extend the pregnancy beyond the 36th week.


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- AUB/DUB / Abnormal uterine bleeding / Dysfunctional uterine bleeding /
- Non gynaecological cases:- pyelonephritis ,appendicitis…etc

Complications of abortion

× Immediate
- Haemorrhage
- Infection that lead to sepsis or septic shock
- Intra-abdominal viscus injury
- Severe vaginal bleeding
- Regret (psychotrauma) if it is induced abortion

× Late
- Infections such PID, HIV /AIDS (direct or indirectly)
- Ectopic pregnency
- Infertility
- Chronic pelvic pain syndrome (CPPS)

Management of abortion

Broadly called as post abortion care (PAC) which is defined as an approach for reducing morbidity and mortality from incomplete & unsafe abortion and resulting complications for improving women's sexual & reproductive health & lives.

As mild or moderate pain is anticipated control of pain is essential land pain control can be done by:

- Analgesics (Po, IM or IV)
  e.g. Paracetamol or Ibuprofen (Po) 30-60 minutes before the procedure.
- Anxiolytic (Po, IM or IV) is indicated if the woman has severe pain or anxiety.
  eg. Diazepam 5-10 mg (IV) or 10mg (Po) 1 hour before the procedure.
- Local anaesthesia using lidocaine as paracervical block, rarely with caution.

B. Late incomplete abortion: is defined as abortion offer the 14th weeks of pregnancy.

The management of such cases is stimulation or initiation of uterine contractions by pitocin drip (using Normal saline or ringer's lactate) that helps expulsion of the uferine contents. If patient expelled the products of conceptus completeness should be checked using MVA or sharp metallic currett.

NB: Failure of explusion despite adequate pitocin dose is an indication to refer patient to hospital.

Follow-up

Every cases of incomplete abortion should be followed their vital signs, input and output and for active vaginal bleeding or other complications after evacuation of products of conceptus is done, for certain time before being discharged.

C. Complications

If there is (are) associated complications such as those mentioned in the above, evacuation of the uterus should be deferred and an appropriate and prompt referral to hospital is mandatory.

2. Post abortion Family planning (PAFP) counseling & service

After evacuation of incomplete abortion, patients should be counseled on:

- V Options of available modern contraceptive methods
- V On the need of starting modern contraception immediately as there is a risk of again being pregnant before commencement of her next menses (especially after 1st trisemester abortion)

V The choice of methods types is decided by herself or it must be a informed consent

3. Counseling

Is provision of health education on reproductive health such as?

- Risks of unprotected sex
- Risks of unintended pregnancy and unsafe abortion….etc.

4. Partnership between service provider and the community

Establishing good communication such as sensitization meeting and provision of feed back to community health workers and community elders play a significant role on creation of community awareness on using modern contraception that prevent unintended pregnancy and unsafe abortion as well as on referring cases promptly to the health facilities.

5. Integration of PAC with other reproductive health services of the facility

This implies that provision of different reproductive health (RH) services such as Family planning, STI screening & treatment …etc with PAC at the same time and place by same or different health service providers. Thus, a patient will get a chance to get other services during her time of visit to health facility in seeking PAC service.

Prevention and control of abortion

- Prevention of unsafe abortion includes

I. prevention of the occurrence of unintended pregnancies by promoting health education to the community on;

- V Safe -sex practices
- V Danger of unprotected sexual- intercourse and unsafe abortion and
- V Methods of preventing unintended pregnancy, i.e. use of modern contraceptive methods with emphases on dual protection, condom.

II. Making reproductive health services, such as modern contraceptive methods, accessible to all in-need, especially for those vulnerable to unsafe abortion e.g. Young people (both in & out of school), marginalized group of the population.. etc and this can be achieved by providing this service in a place, time and persons(s) accessible or preferable to different categories of the population.


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is often stated as an important distinguishing feature between placenta previa and abruptio placenta. However, this distinction is sometimes incorrect. Abdominal pain does not always occur in abruptio placenta and in up to 10% of placenta previa cases there is a coexisting abruption of the implanted placenta.

The number of placenta previa diagnoses has increased dramatically with the use of obstetrical ultrasound, especially using a vaginal transducer. Many placenta previas are diagnosed before there are any symptoms. A prenatal ultrasound can identify a placenta

the procedure is done in the operating room, the patient is prepped and draped, and all preparations for an emergency cesarean section are ready in the event of a severe hemorrhage. It must be remembered that the couple should also be prepared physiologically and psychologically for the possibility of emergency surgery. There is controversy associated with this type of examination. Some obstetricians feel that it is far too dangerous and the placenta may accidentally be punctured causing uncontrollable hemorrhage. Uncontrolled hemorrhage places both the mother and the fetus at higher risk for potential problems.

A double set-up has been considered the final diagnostic step in determining placenta previa. However, with the improved accuracy of diagnostic ultrasound, the indication for performing a double set-up examination is limited. A double set-up is indicated when the


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a blow, motor vehicle accident or a needle puncture from amniocentesis, twins, folate deficiency, polyhydramnios and supine hypotension has been documented to cause abruptio placenta. If the external trauma is forceful enough, the placenta will begin to detach from the uterus. Unfortunately, the physical evidence of the trauma may be minimal and still be associated with placental abruption that can progress from grade 1 to 3 within 24 hours. Behavioral risk factors include cigarette smoking, which causes vasoconstriction of the spiral arteriole and can lead to decidual necrosis.

Signs and Symptoms

The signs and symptoms of abruptio placenta depend to a great extent on the amount of separation of the placenta and type of abruption. The classic symptom of abruptio placenta is acute, "knife like" abdominal pain, with or without vaginal bleeding. However, it must be emphasized that signs and symptoms of abruptio placenta can vary considerably. It is known that only 50% of patients with abruptio placenta will experience abdominal pain.

With mild abruption the mother may complain of "labor pains" and there may be only slight uterine irritation. With moderate abruption, pain can develop gradually or abruptly. In severe abruption pain can be sudden and described as knife-sharp. The pain can be both localized or diffused over the abdomen. Escalating abdominal pain indicates a concealed bleed. Uterine irritability and low back pain will occur in 2/3 of patient with abruption placenta. If a concealed bleed is present, the abdomen becomes enlarged and the uterus rigid.

The abdomen is described as "board-like." The degree of rigidity depends on the amount of concealed blood trapped behind the placenta. The cardiotocography will show signs of rising uterine tone and a change in the contraction pattern.

A Couvelaire uterus occurs when blood accumulates between the separated placenta and the uterine wall. A Couvelaire uterus is due to bleeding into the myometrium resulting in tissue damage, increased tonicity, and inability of the uterus to relax between contractions.

The uterus appears bluish, purplish and mottled due to the extravasation of blood into the uterine muscles. A Couvelaire uterus causes maternal shock. The treatment for Couvelaire uterus is delivery and intravenous Oxytocin. In extreme cases a hysterectomy may be necessary.

× **Management of Placental Abruption.**

- Occasionally a small separation occurs without further problem. These patients have nouterine symptoms. Observation is required with fetal heart rate monitoring, serial labs and Ultrasound, but if no fetal distress occurs within the next 48 hours, the patient may be sent home.
- If placental abruption is mild and the fetus is immature, expectant management may be indicated, with fetal heart rate monitoring and serial laboratory and ultrasound examination.
- In all other cases, delivery is indicated. A vaginal delivery is preferred when fetal distress is not present or when the fetus is no longer viable. A C-section is indicated if fetal distress is present. A C-section is also performed when there is a threat to the mother's life or a failed trial of labor.
- Shock must be treated with adequate replacement of fluids and packed red blood cells; normal saline or ringer lactate should be used. Urine output must be maintained at 25 to 30 ml/hour. A central venous pressure line or Swan-Ganz catheter will assist in monitoring hemodynamic status. - Coagulopathy should be treated with fresh frozen plasma. One unit of FFP increases the fibrinogen concentration by 25 mg/dl. Platelet transfusion is required if the count is less than 50,000. Heparin is not used in DIC secondary to placental abruption.

C. Vasa Previa

Vasa previa, or sometimes called velemensous insertion of the cord, is rare, occurring in less than 1 in 3000 births. Vasa previa is associated with a high incidence of fetal morbidity and mortality because of the potential for fetal exsanguination. Perinatal mortality rate is 50-69%.

Normally, the umbilical cord is covered in Wharton's jelly and protects vein and arteries from any injury. In vasa previa, some parts of the umbilical cord are not protected by Wharton's jelly and the exposed arteries and vein can be easily ruptured. This places the fetus at an enormous risk to bleed to death. The umbilical vessels insert on the chorioamniotic membranes rather than on the placental mass. This causes a segment of the umbilical cord to lose the protections of Wharton's jelly.

Cause

There is no known cause of vasa previa however, it is speculated that it may occur at the time of implantation. The most widely recognized theory is called trophotropism.

Trophotropism in the placental tissue can be compared to the tendency of a plant to lean towards the sun to get the light it needs to survive. The lower segment of the uterus is not as nourishing as the upper segment; therefore the placenta will grow upwards towards the well-vascularized uterine fundus.

Signs

The traditional sign of a vasa previa is a sudden gush of bright red blood at the time the membranes have ruptured. This causes a sudden fetal bradycardia because of the sudden blood loss. A sinusoidal fetal heart rate pattern is highly suggested of vasa previa.

Diagnosis

The diagnoses of vasa previa prior to delivery is usual. However, a vasa previa can be detected during the pregnancy as early as 16 weeks gestation with the use of a transvaginal sonography.

The diagnoses of vasa previa is made when the membranes rupture and there is a gush of bright red blood. Occasionally the umbilical blood vessels rupture during labor and fetal distress is observed on the fetal monitor. When the placenta is delivered the condition of vasa previa is evident. If the diagnosis detects a vasa previa, a cesarean section is performed.

D. **Uterine rupture**. May mimic severe abruption and diagnosis is clinical. An abdominal film may show free intraperitoneal air or an abnormal fetal position accompanied by persistent fetal bradycardia. Emergent C-section for imminent rupture and hysterectomy are required.

III. Postpartum haemorrhage (PPH)

Definition: PPH is defined as blood loss of more than 500 ml following vaginal delivery or more than 1000ml following cesarean delivery.

Incidence:- industrialized countries – 5% of all deliveries

- Developing countries – 30% "

NB. Types and common etiologies is listed in the core module.

Pathophysiology

Over the course of a pregnancy the following physiologic changes occur to fulfill the perfusion demands of the low resistance uteroplacental unit and to provide a reservoir for the blood loss that occurs at delivery. These changes are: Maternal - blood volume increase by approximately 50% and Plasma volume increases more than the total RBC ,thus

Hgb concentration & Hct value fall. At term, the estimated blood flow to the uterus is 500-800 ml/min. which constitutes 10-15% of cardiac output. The uterine vessels traverse through a wave of myometrial fibers also referred as the "living ligatures," thus compressed and kinked, and normally blood flow is quickly occluded due to contraction of these muscle fibers.

During uterine atony (the most important cause of PPH), contraction and retraction of myometrial fibers fails and this leads to massive vaginal bleeding. Similarly trauma to the genital tract in pregnancy results in significantly more bleeding than would occur in the nonpregnant state because of increased blood supply to these tissues. The trauma specifically related to the delivery of the baby, either vaginally or by C/S delivery can also be substantial and can lead to significant disruption of soft tissue and tearing of blood vessels.

Clinical features of immediate (primary) PPH

Usual presentation is heavy vaginal bleeding that can quickly lead to signs and symptoms of hypovolemic shock, that reflects the combination of high uterine flow (blood) and uterine atony (most common cause of PPH). Sometimes, a significant amount of blood can be retained in the uterus behind a partially separated placenta /membrane or blood may collect in an atonic uterus. Thus, strict monitoring of uterine size and tone is crucial following delivery of placenta.

- If the cause of bleeding is not uterine atony, then blood loss may be slower and clinical signs of hypovolemia may develop over a longer time frame.

Two important facts worth bearing in mind are;

1. Caregivers usually underestimate visible blood loss by as much as 50%
2. Symptoms of hypovolemia may not develop until a large volume of blood has been lost due to; most women giving birth are healthy & compensate for blood loss very well

- Most common birthing position (semi-recumbent) with the leg elevated masks the actual loss.

Thus, rapid recognition and diagnosis of PPH is essential for successful management. The major factor in the adverse outcomes associated with severe hemorrhage is a delay in initiating appropriate management.

N.B. The clinical findings in hypovolemia are listed in the core module.

Management of PPH

Shout for help! As it requires team work. One group works on resuscitation while the other in controlling the bleeding.

1. Resuscitation

Establish an intravenous (IV) line and take blood for Hbg, Blood group & Rh and cross-matching; administer oxygen.

Raising the legs improves venous return and is consistent with positioning used to diagnose and treat the underlying causes of bleeding.

Perform the initial resuscitation with large volume of crystalloid solution, either normal saline (Ns) or Ringer lactate solution. Volume replacement better exceed their premorbid norm by 500 to 1000 ml.

Blood transfusion is considered if blood loss is ongoing and thought to be in excess of 2000 ml or if the patient's clinical status reflects developing shock despite aggressive resuscitation. Fresh whole blood or stored whole blood is preferable as it correct RBC loss in addition to volume replacement.

2. Control of primary PPH

2.1. If the placenta is delivered, undergo a diagnostic assessment.

a) Uterine atony

Palpation and massaging the uterus serves to assess the uterine size and tone and to express any clots that have accumulated in the uterus or vagina. In atonic uterus, the uterus will be boggy and large in size that bled, on and off, a dark-red blood.

The initial management includes vigorous massage and administration of oxytocin as a 5u (IV) bolus, as 20u in 1L of Normal saline (IV) to run as fast as possible or as 10u direct in to the myometrium through the abdominal wall.

Emptying the bladder may aid in ongoing assessment and facilitate uterine contraction. If the uterus remains atonic, commence Bimanual massage, This aids to expel clots and decrease bleeding: promoting and sustaining contraction and in a decrease amount of bleeding even if the uterus remains relatively atonic. After bimanual compression is started, a further diagnostic assessment is essential which includes:

b) Traumatic condition of the cervix, vagina, & Perineum

It is identified by visualization of these sites using good light, speculum and ovum forceps. In such cases, the bleeding is bright–red and the uterus is well contracted. Repairing of tears arrest bleeding.

c) Intrauterine retention of missed placental fragments, clots, inversion or uterine rupture

If lower genital tract trauma excluded and the uterus does not remain contracted and bleeding persists despite all efforts, uterine exploration manually using gauze or using a big blunt currett (Hunter's) is necessary to remove RPC or clot; to repose an inverted uterus or to detect any uterine defect; which should be performed under pethidine and diazepam.

d) Coagulopathy

If the diagnostic assessment excludes genital tract trauma; uterine inversion or rupture; retained placental fragments, bleeding from a contracted uterus is commonly due to a defect in hemostasis. Such clinical suspicion can be made by a review of the history and risk factors along with the finding of minimal clot formation.

The following conditions are examples of cases that warrant an immediate referral to hospitals where there are operative facilities, blood bank, and skilled physicians to manage cases.

- Uterus failed to contract and bleeding persists despite all efforts.
- A clinical impression of coagulation defect manifested by bleeding that arises from a well- contracted uterus
- Retained placenta failed to be expelled by controlled card traction (CCT)
- Other complications such as uterine rupture…..etc.

If must be remembered that when patients are referred to hospitals, there is a need to secure iv line and indwelling urinary catheter along with an attending health personnel.

Packing of the uterus may be on option till patient reach the appropriate place for better management. The uterus and vagina must be tightly packed with continuous, layered, gauze under direct visualization using a speculum and/or retractors.

3. Control of secondary PPH

If usually takes place 5-15 days postpartum. Bleeding on the 4-5 weeks could be due to resumption of mensus or rarely due to choriocarcinoma.

Commonest etiologies are:

a. Retained products of conceptus or blood clot
b. Endometritis
c. Subinvolution of the uterus
d. Others: earlier undiagnosed tear or paravaginal haematoma, Necrotic fibroid Chronic inversion, gestational choriocarcinoma

Treatment of secondary PPH includes:

a. Treatment of shock (resuscitation): it could be due to sepsis
b. Commencement of antibiotics
c. Evacuation of the uterus under pitocin (iv) drip. Ergometrin (po) may be continued for 3-5 days
d. Treatment of Anaemia
e. Rarely referral of cases is a need for further surgical or/and medical therapy.

4. Evaluation of response to management

While a patient is resuscitated and an effort is done to arrest bleeding, close follow up of patient's response is crucial. These, includes:

- level of consciousness
- Vital signs (v/s) : Blood pressure, Respiratory rate & Temperature Maintain systolic BP > 90 mm Hg
- Urine out put (maintain at 30-60 ml/hr or 1ml/kg/hr)
- Frequent auscultation of the lung fields help to detect pulmonary edema or ARDS.

Prevention and control of PPH

- Proper utilization of family planning for spacing & to reduce parity
- Comprehensive MCH eg. antenatal treatment of anaemia
- Detection of significant risk factors that warrants delivery to be conduct in maternity units that have readily available resources.

- Proper management of labour
    - o Use of partogram in all labouring mothers.
        - Universal application of active management of third stage labor (AMTSL)
        - AMTSL includes:
- Administration of uterotonic (preferably oxytocin 10 (IU) within one minute of delivery of the baby after excluding twin
- Early cord clamp and cutting
- Expulsion of placenta with controlled cord fraction (CCT) and
- Raising and massaging of the fundus of the uterus abdominally
- Close monitoring of vital signs, vaginal bleeding, and status of uterus during fourth stage of labour.
- Provision of good postnatal care.

Abnormal Placental Implantations

In most deliveries, the placenta will spontaneously separate from the uterine wall, however, there may be an abnormal attachment. Abnormal adhesion of the placenta occurs for unknown reasons and is diagnosed in 1 out of every 12,000 births. The mother with an abnormal attached placenta is at risk for post partum hemorrhage, hypovolemic shock and infection.

Placenta Accerta

Placenta accerta occurs when there is a lack of decidua basalis and the placenta is implanted directly into the myometrium or the uterine muscle, making separation from the muscle difficult.

Placenta Incerta

Placenta increta is the abnormal invasion of trophoblastic cells into the uterine myometrium.

Placent Percerta

Placenta percerta occurs when the trophoblast cells penetrate the uterine muscle till serosal layer of the uterus. The diagnoses of these placentas are not made until after the delivery of the infant and the placenta will not readily separate. Manual extraction is attempted and if the placenta will not separate or not all cotledons are removed, immediate surgical intervention i.e., hysterectomy is indicated.

Obstructed Labor

Def. Failure of decent of presenting part for mechanical reasons in spite of good uterine contraction.

Incidence

V Is associated with incidence of Cephalo Pelvic Disproportion (CPD), quality of antenatal and Intra partum care

Common causes

CPD - Fault in the fetus (Hydrocephalus mal presentation)

- Fault in the Pelvis (result of mal nutrition in child hood formative years trauma and genetics)

Clinically recognized by

- In vertex presentation with increasing molding of fetal head and failure of descent
- In multi gravid usually cervix goes to full dilatation delay in decent and increasing molding
- In primi uterus goes in to inertia when labor is obstructed

Complications

× In primi - Fetal distress, Asphyxia and death

V Maternal

- Vesico vaginal fistula (VVF)
- Recto vaginal fistula (RVF)
- Foot drop (due to nerve compression)

- Vaginal Scaring
- Rarely uterine rupture

× In Multi Gravida

- Fetal – Fetal distress and death
- Maternal – ruptured uterus , Shock , Death

Management of obstructed labor

Prevention

V Education on risks of early marriage

V Should not occur with optimal antenatal care and intra partum care

V When feasible hospital care

V Supervised delivery with easily run satellite clinics and these linked to base hospital

Definitive treatment

- The principles are
- Resuscitation
- Bladder decompression
- Definitive management

Definitive management includes

- C/S for a live baby (in this situation simpysiotomy is an option)
- Destructive operations for dead fetus (make sure always uterus is intact before attempting destructive delivery)

Iv. Differential diagnoses (ddx) of maternal bleeding

V Clinical diagnosis of vaginal bleeding in early pregnancy

Presenting symptoms & signs	Probable diagnoses
Light bleeding, abdominal pain, closed cervix, uterus softer & slightly Larger than normal Fainting, amenorrhoea, tender adnexal mass & cervical motion tenderness.	Ectopic pregnancy
Amenorrhoe, cramping /lower abdominal pain, vaginal bleeding (light or heavy) uterus soft than normal that correspond or smaller than date. Cervix closed or opened	Abortion
Heavy Vaginal Bleeding with Partial expulsion of products of conception which resemble grapes, nausea/vomiting, cramping/ lower abdominal pain soft uterus, dilated cervix, ovarian cysts early on set of pre-eclampsia and no evidence of a fetus.	Molar pregnancy

V Clinical diagnosis of bleeding in later Pregnancy and labour

Presenting symptoms & signs	Probable diagnoses
Bleeding after 28 wks of gestation that may be precipitated by intercourse, relaxed uterus, lower uterine segment feel empty, bleeding may be light or heavy but painless, shock, usually normal fetal condition	Placenta praevia
Bleeding after 28 wks, usually dark oozing vaginally or may be retained in the uterus, intermittent or constant abdominal pain, tense /tender uterus fetal movement decreased or absent fetal distress or absent fetal heart sound.	Abruption placenta
Bleeding (Intra-abdominal and/or Vaginal) sever abdominal pain, abdominal distension and free fluid, abnormal Uterine contour tender abdomen, easily palpable fetal Parts Fetal movement and heart sound absent deranged maternal vital signs	Ruptured uterus


Ethiopia Public Health Training Initiative
EPHTI

3.2 Satellite Module for BSC Degree Nurses

3.2.1 Introduction

Maternal bleeding in pregnancy, labour and early postpartum period is a major contributing factor to maternal mortality worldwide. It is one of the gravest emergencies in obstetric practices. More than half a million mothers die each year worldwide. The most common causes are hemorrhage, including uterine rupture, obstructed labour, unsafe abortion, puerperal infection, and eclampsia. Underlying these medical causes are the socio-economic, geographic and cultural factors.

Health professionals including nurses often fail to take appropriate and timely action when there are actual or potential risks for maternal bleeding. This contributes to the associated morbidity and mortality.

This satellite module is designed to strengthen the contribution of the nursing students and other staff nurses in the management of maternal bleeding. The major

- Identify the prevention and control measures of maternal bleeding.
- Record and report of necessary data related to maternal bleeding.

3.2.3 Learning objectives: at the end of reading this module the students/nurses should be able to:

- List the common causes of maternal bleeding.
- Describe the contributing factors for maternal bleeding
- Demonstrate the role of nurses with the different causes of maternal bleeding

3.2.4 Case study: Learning activity.

A 40 years old woman with six female children was brought by her family members and delivered a baby at H/C. The nurse who attended the labour congratulated the family and the family members were very happy to have a male baby. Suddenly in the middle of the night one of the daughters of the mother discovered that her mother's condition was deteriorating and asked the nurse to check her mother. The nurse discovered that the mother was in a pool of blood. The nurse then decided to Casrcslp1320.6nT0 1 T21a.13ily mem(25 0 o28<ered that the mother was in)]70 Tds2mem(25

3.2.5 Maternal Bleeding

Maternal bleeding/ vaginal bleeding in pregnancy, labour and early post partum period is a major contributing factor to maternal mortality and morbidity worldwide.

Table 3.2.1: Estimated global maternal mortality from major obstetric complications

Ser. No.	Complications	% Maternal deaths
1	• Hemorrhage	25
2	• Sepsis	15
3	• Hypertensive disorders	12
4	• Obstructed labour	8
5	• Unsafe abortion	13
6	• Other direct causes	8
7	• Indirect causes	20

3.2.5.1 Common Causes of Vaginal Bleeding:

3.2.5.1.1 Causes of vaginal Bleeding during pregnancy

- Abortion
- Ectopic pregnancy
- Undiagnosed cervical cancer
- Cervical polyps
- Cervical erosion
- Traumatic coitus
- Molar pregnancy
- Ante partum hemorrhage (placenta previa and abruptio)

Spontaneous abortion

Is an abortion which has not been interfered /happens spontaneously. Many pregnancies end in the 1st trimester because of spontaneous abortion.

Causes:

- About 50 % of early spontaneous abortions are related to chromosomal abnormalities.
- Teratogenic drugs
- Faulty implantation due to abnormalities of the female reproductive tract,
- Weakened cervix, or placental abnormalities,
- Chronic maternal diseases, endocrine imbalances and maternal infections from the TORCH group (Toxoplasmosis, rubella, cytomegally virus and herpes virus).

Threatened abortion

Threatened abortion is defined as bleeding of intrauterine origin occurring before 28 weeks of gestation, with or without uterine contractions, with out dilatation of the cervix, and without expulsion of the products of conception.

S/S of threatened abortion - Slight vaginal bleeding
- Slight backache
- Cervix closed.

Nursing Management of threatened abortion at H/C include:

- Provide quiet atmosphere.
- Encourage rest.
- Observation
- Discharge after 48 hrs if bleeding stopped.
- No sexual intercourse for 2-3 weeks.

Despite the above management if bleeding persists, it suggests an inevitable abortion. Inevitable abortion is when it is impossible to continue the pregnancy.

S/S of inevitable abortion

- Severe backache and bleeding
- Cervix dilated.
- Membrane may be ruptured.

⇒ Outcome: either complete or incomplete abortion.

Emergency Nursing Management at H/C includes:

- Ergometrine 0.5 Mg. IM to control bleeding
- Digital evacuation if the tissue is noted at the cervix
- Monitor V/S
- Refer her for MVA or D and C
- Put up IV drip.

If MVA or E and C service is available at the H/C

- Oxytocin infusion
- Lie the patient flat
- Monitor V/S
- Prepare the patient for MVA or E and C

Missed abortion

When fetus died and retained in the uterus for about 8 weeks. It is not known why the pregnancy is not expelled. It is possible that normal progestogen production by the placenta continues while the estrogen level falls, which may reduce uterine contractility.

S/S

- Brownish vaginal discharge
- Pregnancy test negative.
- Uterus fails to enlarge.
- Other S/S of pregnancy will be reduced or vanished

Management:

- Oxytocin infusion
- D and C or MVA.

Complication – DIC

-sepsis

Habitual Abortion: when a woman has three or more consecutive abortion spontaneously.

Cause - Cervical incompetence due to weakness or repeated D & C

- Chromosomal abnormalities

Management- Shirodkar stitch and remove stitch at term (at 38 weeks of gestation)

Unsafe Abortion

Definition: is an abortion procured by unskilled person or in an environment where aseptic technique is lacking. In our setup it is performed illegally mostly for the sake of benefits or favor.

- World literature shows that abortion contribute to about 15% of all maternal deaths.
- The majority of these deaths occur in Africa.
- Ethiopia has one of the highest maternal mortality rates in the world.
- According the 2000 DHS report maternal mortality in Ethiopia is 870 / 100,000 live births, of which 22-54 % are due to unsafe abortion.

Complications of unsafe abortion

- Shock
- Severe vaginal bleeding.
- Sepsis
- Uterine perforation.
- Intra abdominal injury.

Management at H/C includes:

- Open air way
- IV fluids.
- Triple antibiotic
- Monitor V/S and intake and output
- Administer TAT
- Refer her to hospital

General management of unsafe abortion includes:

- Emergency treatment of complications
- Post abortion 8 T2a Tfncy t1 Tlemovefamie splanrh8>Tj/TTal xi% are due to unsafe a2.393l injury.

Post Abortion counseling and Family planning, why?

- To break the cycle of repeated abortion.
- Major cause of maternal morbidity and mortality
- Abortion reflects unmet need.
- The death due to abortion is ethically wrong.

*** Counsel the post abortion clients before discharge about:**

Return of fertility /it returns soon and instruct about contraception:

- Start soon if sex is inevitable.
- Methods available.
- When to start
- Where to go to get contraception.

**** Never repeat unwanted pregnancy and unsafe abortion.***

Consequences of unsafe Abortion

- Infection, hemorrhage and subsequent repeated abortions.
- Increases Burden to the family, country, hospital..etc.
- Detrimental for women's economical, social and psychological well being.

  Ex. In our setup it affects the girls' ability to continue their education.
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Outcomes of Tubal pregnancy

- Tubal mole
- Tubal abortion → abdominal pregnancy
- Tubal rupture.

S/S of ruptured ectopic pregnancy

- Severe lower abdominal pain
- Referred pain to the shoulder.
- Shock
- Brownish vaginal bleeding

Management at H/C includes:

- IV drip.
- Monitor V/S
- Lie flat
- Urgent referral to hospital

Dx at hospital

- Pelvic Examination
- Pregnancy test
- Ultrasound if available
- Complete blood count to rule out infection
- Culdocenthesis-Aspiration of non-clotted blood, using a syringe and needle through the posterior uterus and in to the cul-de-sac of the peritoneal cavity in case of ruptured ectopic pregnancy.
- Laparatomy to visualize the ectopic pregnancy

Management at hospital

- Admission
- Resuscitation
- Laparatomy ⇒ salpigo-ophorectomy

* Primary Abdominal pregnancy - when the ovum primarily fertilized and embedded in the abdomen.

***** Secondary abdominal pregnancy aborted through f/ tube and implanted in the abdomen.

3.2.5.1.1.2 Common Causes of bleeding after 28th weeks of pregnancy

Antepartum Hemorrhage (APH)

Definition: Any bleeding from the genital tract from the end of 28th weeks of gestation until the end of 2nd stage of labour**.**

Causes of APH:

1. Placenta praevia/unavoidable bleeding
2. Placenta Abruption/accidental hemorrhage

3 Other causes (cervical polyps, Cancer, erosion etc)

NB: This text will be focusing on the placental causes of APH:

Nursing Management of unclassified APH at the level of H/C

In general, the following nursing measures should be implemented for a mother being treated for bleeding disorder during pregnancy:

- Lie pt flat; check FHB
- IV infusion in case of severe bleeding.
- Assess B/P, P, R every 2 hours, and more frequently with active bleeding
- Observnt o in cp31m of shock such as pallor, clammy skin, perspiration, dyspnea or restlessness.
- Carryout gentle abdominal examination when bleeding has stopped.
- Count pads to assess amount of bleeding over a given time period; save any tissue or clots expelled and provide fresh pads.
- Collect and organize all data, including antenatal history, onset of bleeding episode, lab studies (hemoglobin, hematocrit, and hormonal assays).
- Insert catheter and asses urine output hourly (It should not be less than 30 ml /hr)
- Assess if there are -5gtraction: frequency, duration and intensity
- Assess uterine tenderness and DIC
- Prepare for a possible referral
- Assessing coping mechanisms of woman in crisis, give emotional support to enhance her coping abilities by:
  -

- Assess her expressions of anger, denial, silence, guilt, depression, or self-blame.

- Observe and verify the family's ability to cope with the anxiety associated with an unknown outcome.
- Arrange blood donor and refer the patient with pertinent history

Caution: Never do V/E or rectal examination.

Common Nursing diagnoses:

A B C

Fig: 3.2.2 A=low lying placenta previa, B= partial placenta previa, and C=complete Placenta previa

Diagnosis of the placenta previa

- Painless, causeless bleeding that often occurs at rest.
- High head, malpresentations or oblique lie.
- Abdomen is soft and easy to palpate.
- FHB heard easily.
- Ultrasound examination at hospital can be done to localize the placenta
- Speculum examination is done by a Dr. when bleeding is stopped to exclude other causes of bleeding

.

Management at the hospital

- Admit and confine to bed.
- History taking and arranging blood donors.
- Blood group and x-matching.
- Monitor fetal well-being, FHB, Kick chart
  (At least 12kicks/12 hrs)
- Speculum examination can be done by a Dr. to exclude other causes of bleeding.

- Ultrasound examination- to localize the placenta.
- The objective of management is to prolong pregnancy and allow fetus to mature provided that it is safe.
- Double set- up examination is carried out in the OR around term or in serious cases to terminate pregnancy by induction or C/s.

The decision to terminate pregnancy will be made if:

1. The patient is at term.
2. She is in active labour.
3. IUFD or other obstetric complications.

The management of mild type less than 38 weeks:

- Admission and observation of fetomaternal condition.
- Ultrasound and speculum examination and she may go home if bleeding is stopped with advice on rest and follow-up.

Active Management in the hospital

- The pt will be taken to the OR with IV infusion **and**
- **X**-matched blood in readiness.
- Double set- up examination will be carried out and vaginal delivery will be attempted under induction.
- Commonly; Type-I and Type-II anterior are vaginal delivery with induction. Where as Type-II posterior,
- Type III, and Type-IV are delivered by C/s

Complications:

- PPH, shock and death
- Intrauterine hypoxia, LBW, IUFD and fetal abnormality.

Placenta Abruption.

Definition: is bleeding from premature separation of normally situated placenta.

Etiology:- Trauma circumstances such as; fall, injury, ECV, ICV

- Maternal hypertension, pre-eclampsia and eclampsia.
- Sudden decompression of the uterus in case of rupture of membrane in case of patient with polyhydramnious.

- Short cord
- Nutritional deficiency such as folic acid

Classification:

1. Revealed/mild, slight vaginal bleeding, fetus is alive and maternal condition is good.

2. Concealed, all bleeding retained behind the placenta/ retro placental clot, and some blood infiltrate between the uterine muscles causing bruise and edema; called *couvelaire uterus or uterine apoplexy*.

- There is no vaginal bleeding
- There are signs of shock
- Uterus is tender and palpation is painful
- Fetal distress and IUFD

3. Mixed: a combination of both where some bleeding retained and some escapes. Other S/S are the same as with concealed type.

Complications- PPH and shock, DIC, renal failure, postpartum pituitary necrosis (Sheehan's syndrome).

The management of mild/revealed type less than 38 weeks; ultrasound and speculum examination and she may go home if bleeding is stopped.

- If at term, induction and vaginal delivery
- If fetal distress is noted- C/S.

***NB;** generally the obstetric management of abraptio placenta is induction and vaginal delivery and that placenta praevia is C/s*

3.2.5.2 Causes of Bleeding during Labour and postpartum

Obstructed labour

Definition: -Failure of the descent of presenting part for mechanical reasons in spite of good uterine contraction.

Causes: CPD

- Fetal malformation such as hydrocephaly
- Pelvic tumor

Signs:

Early signs:

1. Presenting part doesn't enter the pelvic despite good contraction.
2. Cervix dilates slowly, and becomes edematous
3. The presenting part not well applied to the cervix
4. Early rapture of membrane.

Late Signs:

1. Maternal distress.
2. Fetal distress.
3. Abdomen is tense and hard to palpate.
4. Contractions are long, strong with little or no relaxation between.
5. Retraction ring of *Bandyl's ring* is seen.
6. Lower uterine segment becomes very thin and ready to rupture.

On V/E

Danger/ Complication

- Rupture of uterus /abrupt Rapture
- VVF/RVF
- Still birth/Birth injuries
- Sepsis
- Shock
- Death.

Rapture of uterus: it is a tear on the wall of the uterus which can be complete or incomplete.

Risk factors:

- Previous C/S scar /silent rupture
- Obstructed labour/abrupt rupture
- Operative manipulation (ECV, destructive deliveries)
- Unwise use of oxytocin
- Extension of old cervical scar

Signs of uterine Rupture

1. Cessation of contractions
2. Fetal distress followed by cessation of FHB
3. Fetal part felt under the skin.
4. Maternal shock.

Nursing Management of ruptured uterus at H/C:

- ü Lie flat
- ü IV drip
- ü Accompany to hospital

Management at Hospital:

- ü Iv drip
- ü Input output measuring
- ü Blood group and X-match
- ü Inform OR staff to get ready for emergency surgery
- ü Get relative for consent when the mother can not do that
- ü Management is laparatomy and hysterectomy (sometimes repairing).
- ü Provide postoperative care.

Types of PPH

1. Primary PPH - with in 24 hours of delivery
2. Secondary PPH -from 24 hours- 6 weeks. It is also said to be puerperal hemorrhage

Common causes

1. **A**tonic PPH (common one)
2. Traumatic PPH.
3. Hypofibrinogenemia / coagulation defect (DIC)

The difference between atonic and traumatic PPH

Atonic PPH	Traumatic PPH
• The uterus is lax	• The uterus is firm
• Bleeding starts after a few minutes and flows slowly	• Bleeding starts immediately after delivery and flows continuously.
• The color of bleeding is not bright red.	• Bright red bleeding

Nursing Management of PPH

- ♦ Massage the uterus and shout for help
- ♦ Give ergometrine 0.5 mg IV
- ♦ Put up IV drip and call Dr.
- ♦ Empty the bladder.
- ♦ Try to expel the placenta with the contraction caused by ergometrine. If impossible perform manual removal of the placenta (to save life!)
- ♦ Examine the placenta for completeness.
- ♦ Pitocine can be added into the bag.
- ♦ If the uterus is still lax perform Bi-manual compression.
- ♦ If still the bleeding persists check for laceration.
- ♦ If no atony and trauma but bleeding continues anticipate the possibility of DIC and refer the mother urgently.

Preventions of PPH

-

Cause - Mismanagement of 3rd stage as:

- Combined method of placental expulsion.
- Traction of the cord in an atonic uterus
- Polyps can cause chronic inversion

Management:

- Using your gloved fist of hand push the uterus back into place gently.
- Get your assistant to give ergometrine IV while your hand is still inside.
- Remove your hand when action of ergometrine starts.
- Don't try to expel the placenta**.**
- Keep the patient NPO and refer as soon as possible to hospital

Hematomas:

Hematomas are usually the results of injury to a blood vessel with out noticeable trauma of the superficial tissue. The most frequently observed hematomas are of the vagina and the vulva. The soft tissue in the area offers no resistance, and hemtomas containing 250-500ml

with abdominal palpation although these procedures may be quite un -comfortable for the woman.

- S/S of shock in the presence of a well-contracted uterus and no visible vaginal blood loss may alert the nurse to the possibility of a hematoma.

Nursing diagnoses that may apply when a woman develops a hematoma post partially include:

- High risk for injury related to tissue damage secondary to prolonged pressure from a large vaginal hematoma
- Pain related to tissue trauma secondary to hematoma formation

Nursing implementations include:

- Promote comfort and decrease the possibility of hematoma formation by applying ice pack to the woman's perineum during the first hour after birth and intermittently there after for the next 24 hours if birth was long or traumatic or if forceps or Vacuum extra actor was used.
- If a hematoma develops, sitz baths will aid fluid absorption once the bleeding has been controlled and will promote comfort, as will the judicious use of analgesics.

Subinvolution:

Subinvolution of the uterus occurs when the uterus fails to follow the normal pattern of involution (decreases in size of about 1 cm/day). Retained placental fragments and infection are the most frequent causes. With subinvolution, the fundus is higher in the abdomen than expected. In addition, lochia often fails to progress from rubra to serosa to alba. Lochia may remain rubra or return to rubra several days post partum. Leucorrhoea and backache may occur if infection is the cause. Subinvolution is most commonly diagnosed during the routine post partal examination at 4-6 weeks. The woman may relate a history of irregular or excessive bleeding, or describe the symptoms listed previously. Diagnosis is made when an enlarged, softer than normal uterus is palpated with bimanual examination. Treatment involves oxytocics, antibiotics and/or curettage.

Individualized nursing care should be based on detailed history, thorough physical examination and lab results. The care should involve the mother & her family, and documentation should be always complete.

3.2.6 Underlying Socioeconomic, geographic and cultural factors contributing to death from maternal bleeding

- Lack of decision making power
- Lack of access to medical facilities
- Lack of quality obstetric care
- Lack of access to medical facilities

Due to lack of transport facilities in the villages, maternal mortality rates in the rural areas are higher than in urban areas. Distances between the primary H/Cs and the specialist centers are magnified by inadequate transportation and communication. Environmental factors are responsible for difficulty and delay in transportation of women living in remote rural areas. The means of transportation or communication are usually poor; the roads are rough and unusable during the rainy seasons of the year. Many patients die during transportation or arrived in morbid state.

Substantial evidence indicates that distance is a primary factor hindering the utilization of few available health care facilities in general. Nevertheless, distance may not always be the only reason. The road infrastructure in most developing countries including Ethiopia is very poor. There are many rural areas with no access by road. This is especially true in regions with difficult terrain like mountainous areas and islands. Access to these areas may only be by foot, or boat. Even where roads exist they may be only seasonal and often women in their desperation are obliged to be carried on chairs, beds or stretchers made of wood for long distances before reaching the roads. When they find vehicles they are quite expensive. The drivers are often skeptical about taking on half dead or bleeding women for fear of being involved with the police if these women happen to die n their vehicles. They also fear stigmatization from the communities if they claim money for transportation after the woman has died. They therefore ask that the full cost of transportation be paid in advance. This of course may be too high and if the family cannot afford it the woman with the complication dies without ever reaching the hospital.

Socio-cultural and economic factors

Most women in our country belong to the low socioeconomic class. It may not be because of ignorance that they do not go to hospital, but because they cannot afford it. On the other hand most of these women are ignorant about the consequences of vaginal bleeding.

It is important to note here that factors such as female circumcision, early marriage and consequently early childbirth contribute to hemorrhage in pregnancy. This increases the risks of poorly developed pelvis and prolonged labour, often followed by post-partum hemorrhage. The tears that quite often result from the circumcision or de-circumcision, if not

The problem of establishing blood banks in low-income countries including Ethiopia is very difficult. Other blood products or volume expanders like normal saline, plasma and colloid solutions are usually lacking.

3.2.6.1 Possible solutions to reduce maternal bleeding and death from its complications

Antenatal care:

- Antenatal care is a preventive medicine that includes nutrition and health education. It helps to anticipate and prevent problems liable to occur during pregnancy and childbirth. It also helps to detect early and treat effectively complications that arise during pregnancy. The trained TBA who is aware of her limitations and capabilities can ascertain when complications arise and refer the patients at the right time and in good conditions.

- There is an urgent need to instill awareness of the importance of care during pregnancy and childbirth. This is also important for the husband, family, for pregnant women, community and media which can play a great role to raise the level of health consciousness. It is also important to upgrade the providers' technical competence attitude and availability of the supply

- Recently UNFPA suggested that given a choice women will use facilities and providers that offer what they perceive as the best care what women want from their providers includes, but not limited to:
  - Respect, friendliness, confidentiality and privacy.
  - Understanding on the part of providers of each woman's situations and needs.
  - Complete and accurate information
  - Technical competence
  - Access to continuity of care and medical supplies
  - Fairness and avoiding long waiting time.

- During pregnancy at ANC clinics the following high risk factors for hemorrhage related complications should be identified for referral and better management.
  - Grand multiparty
  - Anemia
  - Malpresentations
  - Multiple pregnancy

- Teach pregnant women and the community at large about the danger signs of pregnancy, e.g. bleeding during pregnancy; visual disturbance; headache.
- Identify and refer high risk women to the hospital for better care.
- Advise pregnant women to take iron, folic acid and anti-malarial drugs as prophylaxis as per the Doctors prescription.
- Identify the signs of onset of labour.
- Recognize the signs of prolonged labour.
-


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The treatment in cases of incomplete abortion is immediate uterine evacuation. In case of ectopic pregnancy, laparotomy should be rapidly performed. Major degrees of placenta previa should be treated by caesarean section so refer them rapidly to a unit able to handle such emergencies. Repairs of episiotomies and tears should be rapid to avoid unnecessary blood loss.

3.3 Satellite module for BSc Medical Laboratory personnel

3.3.1Learning objectives

Up on completion of the activities in this module, you will be able to:

- Name, describe and perform specific laboratory tests that could be undertaken during maternal bleeding.
- Carry out calibration for cyanmethemoglobin method of hemoglobin determination
- Know the normal hemoglobin and hematocrit values in different age groups
- Define packed cell volume
- Discuss the clinical significance of hemoglobin and Hematocrit determination
- List and describe the methods used for diagnosis sexually transmitted infections
- Perform ABO, Rh blood grouping and cross matching using different methods.
- Explain how to report and interpretate the result.
- Describe the purpose of anti human globulin (AHG) test
- Know the principle behind and how to carry out the AHG procedure
- Be able to perform different coagulation tests.

3.3.2. Laboratory markers of maternal bleeding

- Hematuria /blood
- Normochromic normocytic red blood cells
- Hypochromic Microcytic red blood cells
- Thrombocytopenia

3.3.3. Diagnostic Laboratory tests that may be performed Include

ü Hemoglobin or Hematocrit (Decreased hemoglobin or hematocrit values)

ü Peripheral red blood cell morphology (Normocytic norm chromic red cells and Hypochromic Microcytic red blood cells)

ü Complete blood count (CBC)

ü Urinalysis (Urine testing): - to detect bacteriuria by using reagent strip test for nitrite together with leukocytes, protein and blood, Since bacteruria is more common in pregnancy and urinary tract Infection is the commonest complication

of pregnancy in the middle trimester which may lead to premature birth→ Placental incomplete adherent→Leading to blood lose

- ü Screening sexually Transmitted Infections

- Syphilis screen - Non treponemal test
  Such as (VDRL,RPR,ART,EIA)
  - treponemal –specific tests
  E.g TPHA, FTA-AB
  - Dark field Microscopy

  } serologic tests

- screening other sexually transmitted infections
  - -Gram stain smear
  - -Wet (saline) mount preparation
  - -Culture

- ü ABO and Rhesus (Rh) blood Grouping
- ü Cross matching
- ü Coomb's test
- ü Pregnancy test for HCG
- ü Pap-smear examination
- ü Coagulation tests - Prothrombin time (PT)
  - Activated partial thromboplastin time (APTT)
  - Thrombin time (TT) test
- ü Clotting /Clot retraction time
- ü Bleeding time
- ü Fibrinogen level

3.3.3.1. Hemoglobin Determination

- **Explanation of Test**

The hemoglobin determination test is used to

- Screen for anemia
- Determine the severity of anemia
- Follow the response to treatment for anemia

Different techniques have been suggested for measuring Hemoglobin and assessing anemia

I. Cyanmethemoglobin (Hemoglobin cyanide HicN) photometric method
II. Acid Hematin (sahli-Hellige)
III. The "Hemocue" method
IV. Oxyhemoglobin method

Note: method III and IV may not be routinely practicable in our set up as some of these techniques are expensive and difficult to prepare their standard.

I. HAEMIGLOBIN CYANIDE (HICN) TECHNIQUE

Principle of test

Whole blood is diluted 1 in 251 in a drabkins solution which contains potassium ferricyanide and Potassium cyanide. The red cells are hemolyzed and the hemoglobin is oxidized by the fericyanide to methamoglobin. This is converted by the cyanide to stable haemiglobincyanide (HicN). Absorbance of the HicN solution is read in a spectrophotometer at wave length 540 nm or a filter colorimeter using a yellow-green filter. The absorbance obtained is compared with that of a reference HicN standard solution

Advantage -convenient method
- Readily available and stable standard solution
- All forms of hemoglobin except sulfhemoglobin (SHb) are readily converted to HicN

Reagent: The diluents is detergent modefied drabkin's solution

Materials
- Spectrophotometer or colorimeter
- Micropipet or sahli pipet
- Test tubes or small bottles with stopper

Procedure:

1. measure Carefully 20μ l (0.02ml) of capillary blood or well-mixed venous blood and dispense it in to 4 ml diluents (Drabkin's fluid)
2. Stopper the tube, mix and leave the diluted blood at room temperature, protected from sunlight, for 4-5 mints.
3. Place a yellow green filter (e.g 11 ford 605) in the colorimeter or set the wavelength at 540 nm.

5. The hemoglobin conc. in a sample can be read from the calibration curve.

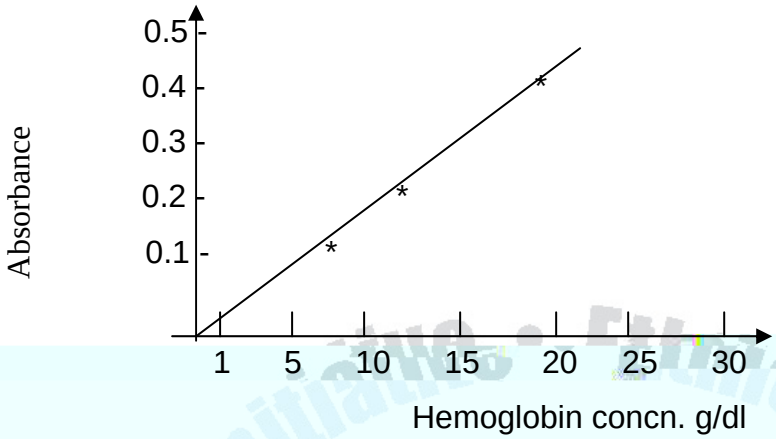

Fig. Example of an HicN hemoglobin calibration Graph using commercially. produced HicN standards: 6 g/dl. 12g/dl, 18 g/dl

Note:

- Drabkin's fluid must be stored in a light opaque container, e.g. brown glass bottle. It is a pale yellow clear fluid and must not be used if it loses its color or becomes turbid.
- Hemoglobin standard solutions are stable for long period (2 years or longer) when stored tightly capped and refrigerated (2-6^{o}c)

Reference Values:

Adult women: 12-16 g/dl or 1.86 – 2.48 nmol/L

Adult men: 13-5-17.5 g/dl or 2.09 –2.71 nmol/L

New born (both genders): 14 – 20 g/dl

3.3.3.2. Determination of Packed cell volume (PCV) or Hematocrit (Hct)

Principle of test: The PCV is the proportion of whole blood occupied by red cells. Anticoagulated blood is placed in a glass capillary's of specified length, bore size, and wall thickness is centrifuged in a micro hematocrit centrifuge at relative centrifugal force 12000-15000 xg for 5 minutes to obtain Constant packing of the red cells. The PCV value is read from the scale of dividing the height of the red cell column by the height of the total column of blood.

Specimen: To measure the PCV either well mixed well oxygenated EDTA anticoagnlated blood or capillary blood collected in to a heparinized capillary can be used.

Materials

- Micorhematocrit centrifuge
- Reading device, it can be a ruler or micrhematocrit reader
- Heparinized or plain capillary tubes
- Sealant (wax or plastic clay)

There are two methods of determination

1. The microhematocrit method
2. Macrohematocrit (wintrobe) method

Although recommended by the ICSH as an alternative method, it is no longer in routine use because of technical problems and centrifugation time required (30 mint) to achieve maximal packing of cells.

Microhaematocrit determination

Test procedure

1. Fill about three quarters of the tube by capillarity (if anticoagulated venous blood, adequate mixing is mandatory)
2. Seal the unfilled end, preferably using a sealant material. If unavailable, Heat-seal the capillary using a small flame from a spirit lamp or pilot flame of a Bunsen burner, rotating the end of the capillary in the flame.
3. Place the filled capillary in one of the numbered blots of the microhematocrit rotor with the sealed end against the rim gasket (to prevent breakage).
4. Centrifuge for 5 minutes (RCF 12000 – 15000 xg),

   Note: If the PCV is more than 0.50, centrifuge for a further 5 Minutes to ensure Complete packing of the red cells
5. Immediately after centrifuging, read the PCV

   To read the PCV in a hand –held microhematocrit reader, align the base of the red cell column (above the sealant) on the 0 line and the top of the plasma column of the 100 Line. Read off the PCV from the scale. The reading point is the top of the Red cell column just below the buffy coat layer (consisting of WBCand platetates).

   When no reader is available: use a Ruler to measure the length of the total column of blood in mm and the length of the red cell column (base To below buffy coat layer).


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Serology

Principles : - infection of humans with T.pallidum provokes in the host a complex antibody response. Serologic tests for syphilis are based on the detection of one or more of these antibodies. Host antibodies are of two know types:

1. non - treponemal antibodies, or reagin which react with lipid antigen
2. treponemal antibodies which react with T. pallidum & closely related strains.

- Serologic testing is the most commonly used procedure in the diagnosis & is useful in follow up of syphilis
- Sensitivity & specificity of serologic tests vary depending on the type of test performed and the stage of the disease
- Serologic testing is the only method for detecting latent and tertiary syphil is
-

ü **VDRL QUALITATIVE TEST ON SERUM**

Materials:

- Mechanical rotator (adjustable at 180 rpm)
- Slides
- 18-,19-, and 23 –gauge hypodermic needles with syringe
- 30ml, round, glass _ stoppered, narrow-mouthed bottles

Reagents:

- VDRL antigen : coutaining 0.03% cardiolipin, 0.9% cholestrol lecithin to produce standard Reactivity (0.21%)
- 1.0% buffered saline solution
- 0.9% saline

Preparation of Antigen Suspension

6. The antigen suspension is now ready for use & may be kept for 1 day. When ever the suspension is used, it should be mixed gently.

Preparation of specimen (serum)

1. Heat clear serum in a 56^{o}c water bath for 30 mints before testing (to destroy complement)
2. Examine the serum when it is removed from the water bath.
3. If serum is allowed to remain untested for 4 hrs or more after original heating, you need to reheat for 10 Mints at 56^{o}c before testing
4. When tested, the serum must be at room temp.

Procedure:

1. Pipette 0.05 ml of heated serum in to ringed slide
2. Add one drop of antigen suspension on to each serum with 18- gauge needle & syringe.
3. Rotate the slides for 4 mints on a mechanical rotaton adjusted at 180 rpm.
4. Read tests microscopically with 10x ocular & a 10x objective immediately after rotation.

Reading and reporting of results:

No clumping (slight roughness**): Non-reactive**

Small clumps**: Weakly reactive**

Medium or large clumps**: Reactive**

Note: A prozone reaction is occasionally encountered. This type of reaction is demonstrated when complete or partial inhibition of reactivity occurs with undiluted serum; maximum reactivity is obtained only with diluted serum. This prozone reaction may be so pronounced that only on weakly reactive (or “rough” non reactive) result.

ü **RAPID PLASMA REAGIN (RPR) CARD TEST ON SERUM**

Materials:

- 20 guage needle
- plastic dispensing bottle
- plastic coated cards
- Dispenser (0.05m/per drop)
- Capillary pipettes (0.05 m L capacity
- Stirrers


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- There are expensive laboratory technologies that helps to diagnose other STIs

  E.g. Tissue culture, ELISA or PCR are usually reguired to diagnose urogenital chlamydia infections (chlamydia trachomatis)

Specimens:

- Cervical swabs
- Vaginal swabs

Note:- Possible pathogens in cervical swab from women with sepsis or septic abortion are:-

- Streptococci (particularly S.pyogens and other β-hemolytic streptococci)
- Gram-ve rods like E.col: proteus etc…

ü Gram staining technique

Reagents required: - Crystal (Gentian) violet stain
- Lugol's iodine
- Acetone – alcohol decolorize (95% v/v ethanol, or absolute Acetone)
- Safranin or neutral red.

Method

1. Fix the dried smear with methanol or heat for 1-2 minutes (avoid damaging Pus cells
2. Cover The fixed smear with crystal violet stain for 30-60seconds
3. Rapidly wash off the stain with clean water
4. Tip off all the water, and cover the smear with Lugol'.s iodine for 30-60 seconds
5. W0009 Tc -0ao1ils

Results:

Gram-positive bacteria ----------Dark purple

Yeast cells----------Dark purple

Gram negative bacteria ----------Pale to dark red

Nuclei of pus cells ----------Red

Epithelial cells ----------Pale red

Reporting Gram smears

The report should include the following information:

- Numbers of bacteria present, whether many, moderate, few, or scanty
- Gram reaction of the bacteria, whether Gram positive or Gram negative
- Morphology of Bacteria: cocci, diplococci, streptococci, rods, or coccobacill:
- Presence and number of pus cells
- Presence of yeast cells and epithelial cells.

3.3.3.5. Laboratory aspects of blood transfusion

For selection of suitable blood for a patient or mother requiring transfusion, the following tests should be performed:

I. ABO and Rh (D) blood grouping

II. Cross Matching and antibody screening of the patient or mother.

Note:- pretransfusion tests also include screening blood for transfusion transmitted infections, such as

- Human immunodeficiency virus (HIV) 1 and 2
- Hepatitis B Virus (HBV)
- Hepatitis C Virus (HCV)
- Treponemal palladium (agent of syphilis)
- Plasmodium species (agent of malaria)

I. ABO Grouping Techniques

A Patient or a donor of unknown ABO blood group is usually tested by forward (cell) grouping and reverse (serum) grouping. The forward grouping is accomplished by mixing unknown red cells with serum containing known antibody where as the reverse grouping is accomplished by mixing unknown serum with red cells containing known antigen.

The cell Grouping is performed by:

A) Slide method and

B) Test tube method

Both test tube and slide methods are recommended. The serum grouping is performed by the test tube method only, the slide method is not usually recommended because of the presence of weak antibodies in the unknown serum so that result is easily overlooked or difficult to read. When we use the test tube method there is a chance or possibility of shaking and centrifugation, which facilitate the agglutination reaction and so the result Is less likely over Looked.

NB: Do not relay on reverse grouping alone to decide the blood group. It is done to check or double check the foreward grouping.

Rapid cell ABO grouping

A) Slide method

1. Label a glass slide as follows:

Anti –A	Anti – B

2. Pipette into each division as follows

   Anti –A 1 drop anti –A serum

   1 drop donor's capillary blood

   Anti – B 1 drop anti – B serum

   1 drop donor's capillary blood

3. Mix the contents of each division using a clear piece of stick for each.
4. Tilting the slide from side to side, look for agglutination and record the results after 2 Minutes.

   Important: Allow a full 2 minutes before recording the results to avoid missing weak reactions

5. Interpret the result as follows:

Anti – A	Anti – B	Group*
+	-	A
-	+	B
+	+	AB
-	–	O

* Confirm by tube cell and serum grouping

B. Test Tube method

Materials:

- Normal saline sol. 0.9% or 0.85%
- Wash bottle
- Chemically clean & dry test tube (10x15mm)
- Droppers
- Electrical centrifuge
- Markers
- Optical (hand lens or microscope)

1. Prepare about a 2-5% suspension of fresh red Cells in saline.
2. Label two test tubes as A and B

Specimen could be

- Whole Blood
- From finger prick
- Washed blood

II. Rh Typing

There are three methods of Rh- typing

A) slide test method
B) saline tube test method
C) Modified tube test

A) Slide method

1. prepare a 40-50% suspension of cells in their own serum or use whole Blood, finger puncture or coagulated blood
2. Label two slides as C and T
3. Place one drop of reagent anti-Rho (D) on slide labeled as T.
4. Place one drop of albumin or other control Medium on another slide labeled as C.

or hemolysis). The recipient is typed for ABO and Rh factors then donors blood is selected that is of the same type as that of the recipient.

There are two types of compatibility testing (X-maching) procedures:

1. The major compatibility testing (major cross-match)
2. The minor compatibility testing (minor cross-match)

The major compatibility testing procedure consists of mixing the patient's serum and the donor's cells. As the name imply this test is much more critical for assuring safe transfusion than minor testing.

The cross match be it major or minor, it should be performed in a tube. Although slide method is used in many places this is not the best procedure because the recipient may have a weak antibody in his serum which could easily be missed on the slide such a weak antibody could cause a transfusion reaction.

There are 2 general procedures for doing a cross match

- Tube method
- Slide method.

Slide major cross match

Method:-

- Add a drop of recipients serum with equal volume of donor red cells on the slide,
- Mix it with a stirrer or applicator stick
- Observe under low power (10x) objective of microscope

Interpretation: If red blood cells agglutinate (clumping)**: Incompatible**

No red blood cell agglutination**: compatible**

The Anti-Globulin Test (coomb's Test)

THE ANTI-GLOBULIN TEST: - It is a sensisitive technique to detect incomplete antibodies that are sensitive but which fail to agglutinate red cells suspended in saline at room $T^{0,}$ mainly IgG. These antibodies are agglutinated by the anti IgG antiglobulin serum through linking of the IgG molecules on neighboring red cells.

There are two kinds of anti globulin tests:-

- the direct anti globulin test (DAT)&
- The Indirect " " (IAT)

A) The Direct Anti globulin Test (DAT)

- Used to show whether red cells have been sensitized (coated) with antibody or complement in vivo, as in case of hemolytic disease of the newborn(HDN), autoimmune hemolytic anemia, or transfusion reactions.

Principle: Patients erythrocytes are washed to remove free plasma proteins & directly mixed with AHG, if incomplete antibodies are present, agglutination occurs.

B) The Indirect Anti globulin Test (IAT)

It is used for the detection of antibodies that may cause red cell sensitization in vitro. The sensitized RBCs or complement act as the antigen for the anti globulin reagent.

- IAT is used in cross-matching, to detect antibodies that might reduce the survival of transfused red cells.

Principle: The serum containing antibodies is incubated with erythrocytes containing antigens that adsorb the incomplete antibodies after washing to dilute the excess antibody in the serum; the addition of anti globulin serum produces agglutination in the presence of incomplete antibodies.

Procedure (IAT)

1. Put 2-4 drops of serum in a test tube
2. Add a drop of 5% red cell suspension
3. Mix & incubate at $37^{O}C$ for 15-30 mints
4. centrifuge at 3400 rpm,for 15 seconds & examine for agglutination or hemolysis
5. wash 3-4 times, decanting the supernatant
6. Add 1 or 2 drops & antiglobulin reagent
7. mix and centrifuge at 3400 rpm, for 15 seconds
8. Examine for agglutination or hemolysis

Note. There are two types of antiglobulin reagents that can be used in the laboratory Procedure. broad specturum (polyspecific sera) & monospecific sera.

Polyspecific sera: Prepared by combining anti IgG & anti-complement. The reagent also contain antibodies, such as anti- IgM, anti- Complement

Monospecific: contain only a single antibody: anti –IgG or only anti –complement.

Laboratory investigation of bleeding disorders.

There are three commonly used coagulation tests. These are basic or first-line screening tests of hemostasis and are generally used as the first step in investigation of an acute bleeding patients, a person with a suspected bleeding tendency or as a precausion before an invasive procedure is carried out

1. Prothrombin time (PT)
2. Activated partial thromboplastin time (APTT)
3. Thrombin time (TT) test

- **Prothrombin Time**

  Principle: The test measures the clotting time of plasma in the presence of tissue extract (thromboplastin)

  "Or"

  Citrated plasma +Thromboplastin +CaCl2 ⟶ time to clot

- Thromboplastin (a lipoprotein) = phospholipid + tissue factor (activates FVII)
- Evaluates the Extrinsic clotting system (VII,X,V,II & fibrinogen)

Method 1. Deliver 0.1 ml of plasma into a glass tube placed in a water bath

2. Add 0.1ml of thromboplastin wait 1-3 min to allow the mixture to warm
3. Add 0.1 ml of warmed CaCl2 &mix the contents of the tube
4. Start the stop watch & record the end point
5. Carry out the test in duplicate on the time basis.
6. Finally the results are expressed as the mean of the duplicate readings.

Normal values

- The normal range of prothrombin time is between 11 to 16 seconds
- Each laboratory should establish its own normal ranges

- **Activated partial Thromboplastin Time**

Principle:-

Citrated plasma +partial thromboplastin + Activator+CaCl2 ⟶ time to clot

- partial thromboplastin= a phospholipids-that does not contain tissue factor

- Activator= a negatively charged surface (kaolin, glass,) – activates Factor-XII
- Evaluates the Intrinsic clotting system (XII, XI, VIII, X, V, II and fibrinogen

Method:- 1. Mix equal volume of the phospholipid reagent and the kaolin suspension & leave in a glass tube in the water bath at 37^0c
2. Place 0.1ml of plasma into a new glass tube
3. Add 0.2 ml of kaolin-phospholipid solution, mix the contents and start the stop watch simultaneously. Leave at 37^oc for 10 mints with occasional shaking.
4. At exactly 10min, add 0.1 ml of pre warmed $cacl_2$ & start a second stop watch.
5. Record the time taken for the mixture to clot.

Normal range: 30-40 seconds

- **Thrombin Time**

  Principle: Thrombin is added to plasma and the clotting time is measured "or"

  Citrated plasma + dilute thrombin $\longrightarrow$ time to clot

  -The thrombin time is affected by the concentration & reaction of fibrinogen

Method 1. Add 100µl thrombin sol^n to 200µl of control plasma in a glass tube at 37^OC &
2. Start the stop watch
3. Measure the clotting time

Normal range: 15-19 seconds

Interpretation of Abnormal (prolonged) coagulation tests

Prothrombin Time (PT)	Partial thromboplastin Time (a PTT)	Thrombin Time (TT)
- Deficiency of factors prothrombin,V,X,VII& fibrinogen - Warfarin anticoagulation - Excessive heparin - Liver disease - Mild to sever vitamin K deficiency - DIC	-Intrinsic Factors deficiency -Heparin treatment (most common cause of a long aPTT) -Profound vitamin K deficiency - Liver disease -Excessive warfarin therapy	- Low or abscent fibrinogen -Heparin (much more sensitive to heparin than a PTT) - Uremia - Interference with fibrin polymerization

N.B. Acquired coagulation disorder can be associated with infections, obstructive complications (septic abortion, eclampsia, raptured uterus) and haemorragic disease of the new born.

NOTE: Most procedures for each method are not included in this module. Thus if the need arise please refer any book related to the topic.

UNIT 4

ANNEXES

4.1 Annex-I: Bibliography /References

- Acute hypertension related to Hemorrhage In the obstetric patient Obstetrics & Gynecology, clinics of North America march, 1995.
- ALARM International. Women's access and expectations of health care services.
- Axemo, P et al (1995). International maternal health: Maternal morbidity. WHO, Sweden.
- Bennet, B (1993). Text of Midwives, 12th Edn. Great Britain.
- Bryant J.N. Laboratory Immunology and Serology. Third edition, 1992.
- Carpenito, L (1994). Nursing diagnosis application to clinical practice, 6th Ed. Philadelphia, J.B Lippincot.
- Chees brough L.M. District Laboratory practice IN Tropical Countries. Vol. 2, 2001
- Clinical Urinalysis. The principles and practice of Urine testing in the hospital andCommunity: published by Ames Division, miles limited 1990
- Derek, L. J (1990). Fundamentals of obstetric and Gynecology. Vol I and II.
- Dorland's illustrated Medical dictionary. 25th edition 1974: 538.
- Driessen, F (1991). Obstetric problems: a practical manual. AMRF, Nairobi.
- Essential elements of post abortion care (PAC) : An expanded and updated model. PAC Consortium. July, 2002.
- Fisch Bach .F. A manual of Laboratory and diagnostic Tests, Fourth edition 1992
- Johnson, R. Implementing Global standards of Maternal and Neonatal Health care at health care prouider level: A strategy for dissemination and using Guidelines. JHPIEGO. Sept. 2000.
- Lademig, P et al (1994). Essentials of maternal and newborn nursing 3rd Edn. California, Addison- Wesley nursing.

- Manual of Basic techniques for a health Laboratory Y.WHO 1908
- Pernoll MI. Current obstetrics & Gynecology: Diagnosis and treatment. 7th edition. 1991.
- Preventing PPH: managing the third stage of labour. PATH, Outlook. Sept. 2001: 19:3
- Ravindaran, T and Bal Subramanian. P (2004). The paradoxical reality of married women in rural Tamil: Reproductive health matters. India. 23(12):88-99.
- Sexual Health and sexually transmitted Infections WWW (internet Information)
- Thankman, R. Verma. Clinical Gynecology. 1st edition> 1991: 118
- WHO (1998). Preventing maternal death. WHO, Geneva.
- WHO. Managing Complications in pregnancy and childbirth: a guide for midwives and doctors. WHO. 2000 (WHO/RHR/00.7).
- Home: Medical education. Placenta previa. Nancy. Collins, RN.BSN.PHN. 2004.
- SaraMackenzie,MD. University of IOWA Fammily practice hand book. Late antepartum hemmorrhage,fourth edition; Chapter 14:2004
- Steven L. Clark, MD. OBG Management Volume 14, NO. 11 2004 Douden Health Media.

4.2 Annex-II: Key for pre-test questions

	Category			
S.No	All category	Health officers	BSc Nurses	BSc Medical Lab
1	B	T,F,T,F, F,	B	- hematuria, hemoglobinuria, Normocytic normochroic red blood cells
2	D	T,F,T,T,F	C	- CBC, VDRL/ RPR, Gram stain, ABO and Rh- blood grouping, PAP-smear examination, pregnancy test etc..
3	B	T,F,T,T,F	B	- Acid hematin (sahli hellige), Cyanmethamoglobin method, Hemocue method, Oxyhemoglobin method.
4	B	T,T,T,T,F	C	- Serology
5	B	T,T,F,F,T	C	D
6	A	T,F,T,T,F	B	D
7	B	T,T,T,F,F	A	F
8	A	F,T,T,F,F	C	D

ART - Automated reaagin test

EIA - Enzyme Immuno Assay

TPHA - Treponema pallidum hemaggultination

FTA-AB - Flourcent antibody absorption

PCV - Packed cell volume

ICSH - International Community of Standard Hematology

PPH - Post partum hemorrhage

Hgb - hemoglobin

FHB - fetal heart beat

C/P - Clinical picture

V/E - Vaginal examination