Ministry of Higher Education and Scientific Research

College of Health and Medical Technology

Anaesthesia Techniques Department

Subject: Basics of Surgery (2) ,

2nd stage.

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Lecture 8

Sterile Precaution and AIDs

Sterile precaution and AIDs

Sterilization

Sterilization is the complete elimination or destruction of all forms of microbial life and is accomplished in health care facilities by either physical or chemical processes. Steam under pressure, dry heat, ethylene oxide (ETO) gas, hydrogen peroxide gas plasma, vaporized hydrogen peroxide, and liquid chemicals are the principal sterilizing agents used in health care facilities. Sterilization is intended to convey an absolute meaning, not a relative one.

Any surgery or medical procedure must be performed under high-grade sterilization. This is so that germs and infections are not transmitted from one person to another. Therefore, we must deal with a patient infected with AIDS with caution so as not to transmit the infection to healthy people

putting PPE ON

N95, face shield, contact gown, gloves

Checklist

1. **Remove** any personal items and jewelry and put in secure location, not in pockets.
2. If you already have a mask on: **Sanitize** hands. **Remove** mask. **Store** mask. **Sanitize** hands.
3. **Put on** contact gown outside room. Open-end **faces** your back. **Tie** the back of the gown.
4. **Put on** gloves over the cuffs of the gown.
5. **Put on** N95, ensuring proper seal. **Ensure** straps are not crossing.
6. **Place** hands over the front of the N95. **Breathe** an easy deep breath in and out. If you **feel** air escape the edges, **refit** and **repeat**.
7. **Sanitize** gloves.
8. **Put on** face shield.
9. **Sanitize** gloves.
10. **ENTER room. DO NOT enter** the room if you do not achieve a proper respirator seal.
11. **Do not** touch face or re-adjust N95 or face shield inside room.

Checklist

Inside room

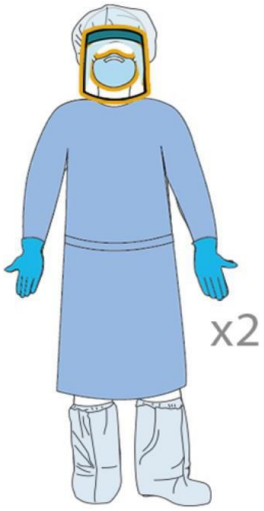
1. **Sanitize** gloves.
2. Cross arms and **grip** gown on shoulders. **Pull** and **break** gown in controlled fashion.
3. **Roll** the gown towards your hands. **Remove** the gloves with the gown. **Dispose** of gloves and gown.
4. **Sanitize** hands.
5. **Exit** operating room.

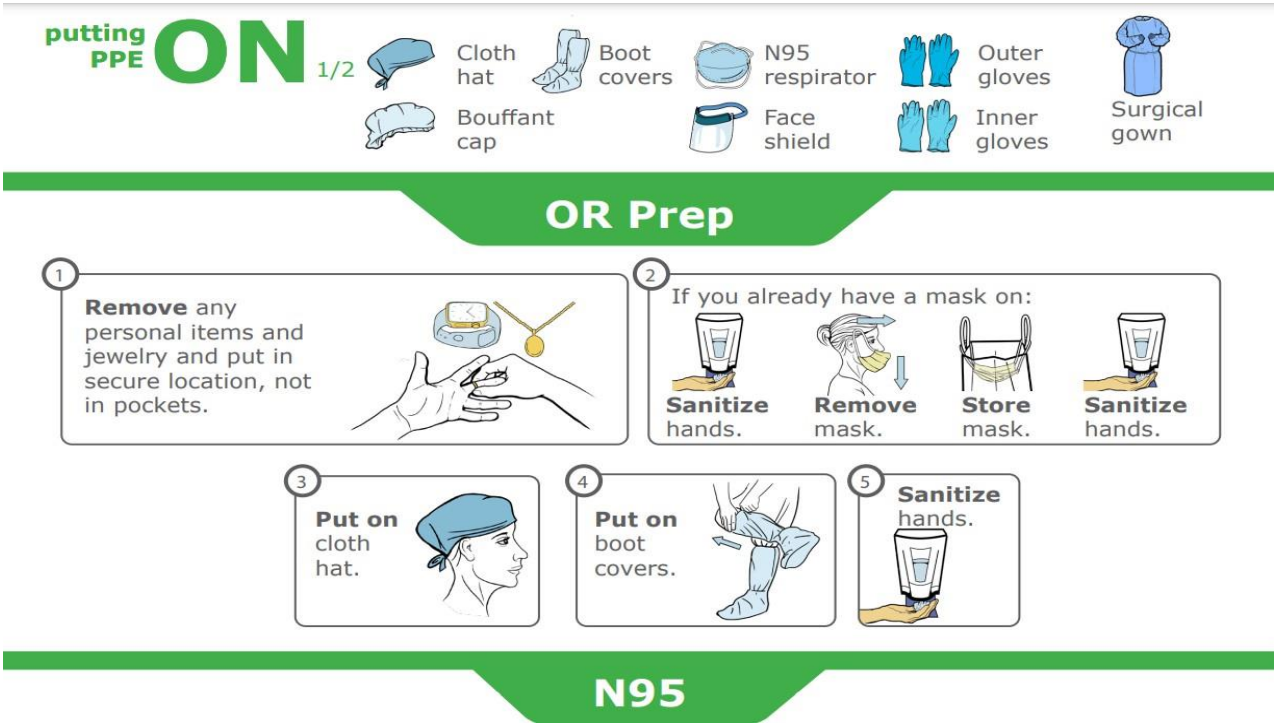
Outside room

1. **Put on** new gloves.
2. **Place** wipe on table.
3. **Remove** eye wear and **place** on wipe. **Do not** touch face.

   Sanitize gloves.
5. **Pinch** bottom strap and **pull** far over head. **Do not** let straps touch your face.
6. **Pinch** top strap and **pull** far over head. **Do not** let straps touch your face as you **remove** the N95.
7. **Store** N95.
8. **Sanitize** gloves.
9. **Put on** mask.
10. **Wipe** shield. **Sanitize** in the following order: back of shield, elastic band, foam band, front of shield.
11. **Place** shield in bag to dry.
12. **Wipe** table.
13. **Sanitize** gloves.
14. **Remove** gloves.
15. **Wash hands** with soap and water or **sanitize** hands.

- **Operating Room (Sterile) - ACE**
- **N95 (reuse)**
- **Face shield (reuse)**
- **Surgical gown**
- **Double gloves**
- **Cloth hat**
- **Bouffant**
- **Boot covers**
- Instructions for ACE PPE for staff requiring sterile PPE.
- Useful for when you are...
- ...experiencing PPE supply issues.
- ...working the operating room near the sterile field.
- ...caring for a symptomatic patients.
- ...performing aerosolizing procedures.





N95

6. **Put on** N95. **Ensure** straps are not crossing.

7. **Place** hands over the front of the N95. **Breathe** an easy deep breath in and out.

If you **feel** air escape the edges, **refit** and **repeat**.

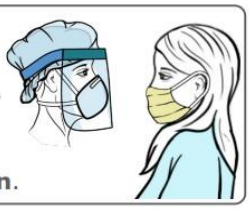
8. **Put on** bouffant cap.

Face Shield

9. **Put on** face shield.

10. **Remove** comm. devices, such as cell phones, pagers, and ID badge.

11. **Check** for good fit with **PPE Champion**.

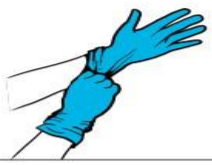


12. **Perform** standard surgical scrub.

ENTER operating room (use runner to open door)

Gown, Gloves

13. **Put on** first pair of sterile gloves.



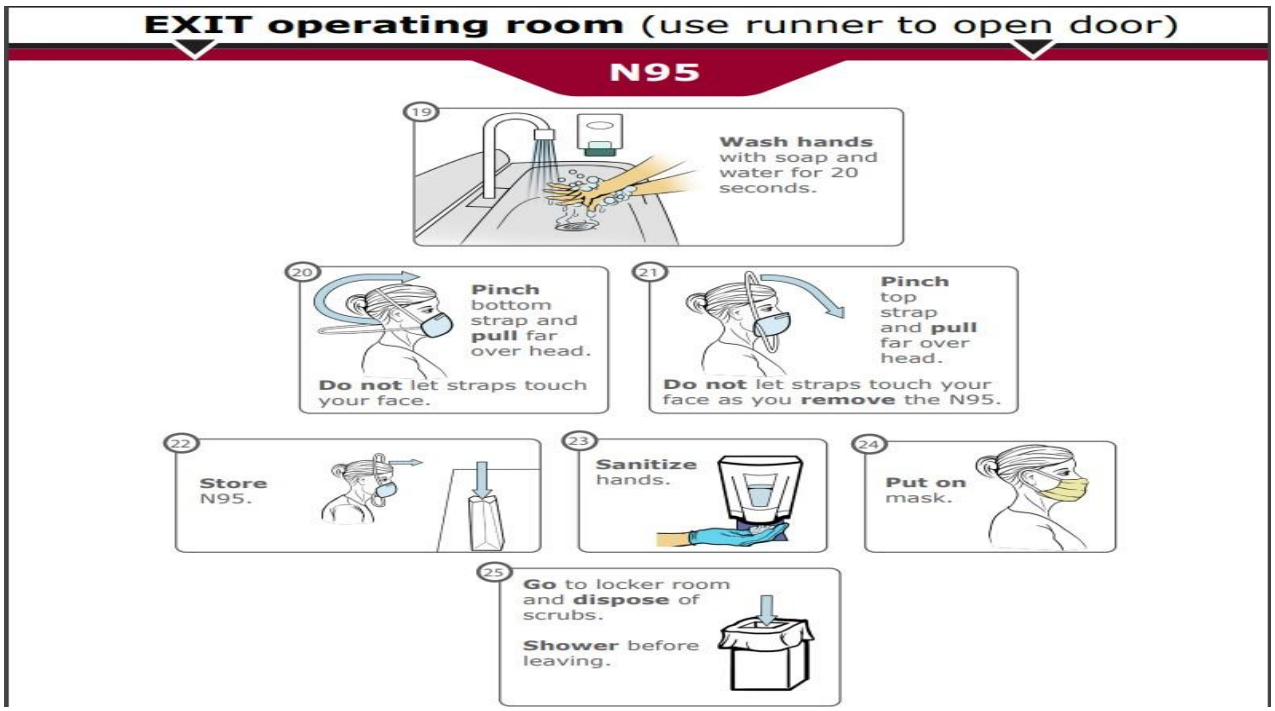
14. **Put on** surgical gown with circulator's help.

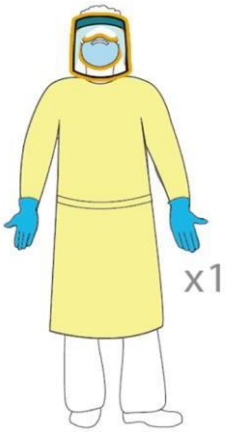
Circulator in non-sterile PPE.

15. **Put on** second pair of sterile gloves over gown cuffs.


taking PPE OFF 1/2
Cloth hat, bouffant cap, boot covers, N95, face shield, surgical gown, double gloves
Gown, Boot Covers, Gloves
1 Wipe outer gloves.
2 Sanitize outer gloves.
3 Remove boot covers.
4 Sanitize outer gloves.
5 Remove outer gloves.
6 Sanitize inner gloves.
7 Reach back and release the neck portion.
8 Untie the waist.
9 Remove the gown into the designated bin.
Face Shield
10 Sanitize inner gloves.
11 Remove face shield without touching front of shield.
12 Wipe shield. Sanitize in the following order:
Back of shield.
Elastic band.
Foam band.
Front of shield.
13 Wipe table.
14 Place shield upside down to dry.


Bouffant, Gloves
15 Sanitize inner gloves.
16 Remove bouffant and dispose.
17 Sanitize inner gloves.
18 Remove under gloves and dispose.


EXIT operating room (use runner to open door)
N95
19 Wash hands with soap and water for 20 seconds.
20 Pinch bottom strap and pull far over head.
Do not let straps touch your face.
21 Pinch top strap and pull far over head.
Do not let straps touch your face as you remove the N95.
22 Store N95.
23 Sanitize hands.
24 Put on mask.
25 Go to locker room and dispose of scrubs.
Shower before leaving.



- **Operating Room (Non-Sterile) - ACE**
- **N95 (reuse)**
- **Face shield (reuse)**
- **Disposable gown**
- **Single gloves**
- Instructions for ACE PPE for staff requiring non-sterile PPE.
- Useful for when you are...
- ...experiencing PPE supply issues.
- ...working the operating room but not near the sterile field.
- ...caring for symptomatic patients.
- ...performing aerosolizing procedures.

N95

5 **Put on** N95, ensuring proper seal.
Ensure straps are not crossing.

6 **Place** hands over the front of the N95. **Breathe** an easy deep breath in and out.

If you **feel** air escape the edges, **refit** and **repeat**.

7 **Sanitize** gloves.

Face Shield, Entry

8 **Put on** face shield.

9 **Sanitize** gloves.

10 **ENTER room**

DO NOT enter the room if you do not achieve a proper respirator seal.

11 **Do not** touch face or re-adjust N95 or face shield inside room.

taking **PPE** **OFF** 1/2

N95, face shield, contact gown, gloves

Gown, Gloves

1 **Sanitize** gloves.

2 Cross arms and **grip** gown on shoulders.

Pull and **break** gown in controlled fashion.

3 **Roll** the gown towards your hands.

Remove the gloves with the gown.

Dispose of gloves and gown.

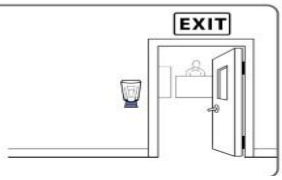
4

Sanitize hands.

Exit

5

Exit operating room.



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taking PPE OFF 2/2

N95, face shield, contact gown, gloves

Gloves, Setup

After outer glove removal in the patient room, exit and...

1 **Put on** new gloves.

2 **Place** wipe on table.

3 **Remove** eye wear and **place** on wipe.

Do not touch face.

N95

4 **Sanitize** gloves.

5

Pinch bottom strap and **pull** far over head.

Do not let straps touch your face.

6

Pinch top strap and **pull** far over head.

Do not let straps touch your face as you **remove** the N95.

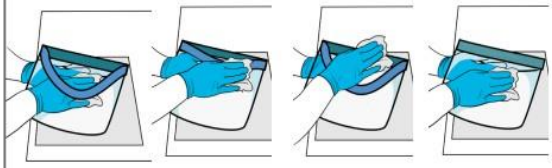
7 **Store** N95.

8 **Sanitize** gloves.

9 **Put on** mask.

Face Shield

10 **Wipe** shield. **Sanitize** in the following order:



11 **Place** shield in bag to dry.

12 **Wipe** table.

13 **Sanitize** gloves.

14 **Remove** gloves.

15 **Wash hands** with soap and water or **sanitize** hands.

Lecture 9

Calcium metabolism, calcification

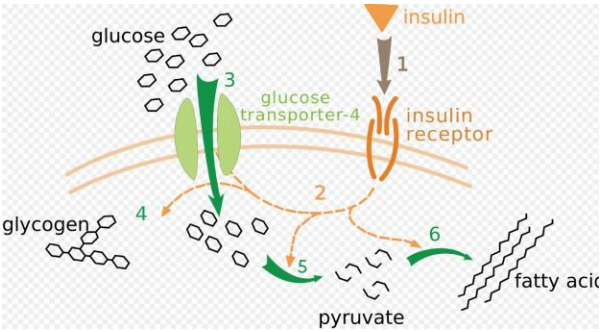
Calcium metabolism, calcification

Calcium metabolism

- Calcium metabolism is the movement and regulation of calcium ions (Ca2+) in (via the gut) and out (via the gut and kidneys) of the body, and between body compartments: the blood plasma, the extracellular and intracellular fluids, and bone. Bone acts as a calcium storage center for deposits and withdrawals as needed by the blood via continual bone remodeling

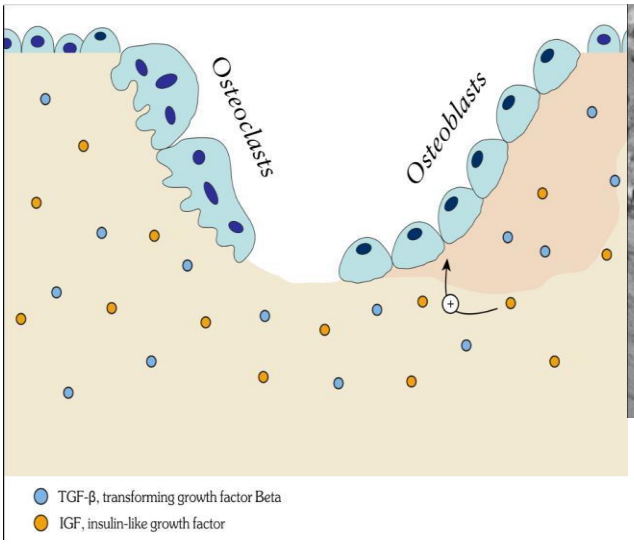
metabolism

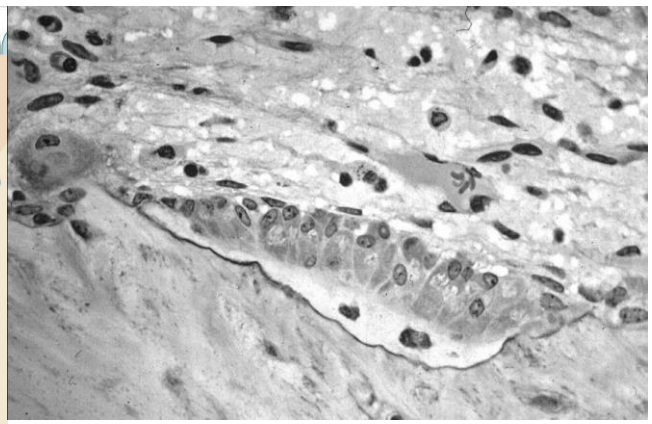
- s the set of life-sustaining chemical reactions in organisms. The three main functions of metabolism are: the conversion of the energy in food to energy available to run cellular processes; the conversion of food to building blocks for proteins, lipids, nucleic acids, and some carbohydrates; and the elimination of metabolic wastes

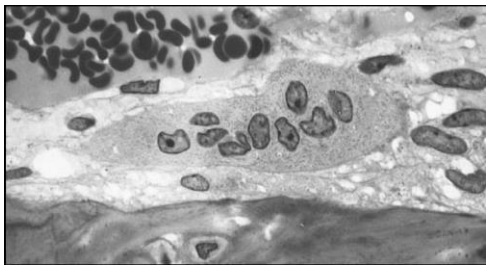


- In the first year of life, almost 100% of the skeleton is replaced. In adults, remodeling proceeds at about 10% per year.

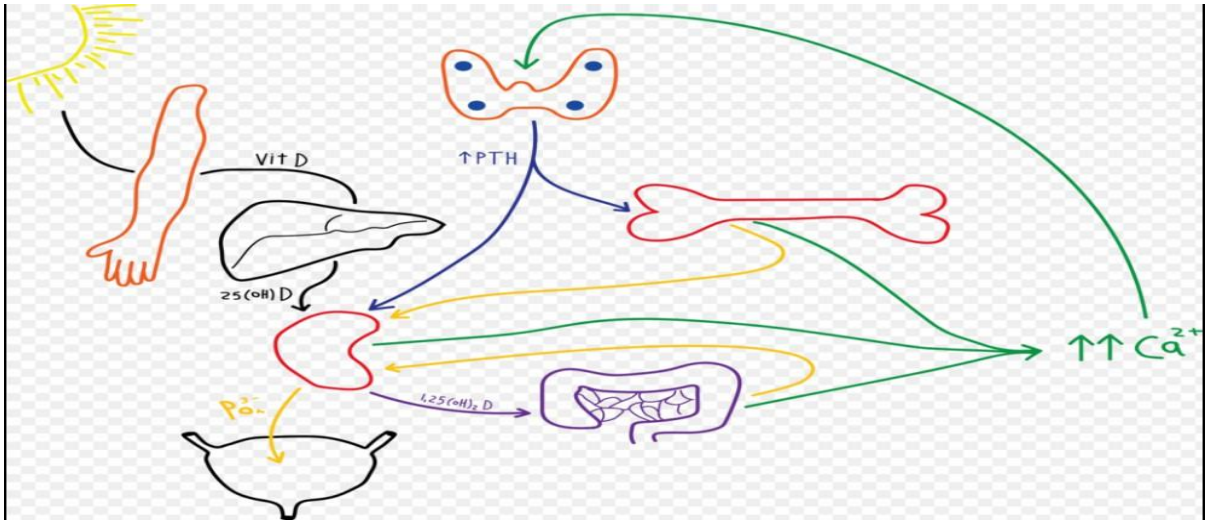
- An imbalance in the regulation of bone remodeling's two sub-processes, bone resorption and bone formation, results in many metabolic bone diseases, such as osteoporosis.

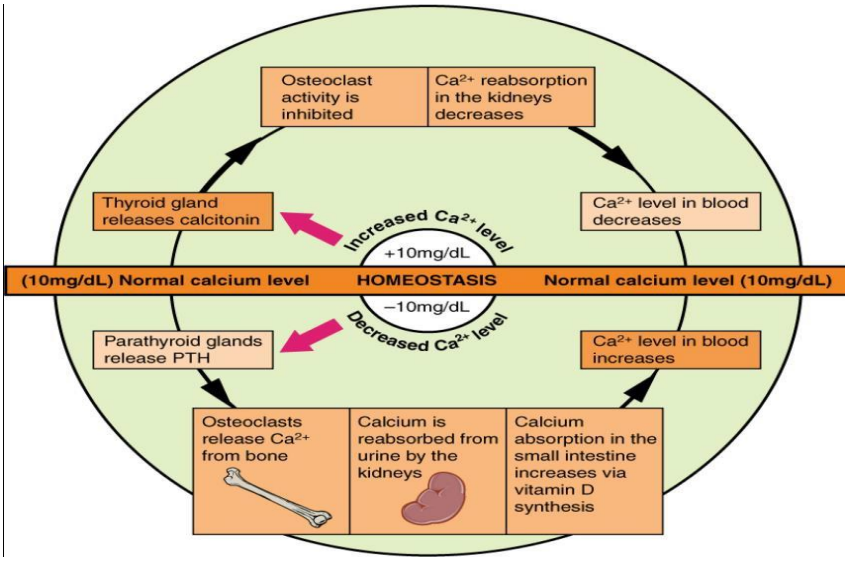






Calcium homeostasis





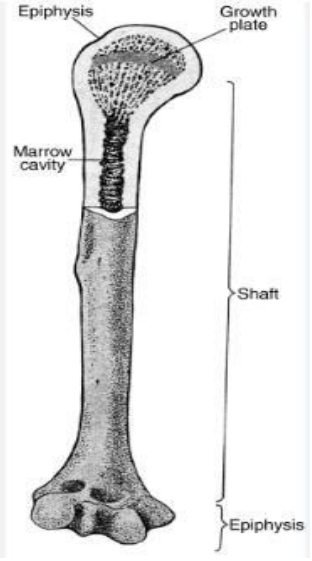
The body regulates calcium homeostasis with two pathways; one is signaled to turn on when blood calcium levels drop below normal and one is the pathway that is signaled to turn on when blood calcium levels are elevated

Blood concentration

- The concentration of calcium ions inside cells (in the intracellular fluid) is more than 7,000 times lower than in the blood plasma (i.e. at <0.0002 mmol/L, compared with 1.4 mmol/L in the plasma)

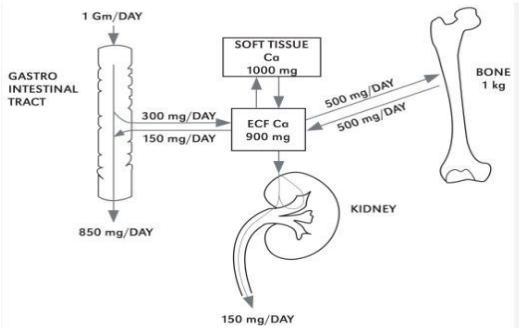
Bone

- Calcium acts structurally as supporting
- material in bones as calcium
- hydroxyapatite (Ca10(PO4)6(OH)2).



Intestinal absorption

- The normal adult diet contains about 25 mmol of calcium per day. Only about 5 mmol of this is absorbed into the body per day.



Excretion

- Intestine

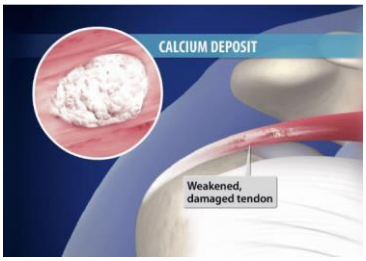
Most excretion of excess calcium is via the bile and feces, because the plasma calcitriol levels (which ultimately depend on the plasma calcium levels) regulate how much of the biliary calcium is reabsorbed from the intestinal contents.

Kidneys

- Urinary excretion of calcium is normally about 5 mmol (200 mg) /day. This is less in comparison to what is excreted via the feces (15 mmol/day).

Calcium calcification

- Calcification occurs when you have a buildup of excess calcium in your body. There are many different types of calcium deposits. They can form all over your body, including in your soft tissues, arteries and organs. Some calcium deposits are normal, but others can signal you have a health condition that you need to address.



What are calcium deposits?

- Calcium deposits, or calcification, can occur when calcium builds up in your body. This buildup of calcium can harden in your tissues, organs or blood vessels. When this happens, your body's normal processes may not run correctly.

What are the different types of calcifications?

- Skin

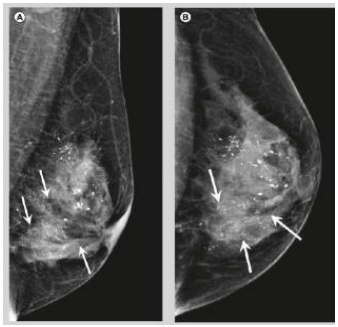
Calcium deposits on your skin are called calcinosis cutis. Calcinosis cutis can occur anywhere in your body. Calcium deposits on your fingertips are most common. But calcium deposits may appear on your face, including your eyelids. They may also occur on your joints, such as your elbows and knees.

Teeth

- Your teeth need calcium to make healthy enamel. Enamel helps protect your teeth, but sometimes excess calcium deposits can occur on your teeth. The deposits can build up around the roots of your teeth and in your dental pulp. Your dental pulp is in the middle of your tooth.

Breasts

- Calcium deposits in breasts usually don't cause any symptoms. They're too small to feel. Healthcare provider may discover breast calcifications during a routine mammogram. On a mammogram, they look like small, bright white spots.

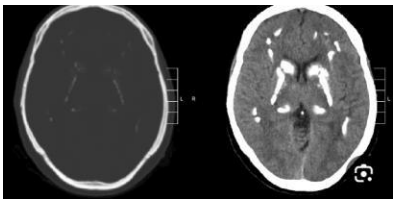


Shoulders

- Calcium deposits in shoulders can cause pain and discomfort when you move. You may notice a decreased range of motion. But sometimes shoulder calcification causes no symptoms. Healthcare provider may find them during an imaging test for an unrelated condition.

Brain

- Primary brain calcification is a condition that causes calcification in the blood vessels in your brain. The calcium deposits usually occur in structures in your brain called basal ganglia. Basal ganglia control movement in your body.

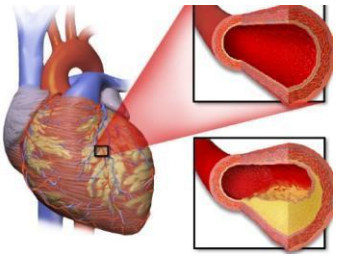


Kidneys

- A condition called nephrocalcinosis occurs when too much calcium builds up in your kidneys. This type of calcification usually occurs in the inner part of your kidney, the renal medulla. Most of the time, the condition affects both of your kidneys.

Arteries

- Calcium deposits in your arteries (blood vessels) can cause them to stiffen. This increases your risk for problems with your cardiovascular system. Coronary artery calcification increases with age, with deposits found in 90% of men and 67% of women older than age 70.



Symptoms and Causes

- **Inflammation:** Inflammation can cause tissue damage. This can cause your body to release proteins that bind calcium in clumps.
- **Calcium metabolism disorders:** These types of disorders can lead to a condition called hypercalcemia. Hypercalcemia occurs when you have too much calcium in your blood.
- **Certain autoimmune disorders:** Autoimmune diseases that affect your skeletal system or connective tissues can cause calcification.

Lecture 10

Coagulopathy and Blood Dyscrasia in surgery

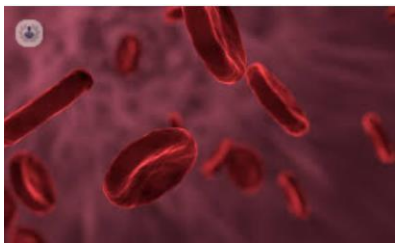
Coagulopathy and Blood dyscrasia in surgery

Coagulopathy

- (also called a bleeding disorder) is a condition where the blood's ability to coagulate (form clots) is affected.
- They can be congenital (such as hemophilia, Von Willebrand disease or hereditary platelet diseases) or acquired (caused by a defective synthesis of plasma coagulation factors or by the absorption of antibodies that attack blood clotting functions.
- In the latter case, most common causes may be poor diet that does not provide the necessary substances, intestinal malabsorption or the consumption of drugs that hinder the absorption of vitamin K.

Prognostic of the disease

- Certain types of coagulopathy do **not allow blood to clot.** Some types of coagulopathies are characterized by **hypercoagulation** (excessive blood clotting) which can result in thrombosis or embolism. Both are disorders that can cause premature death if they're not treated adequately.



The most common symptoms of a coagulopathy are the following:

- Bruising that occurs for no apparent reason
- Hermathrosis (bleeding into a joint cavity)
- Haemorrhage after childbirth
- Accumulation of blood in the pleural cavity (hemothorax)
- Very heavy menstrual flow
- Loss of blood through the nose

- Anal bleeding
- Blood in the urine
- Blood in the sperm
- Livedo reticularis
- Thrombocytopenia
- Persistent involuntary and painful erection of the penis (priapism)
- Gingival bleeding
- Rheumatisms
- Bloody gums
- Joint pain and swelling

diagnostic of a Coagulopathy

- The diagnostic is based on an objective **analysis of the habits of a patient,** for example. the type of medication they're taking, if they suffer from allergies, if they've had a blood transfusion and if they smoke or drink. It is also based on the medical history of the patient, blood analysis and tests to evaluate blood clotting.

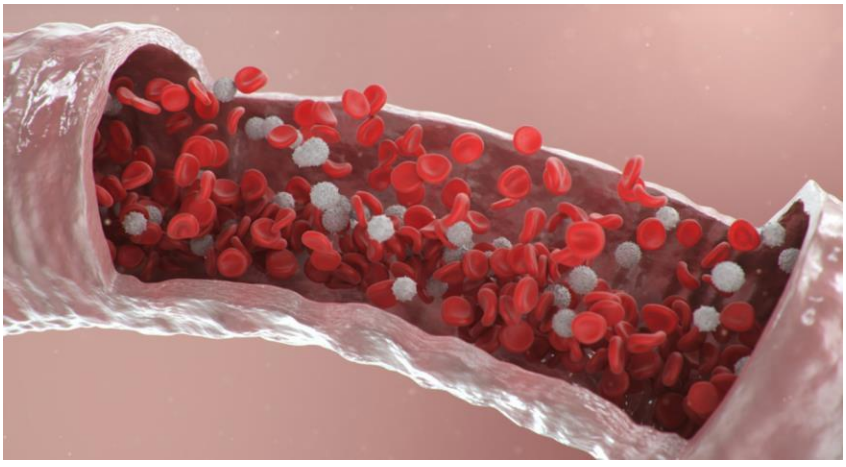
Can it be prevented?

- Especially in the case of blood clotting that is extremely quick (that can favour the appearance of thrombosis), it can be a good idea for individuals who are at high risk of developing a coagulation disorder to carry out preventative lifestyle changes.
- Exercise, losing weight and not sitting down for too long can reduce the symptoms of coagulation disorders.

Treatment for a coagulopathy

- Medications that prevent the the excessivformation of blood clots
- Contraceptive pills to counteract e bleeding during menstruation
- Medication that substitutes protein in the blood to ensure you do not excessively bleed

Blood dyscrasia



Red blood cell and hemoglobin diseases

- In some cases, the red blood cells tend to be abnormal in various varying ways. Apart from cells deficiency or excessiveness, they can be structurally abnormal or associated with abnormal hemoglobins. The presence of anemia (a limited amount of red blood cells) can result from different factors. It includes reduced blood cell production, loss due to severe bleeding, high destruction, or redistribution.

- Examples of red blood cells conditions include;
- Hemoglobinopathies: These are hemoglobin-related diseases, including genetic conditions such as sickle cell disease. It also includes acquired conditions such as sideroblastic anemia.
- Nutritional disorders: It consists of iron deficiency anemia caused by folate or vitamin B12 deficiency.

- Aplastic anemia: Although rare, the red blood cells can be produced in a limited amount due to bone marrow damage.
- Red cell membrane diseases
- Red blood cell enzyme deficiencies
- **Polycythemia:** This involves an increase in the production of red blood cells as a response to lung disease and other health issues.
- Hemolytic anemias: Occurs due to breaking down of the red blood cells

Anemia

- Anemia is described as a drop in the mass of red blood cells (RBCs). RBCs transport oxygen from the lungs to the tissues and carbon dioxide from the tissues back to the lungs. A reduction in the number of RBCs that carry oxygen and carbon dioxide affects the body's capacity to exchange gases in anemia. The reduction might be due to blood loss, increased RBC breakdown (hemolysis), or decreased RBC generation.

Iron Deficiency Anemia

- When the body's iron reserves fall too low to sustain normal red blood cell (RBC) synthesis, iron deficiency anemia occurs. The reason might be a lack of dietary iron, poor iron absorption, bleeding, or a loss of bodily iron in the urine. Iron balance in the body is typically carefully regulated to ensure that enough iron is absorbed to compensate for bodily losses of iron.
-

Signs and symptoms

Patients with iron deficiency anemia may report the following:

1. Fatigue
2. Leg cramps on climbing stairs
3. Craving ice to suck or chew
4. Poor school performance
5. Cold intolerance
6. Altered behavior
7. Dysphagia with solid foods (from esophageal webbing)
8. Symptoms of comorbid cardiac or pulmonary disease

Bleeding disorders

Bleeding diseases are classified into four main categories, including;

1. Deficiencies of coagulation factors
2. Fibrinolytic abnormalities
3. Platelet disorders
4. Vascular abnormalities

Coagulation factor defects, including hemophilia, are caused by a genetic condition of clotting factors. These factors are required for the blood to clot naturally or as usual. This problem can be common or uncommon, and it can also be mild or fatal.

Risk Factors of Blood Dyscrasia

- A poor diet
- Aging
- Autoimmune conditions
- Diseases of the kidney, liver, or thyroid
- Heart disease
- High blood pressure
- High cholesterol
- Immobility
- Obesity
- Pregnancy
- Prolonged exposure to certain chemicals and drugs
- Smoking
- Surgery
- Trauma

Diagnosis of Blood Dyscrasias

- **Assessment of the patient's history** : Blood dyscrasias diagnosis usually starts by thoroughly assessing the history of the patient.
- **Physical examination**
- **Blood cells evaluation**
- **Bone marrow evaluation** :The physicians can opt for bone marrow biopsy or aspiration to obtain sufficient data regarding bone marrow health.
- **Coagulation study :**In case the physician suspects a bleeding condition, he or she will tell if you have a platelet condition or some form of bleeding disorder.

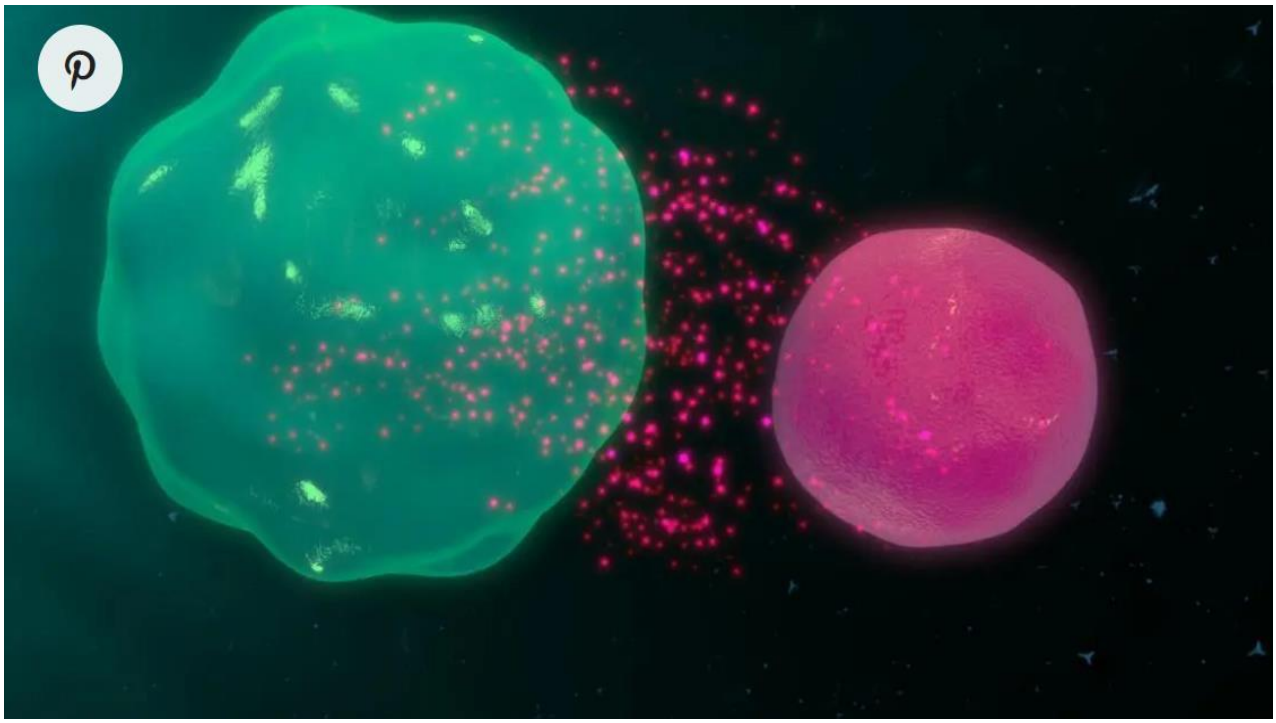
Lecture 11

Specific infection

Specific infection

What to know about infections

- An infection occurs when a microorganism — such as bacteria, fungi, or a virus — enters a person's body and causes harm. In many cases, the immune system can stop these pathogens from multiplying in the body. If not, serious damage can result.
- The microorganism uses that person's body to sustain itself, reproduce, and colonize. These infectious microscopic organisms are known as pathogens, and they can multiply quickly.



They can spread in several different ways, including through:

- skin contact
- the transfer of bodily fluids
- contact with feces
- ingesting contaminated food or water
- inhaling airborne particles or droplets
- touching an object that a person carrying the pathogen has also touched

Types

- Bacteria, viruses, fungi, and parasites are different types of pathogens. They vary in several ways, including:
- size
- shape
- function
- genetic content
- how they act on the body

Some examples of bacterial infections are:

- bacterial meningitis
- otitis media
- pneumonia
- tuberculosis
- upper respiratory tract infection (although this is usually viral)
- gastritis
- food poisoning
- eye infections
- sinusitis (again, more often viral)
- urinary tract infections (UTIs)
- skin infections
- sexually transmitted infections (STIs)

Prevention

- Wash the hands often, especially before and after preparing food and after using the bathroom.
- Clean surface areas and avoid keeping perishable food at room temperature for too long while preparing a meal.
- Receive any recommended vaccinations and keep them up to date.
- Only take antibiotics with a prescription and be sure to complete the recommended course, even if symptoms improve at an earlier stage.

Tuberculosis(TB):

Is fatal contagious disease that affects the lungs and other part of body which is a public health problem but curable and preventable disease.

Caused organism: Bacteria (**Mycobacterium** tuberculosis).

Type

1-Primary : for the first time (pediatric)

Moderate lymph node infection

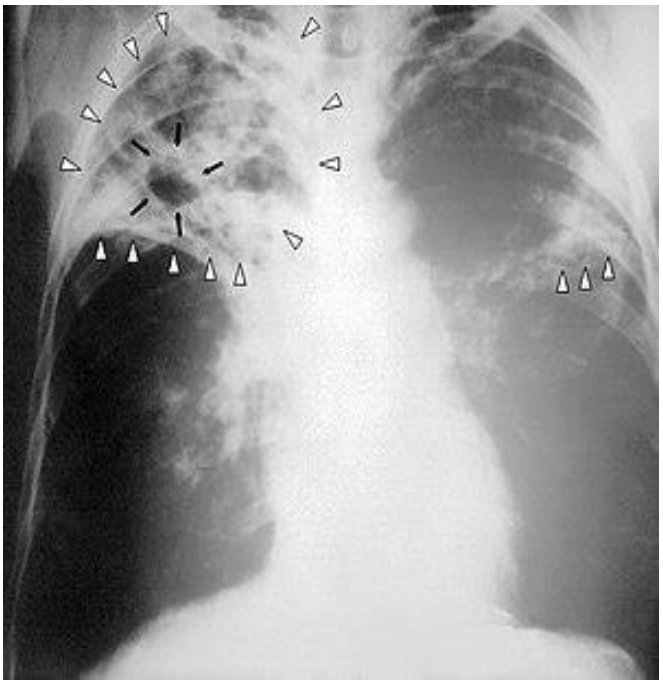
2- Secondary: for the 2nd time infection (adult)

Types of site infection

1- Pulmonary TB.

2- Extra pulmonary TB.

Pulmonary TB is a contagious bacterial infection that involves the lungs.



2-TB of the bone and the joint.

3-TB of the central nervous system.

Mode of disease transmission

Airborne: TB is from person to person through the air. When people with lung TB cough, sneeze or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infection.

Symptoms of TB

1- Cough more 3 weeks.
2- Chest pain.
3-Fatigue.
4- Coughing up blood.
5- Feeling tired all the time.
6- Night sweats.
7- Chills.
8- Fever
9- Loss of appetite.
10- Weight loss.

Most at risk

1- People who are infected with HIV.
2- Low immune system.
3- People with under nutrition 3 times mores at risk.
4- Alcohol user.
5-Smoking.

TB diagnosed

- Chest X-ray.
- Sputum test.

Tuberculosis complications

1. Spine pain where back pain and stiffness appear.
2. Joint damage;
3. Swelling of the membranes covering the brain, causing meningitis.
4. Liver or kidney problems.
5. Heart disorders;

Treatment

Antibiotics(Qroup1 INH, Rifampicin, Pyrazinadmide), Qroup2(Para amino salicylic, Ciprofloxacin, Amikacin)

The treatment protocol is from six to twelve months, taking into account the periodic examination of **liver function**.

Prevention

1- BCG Vaccine
2- Personal hygiene.
3- Environment sanitation.
4- Isolation of patient.
5- Ventilation.
6- Promote for breast feeding.

Tetanus

Tetanus is a dangerous disease caused by a bacteria called clostridium tetani that surrounds itself with a sheath called spores, which gives it resistance to heat, drought, and many sterilizers so that the spores can withstand boiling for 15 minutes.

These spores are found everywhere in the environment, whether they are in the soil, in fertilizers or in animal droppings, in almost everything that surrounds us.

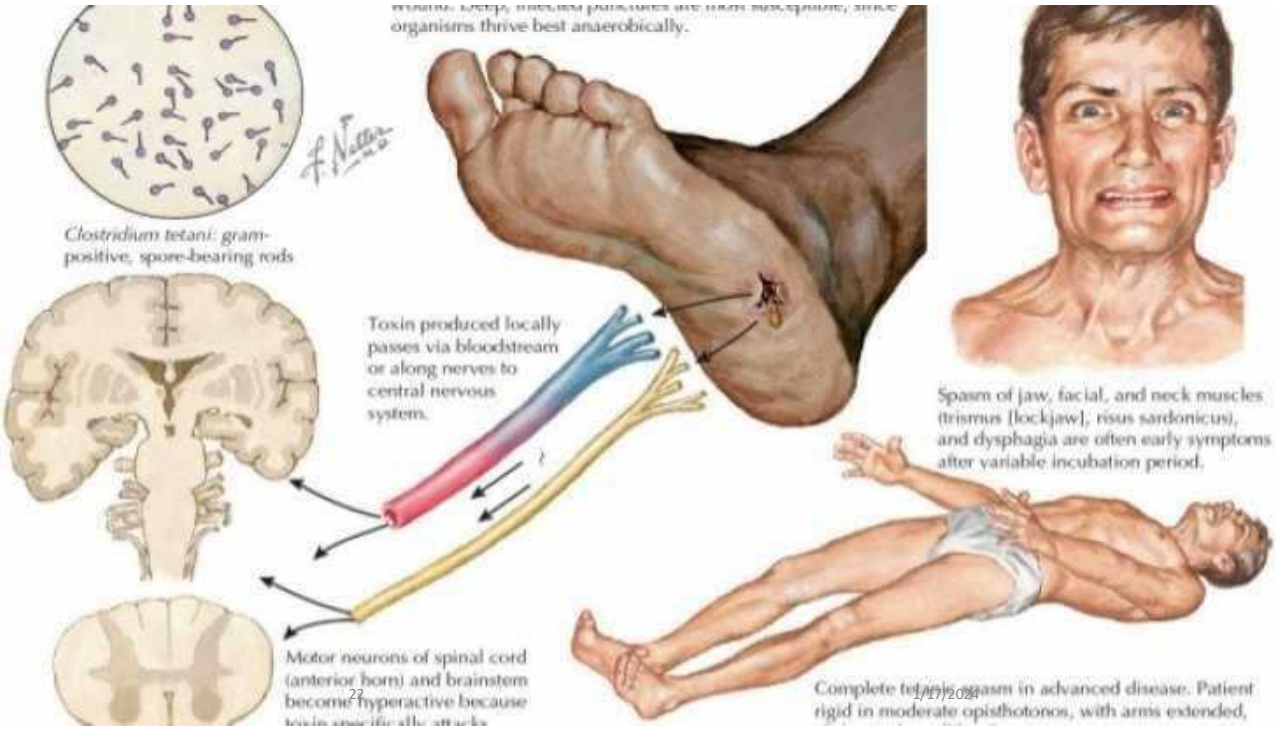
These germs live for a long time outside the human body

How does the injury happen?

For example, when you get a foot injury with an old nail, this area are far from the heart, the wound is poorly ventilated because the tetanus bacteria are anaerobic. These germs enter the human body and activate and begin to spread toxins.

It is one of the most dangerous types of toxins called tetanospasmin, and this poison is responsible for contractions of the muscles of the entire in addition to the pain that occurs with these spasms. body to the extent that it may lead to **fractions and dislocation** of bones,

This toxin travels from the affected area to the spinal cord of the affected person and binds to the nervous system and initiates symptoms. All this is done **within 2-14 days**.

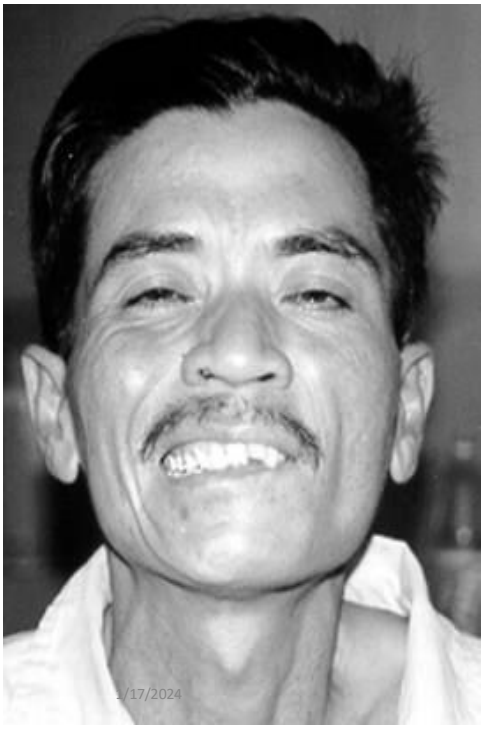


Types of tetanus:

1-Generalized tetanus:

It is a full body muscle spasm.

2-Cephalic tetanus: This results from an external injury to the head, and most often only the **seven nerves** are injured.
It can turn into a generalized tetanus.



3-Localized tetanus: That is, it affects one muscle or a group of muscles in one part of the body.

4-Neonatal tetanus: Tetanus infection occurs during childbirth, due to non-sterilization of surgical instruments. Or not take the tetanus vaccine during pregnancy.90% of children die, but the rest live with permanent disability.

Tetanus cases have developed from the following:

1. Puncture wounds — including from splinters, body piercings, tattoos and injection drugs
2. Gunshot wounds
3. Compound fractures
4. Burns
5. Surgical wounds
6. Injection drug use
7. Animal or insect bites
8. Infected foot ulcers
9. Dental infections
10. Infected umbilical stumps in newborns born of inadequately vaccinated mothers

Symptoms

1. Spasms and stiffness in your jaw muscles.
2. Stiffness of neck muscles
3. Difficulty swallowing
4. Stiffness of abdominal muscles
5. Painful body spasms lasting for several minutes, typically triggered by minor occurrences, such as a draft, loud noise, physical touch or light

Others Symptoms

Possible other signs and symptoms include:

1. Fever
2. Sweating
3. Rapid heart rate

Complications

1. Breathing difficulties
2. A lung artery blockage (pulmonary embolism)
3. Pneumonia
4. Bone fractures
5. Death

Lecture 12

Type of bacteria(surgical microbiology)

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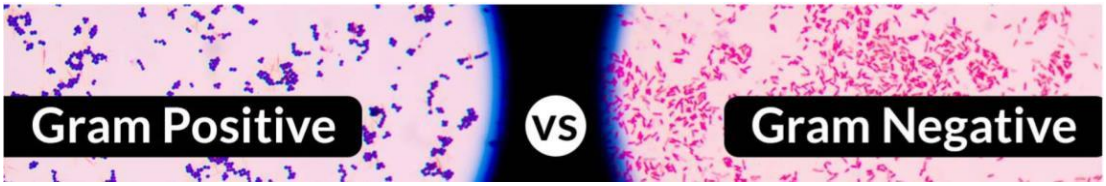
Type of bacteria(surgical microbiology)

Bacteria

- Bacteria are very small (usually single-cell) organisms. They are one of the first life forms to exist on Earth and have been around for approximately three billion years. Various sources suggest there may be as many as one trillion species – although the vast majority of these have not yet been discovered. Most individual bacterial cells – an individual 'bacterium' – are too small to be seen with the human eye. Although, the colonies they form are visible.



Gram-positive and Gram-negative bacteria

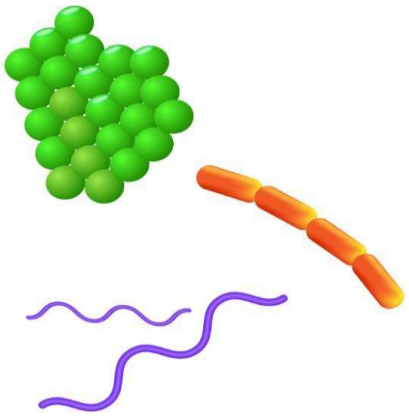
Bacteria are either classified as Gram-positive or Gram-negative. Their classification is based on the outcome of a test called the 'Gram stain'. This test is named after the inventor Danish scientist Hans Christian Gram (1853–1938). The cells are stained with a purple dye ('crystal violet'), which only binds to a substance called peptidoglycan. The cells are then rinsed, and stained with a red dye (safranin). If the cells take on the purple colour, they are considered to be 'Gram positive', and have a high proportion of peptidoglycan in their cell wall. If the cells take on the red colour, they are 'Gram negative'.

Gram positive examples

- *Streptococcus*
- *Staphylococcus*
- *Clostridium botulinum*

Gram negative examples

- *Cholera*
- *Gonorrhea*
- *Escherichia coli (E. coli)*
- *Pseudomonas aeruginosa*
- *Acinetobacter baumannii*

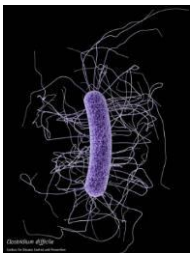


Different shapes of bacteria

- There are three primary shapes: spheres, rods and spirals. In some cases, you can tell the shape of the bacteria from the name: round often have ‘coccus’ in the name, rods ‘bacillus’, and spirals ‘spirillum’. The way that round bacteria join together as a colony can also be used to categorise them.

Treatment

The type of bacteria causing an infection will usually influence the type of treatment given. Find out more about antibiotics, and about multidrug-resistant 'superbugs', which are very difficult to treat.



Surgical microbiology

They are microorganisms such as **parasites, viruses, fungi**, or bacterial infections.

Patients who have undergone surgical procedures may become infected from the **first to the 30th** day after the operation.

Type of Bactria

1. **Aerobic** organisms require oxygen for survival. Examples include: Bacillus anthracis, which causes **anthrax**.
2. **Anaerobic** organisms do not need oxygen to survive. Examples include:

Clostridium perfringens, the most common cause of **gas gangrene.**

How does infection occur after surgery?

Post-operative infection is very possible, and the patient is exposed to stages through the surgical operation, which is the final solution for treatment, whether it is emergency, elective or plastic surgery.

Infection varies from **patient to patient** according to **the type of operation**, the **length of the operation**, the **operation environment**, and the care of the **wound site before and after the operation.**

Common Causes of Surgical Site Infection

1. The use of **insufficiently-sterilized tools** and supplies.
2. Unsterile surgical environment.
3. Poor preparation of surgical instruments **and few of surgeons**.
4. Inadequate **ventilation of the operating room**.
5. Insufficient **cleaning of surgical site.**
6. Poor post-surgery care. Daily sterilization and dressing change, no more **than 48 hours**.
7. The patient is **discharged early** from the hospital after the surgery.
8. **Prolonged duration** of surgery.
9. **Antibiotic-resistant** bacteria.

Risk Factors

- Age (very young or very old)
- Diabetes
- Nicotine use
- Steroid use
- Compromised immune system (HIV, AIDS, etc.)
- Obesity
- Poor circulation
- Poor nutritional status

Symptoms of infection after surgery

1. Redness and swelling at the incision site.

2. Fever.

3- Drainage of yellow or cloudy pus from the incision site.

Preventing infections

-Before surgery:

1. Wash with an antiseptic cleanser from your before you head to the hospital.
2. Don't shave, as shaving irritates your skin and can introduce infection under your skin.
3. Quit smoking before you have surgery, as smokers develop more infections Trusted Source. Quitting can be very difficult, but it's possible. Speak to a doctor, who can help you develop a quit smoking plan that's right for you.

Preventing infections

-After your surgery:

1. Maintain the sterile dressing that your surgeon applies to your wound for at least **48 hours**.
2. Take preventive antibiotics, if prescribed.
3. Make sure patient **understand** how to take care of **wound**, asking questions if patient need **clarification**.
4. Always **wash your hands** with soap and water before touching your wound and ask anyone who may assist in your **care to do the same**.
5. The patient should know in the event of infection of his wound through the signs to refer to the **hospital, the surgeon or the nurse** to evaluate the wound.

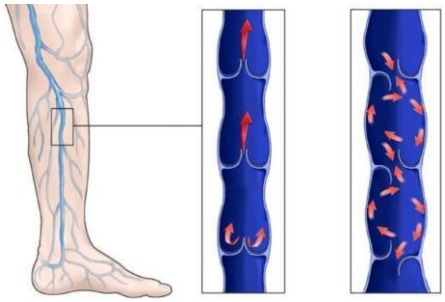
Lecture 13

Venous Disease –Thrombophlebitis And Venus Thrombosis

Venous Disease –Thrombophlebitis And Venus Thrombosis

Venous disease

Venous disease is any condition that affects the veins in body. Veins are flexible, hollow tubes that are part of the circulatory system that moves blood through your body. Veins bring oxygen-poor blood back to heart, which pumps your blood. Arteries carry oxygen-rich blood away from heart.



What is venous disease?

- Veins have flaps (valves) inside that open when your muscles contract. This allows blood to move through your veins. When your muscles relax, the valves close, keeping blood flowing in one direction.

- If venous disease damages the valves inside your veins, the valves may not close completely. This lets blood leak backward or flow in both directions.

Types of venous disease

- **Blood clots:** These can happen in your legs, arms, veins of your internal organs (kidney, spleen, intestines, liver and pelvic organs), in your brain (cerebral vein thrombosis), in your kidneys (renal vein thrombosis), or in your lungs (pulmonary embolism).
- **Deep vein thrombosis (DVT):** This is a blood clot that occurs in a deep vein (including arms and legs). Deep vein thrombosis itself isn't life-threatening. However, the blood clot has the potential to break free and travel through the bloodstream, where it can stick in your lung's blood vessels and become a pulmonary embolism. This can be a life-threatening condition.

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- **Superficial thrombophlebitis:** This is a blood clot that develops in a vein close to the surface of your skin. These types of blood clots don't usually travel to your lungs unless they move from your superficial system into your deep venous system first. Typically, however, they cause pain.
- **Chronic venous insufficiency:** This condition causes pooling of blood, chronic leg swelling, increased pressure, increased pigmentation or discoloration of your skin, and leg ulcers known as venous stasis ulcers.
- **Varicose and spider veins:** These are abnormal, dilated blood vessels that happen because of weakening in your blood vessel wall.

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- **Venous ulcers:** Ulcers are wounds or open sores that won't heal or keep returning. Venous stasis ulcers most commonly occur below your knee, on the inner part of your leg, just above your ankle.
- **Arteriovenous fistulas:** These are arteries and veins that connect to each other directly, with nothing in between. This is abnormal.

Symptoms

- Pain, cramping or discomfort.
- Redness or warmth.
- Heaviness.
- Itching or burning feeling.
- Swelling.
- Bulging veins.

Causes

- Issues with how your veins formed when you were born.
- Injury.
- Other venous diseases.
- Weak blood vessel walls because of pregnancy, aging, cysts or tumors.
- High blood pressure.

What are the risk factors for venous disease?

- Family history of venous disease.
- Pregnancy.
- Having a BMI (body mass index) greater than 30.
- Being a woman or assigned female at birth (AFAB).
- Sitting or standing for long periods of time.
- Taking birth control pills or hormone replacement therapy.
- Using tobacco products.

What are the complications of venous disease?

- Superficial thrombophlebitis: Deep vein thrombosis.
- Deep vein thrombosis: Chronic venous insufficiency or pulmonary embolism.
- Pulmonary embolism: Pulmonary hypertension.
- Varicose veins: Superficial thrombophlebitis or venous ulcers.
- Venous ulcers: Infections, like gangrene.

How is venous disease treated?

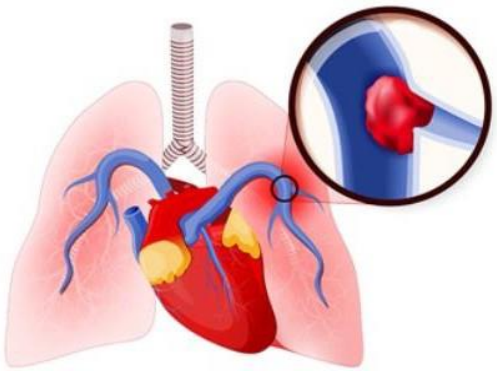
- Medications.
- Compression stockings or bandages.
- Lifestyles changes, such as eating foods with less fat, exercising more and giving up tobacco products.
- Procedures or surgeries.

Venous disease treatment may include:

- Anticoagulants.
- Endo venous ablation of varicose veins (with lasers, sclerotherapy or radiofrequency).
- Thrombectomy.
- Vena cava filter.
- Vein surgery.

symptoms of a pulmonary embolism, such as:

- Shortness of breath.
- Chest pain.
- Fast heartbeat.
- Cough.
- Bluish skin.



Thrombophlebitis

- Thrombophlebitis is swelling (inflammation) of a vein. A blood clot (thrombus) in the vein can cause this swelling.

Causes

- Pregnancy
- Obesity
- Recent surgery (most commonly hip, knee, or female pelvic surgery)
- Too many blood cells being made by the bone marrow, causing the blood to be thicker than normal (polycythemia vera)
- Having an indwelling (long-term) catheter in a blood vessel

Blood is more likely to clot in someone who has certain problems or disorders, such as:

- Cancer
- Certain autoimmune disorders, such as lupus
- Cigarette smoking
- Conditions that make it more likely to develop blood clots
- Taking estrogens or birth control pills (this risk is even higher with smoking)

Symptoms

- Swelling in the part of the body affected
- Pain in the part of the body affected
- Skin redness (not always present)
- Warmth and tenderness over the vein

Exams and Tests

- Blood coagulation studies
- Doppler ultrasound
- Venography
- Genetic testing

Possible Complications

- Blood clot in the lungs (pulmonary embolism)
- Chronic pain
- Swelling in the leg

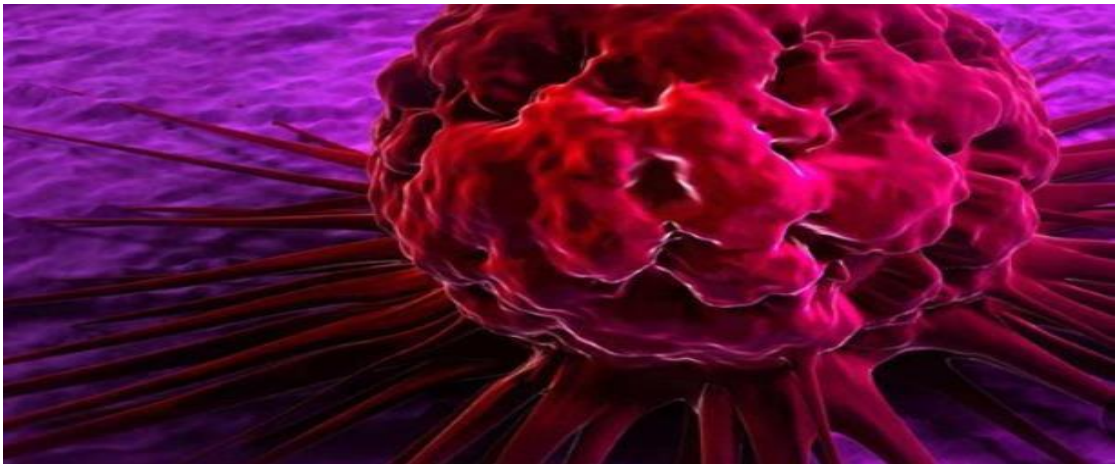
Venus Thrombosis

- is a condition that occurs when a blood clot forms in a vein. VTE includes deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT occurs when a blood clot forms in a deep veins , usually in the lower leg, thigh, or pelvis. DVTs can also occur in the arms, especially if there is a large intravenous central line in the vein.
- The risk of developing VTE is highest after major surgery, major injury, or during periods of infection and inflammation. This is because blood clots can develop in veins damaged by surgery or injury. Lack of movement after surgery or while traveling long distances can raise the likelihood of blood clotting. Inflammation and serious infection also raise the likelihood of blood clots. Swelling, redness, and pain are some of the symptoms of DVT. A pulmonary embolism can cause sudden chest pain and shortness of breath.

Lecture 14

Oncology

Oncology



How long has cancer existed for?

- Some of the earliest evidence of cancer is found among fossilized bone tumors, human mummies in ancient Egypt, and ancient manuscripts. Abnormalities suggestive of the bone cancer called osteosarcoma have been seen in mummies.

- Among manuscripts the first known description of cancer is seen in the Edwin Smith Papyrus and is a copy of part of an ancient Egyptian textbook on trauma surgery. It describes 8 cases of tumors or ulcers of the breast that were treated by cauterization with a tool called the fire drill. It dates back to about 3000 BC. The papyrus describes the condition as “incurable”

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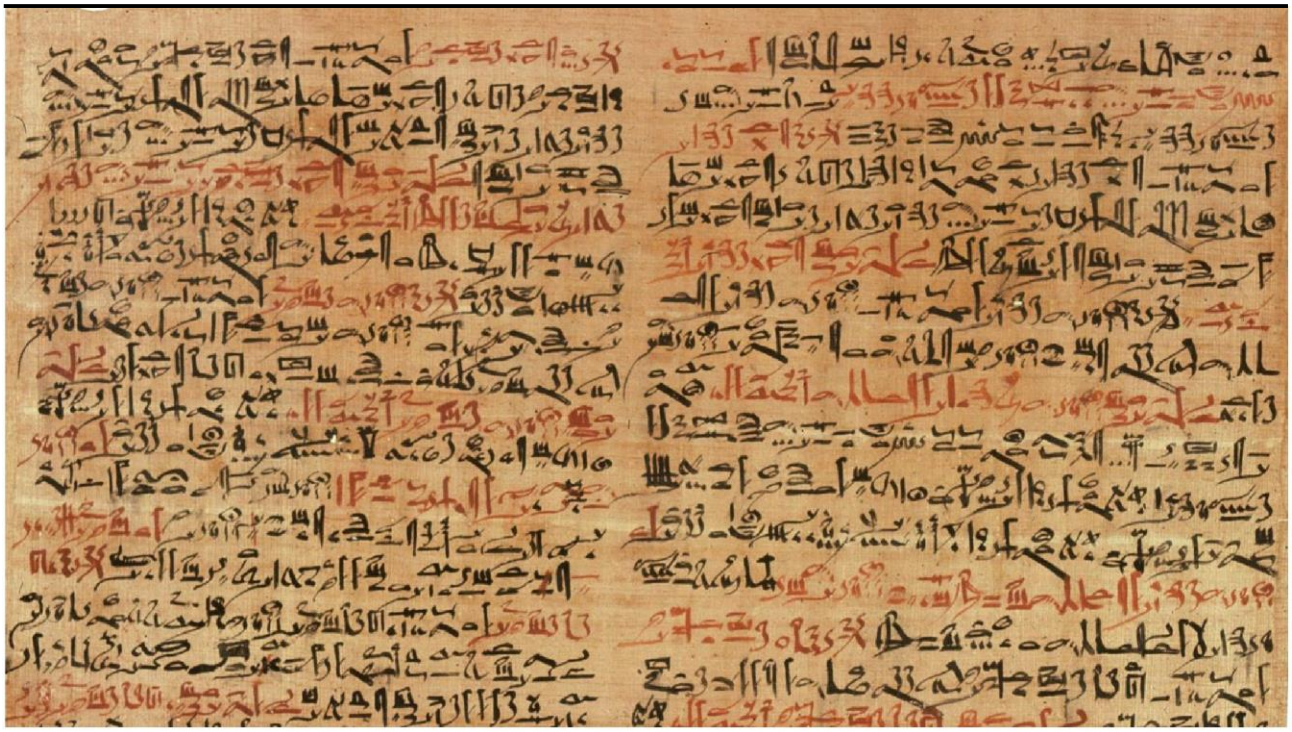
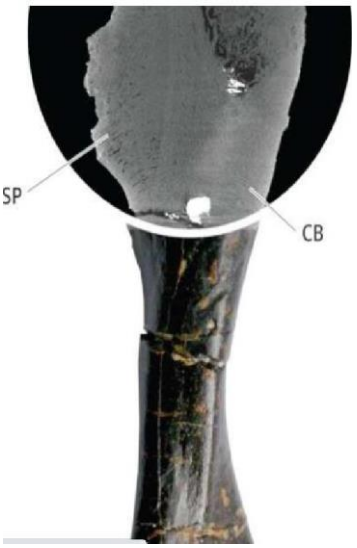


Bone cancer found in 240-million-year-old stem-turtle fossil

by Bob Yirka , Phys.org



Oncology

Oncology is a sub-specialty of medicine dedicated to the investigation, diagnosis and treatment of people with cancer or suspected cancer. It includes:

- preventative medicine
- medical oncology (chemotherapy, immunotherapy, hormone therapy and other drugs to treat cancer)
- radiation oncology (radiation therapy to treat cancer)
- surgical oncology (surgery to treat cancer), and
- palliative medicine.

Oncology

Each of the cells of the body have a tightly regulated system that controls their growth, maturity, reproduction and eventual death. Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells.

Overview

- Cancer refers to any one of a large number of diseases characterized by the development of abnormal cells that divide uncontrollably and have the ability to infiltrate and destroy normal body tissue. Cancer often has the ability to spread throughout your body.

- Cancer is the second-leading cause of death in the world. But survival rates are improving for many types of cancer, thanks to improvements in cancer screening, treatment and prevention.

Symptoms

- Fatigue
- Lump or area of thickening that can be felt under the skin
- Weight changes, including unintended loss or gain
- Skin changes, such as yellowing, darkening or redness of the skin, sores that won't heal, or changes to existing moles
- Changes in bowel or bladder habits

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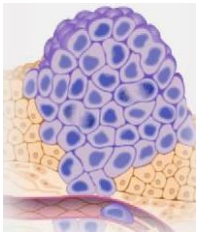
- Persistent cough or trouble breathing
- Difficulty swallowing
- Hoarseness
- Persistent indigestion or discomfort after eating
- Persistent, unexplained muscle or joint pain
- Persistent, unexplained fevers or night sweats
- Unexplained bleeding or bruising

Causes

Cancer is caused by changes (mutations) to the DNA within cells. The DNA inside a cell is packaged into a large number of individual genes, each of which contains a set of instructions telling the cell what functions to perform, as well as how to grow and divide. Errors in the instructions can cause the cell to stop its normal function and may allow a cell to become cancerous.



Risk factors

- Your age

Cancer can take decades to develop. That's why most people diagnosed with cancer are 65 or older. While it's more common in older adults, cancer isn't exclusively an adult disease — cancer can be diagnosed at any age.

- Your habits

Certain lifestyle choices are known to increase your risk of cancer. Smoking, drinking more than one drink a day for women and up to two drinks a day for men, excessive exposure to the sun or frequent blistering sunburns, being obese, and having unsafe sex can contribute to cancer.

family history

- Only a small portion of cancers are due to an inherited condition. If cancer is common in your family, it's possible that mutations are being passed from one generation to the next. You might be a candidate for genetic testing to see whether you have inherited mutations that might increase your risk of certain cancers. Keep in mind that having an inherited genetic mutation doesn't necessarily mean you'll get cancer.

Health Conditions

- Some chronic health conditions, such as ulcerative colitis, can markedly increase your risk of developing certain cancers. Talk to your doctor about your risk.

Complications

- **Pain**. Pain can be caused by cancer or by cancer treatment, though not all cancer is painful. Medications and other approaches can effectively treat cancer-related pain.
- **Fatigue**. Fatigue in people with cancer has many causes, but it can often be managed. Fatigue associated with chemotherapy or radiation therapy treatments is common, but it's usually temporary.
- **Difficulty breathing**. Cancer or cancer treatment may cause a feeling of being short of breath. Treatments may bring relief.

- **Nausea**. Certain cancers and cancer treatments can cause nausea. Your doctor can sometimes predict if your treatment is likely to cause nausea. Medications and other treatments may help you prevent or decrease nausea.
- **Diarrhea or constipation**. Cancer and cancer treatment can affect your bowels and cause diarrhea or constipation.

- **Weight loss**. Cancer and cancer treatment may cause weight loss. Cancer steals food from normal cells and deprives them of nutrients. This is often not affected by how many calories or what kind of food is eaten; it's difficult to treat. In most cases, using artificial nutrition through tubes into the stomach or vein does not help change the weight loss.

Prevention

- **Stop smoking.**
- **Avoid excessive sun exposure.**
- **Eat a healthy diet.**
- **Exercise most days of the week.**
- **Maintain a healthy weight.**
- **Schedule cancer screening exams.**
- **Ask your doctor about immunizations.**

Lecture 15

Abortion, CS and Hysterectomy

Abortion, CS and Hysterectomy

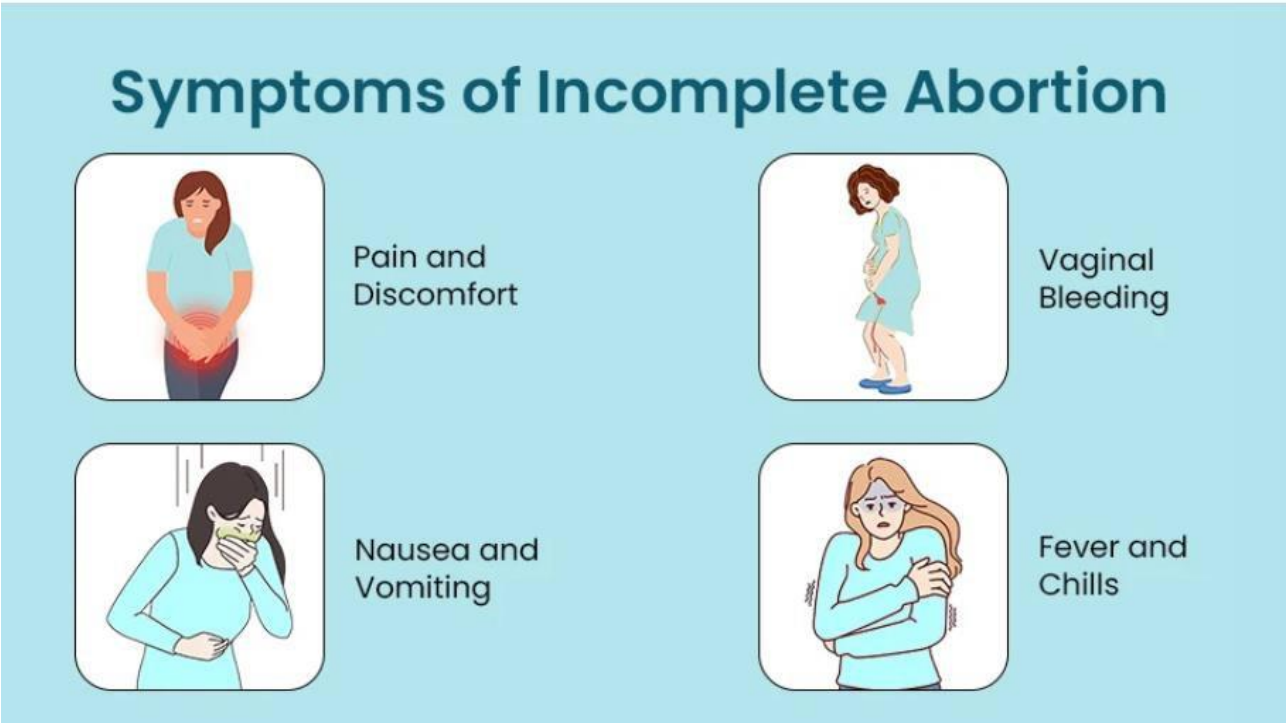
Abortion is the termination of a pregnancy by removal or expulsion of an embryo or fetus. An abortion that occurs without intervention is known as a miscarriage or "spontaneous abortion"; these occur in approximately 30% to 40% of all pregnancies

Symptoms

Lower abdominal pain, Heavy vaginal bleeding with clots

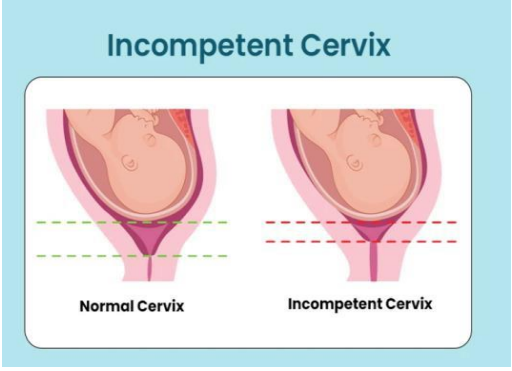
Causes

Incompetent cervix, Uterine Anomalies, Hormonal Imbalance, Unsafe Abortion

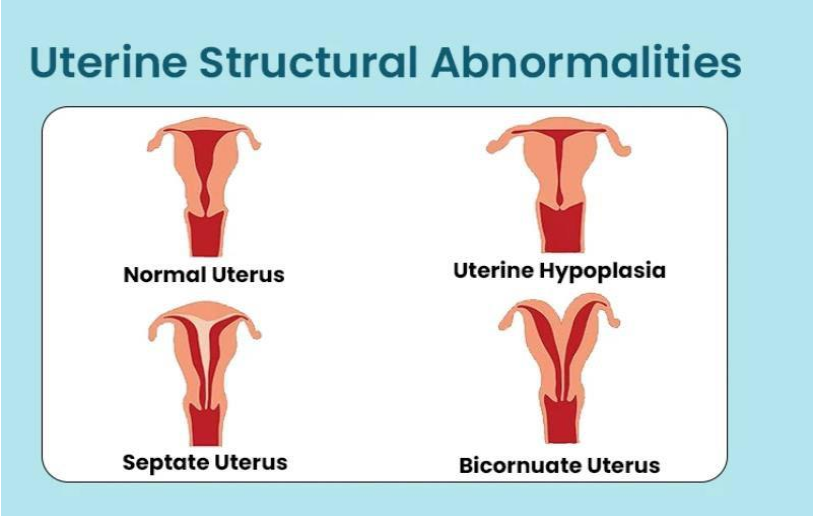


Incomplete Abortion Causes

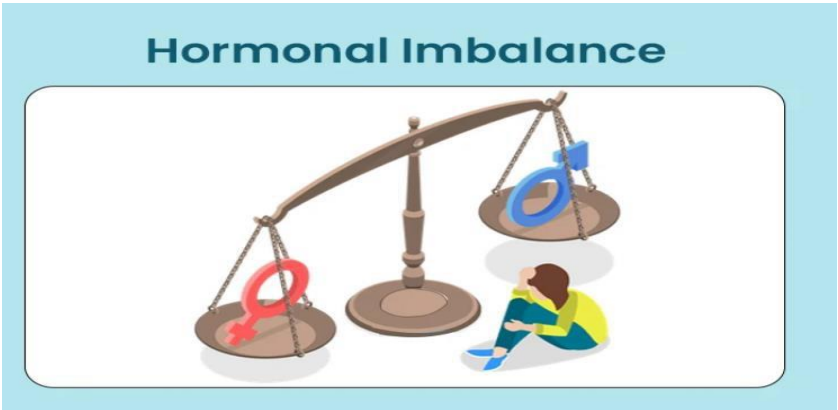
- **Incompetent Cervix:** A condition in which weak cervical tissue causes premature birth or loss of a healthy pregnancy. A weak cervix is a condition where there's a structural issue with your cervix.



Structural Abnormalities: Structural abnormalities can hinder the complete expulsion of pregnancy tissue.

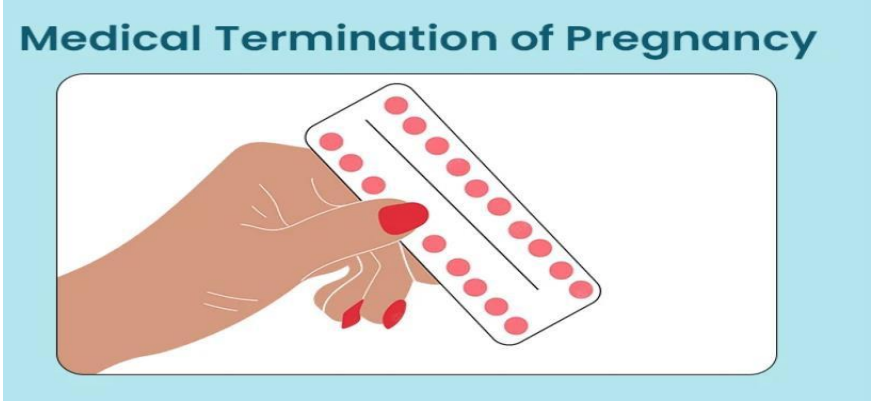


- **Hormonal Imbalance:** Hormonal imbalances, such as low levels of progesterone, can lead to incomplete abortion. Progesterone is a hormone that helps maintain the uterine lining and support pregnancy. If progesterone levels are too low, the uterine lining may not be able to support the pregnancy, leading to incomplete abortion.



Unsafe Abortion / Illegal Abortion: Illegal medical abortions without proper medical professionals' supervision can lead to incomplete abortion.

- **Medical Termination of Pregnancy:** According to a study done by the National Library of Medicine (NLB), the Medical method of abortion (MMA) is a safe, efficient, and affordable method of abortion. However, incomplete abortion is a known side effect.



Incomplete Abortion Risk Factors

Poor Healthcare Facility

Molar Pregnancy

Lack of Medical Care

Old Age Pregnancy

Smoke and Alcohol

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Surgery Simplifi

Prevention of Incomplete Abortion

Prenatal Care

Timely Ultrasound

Spotting Early Signs

Avoid Harmful Rays

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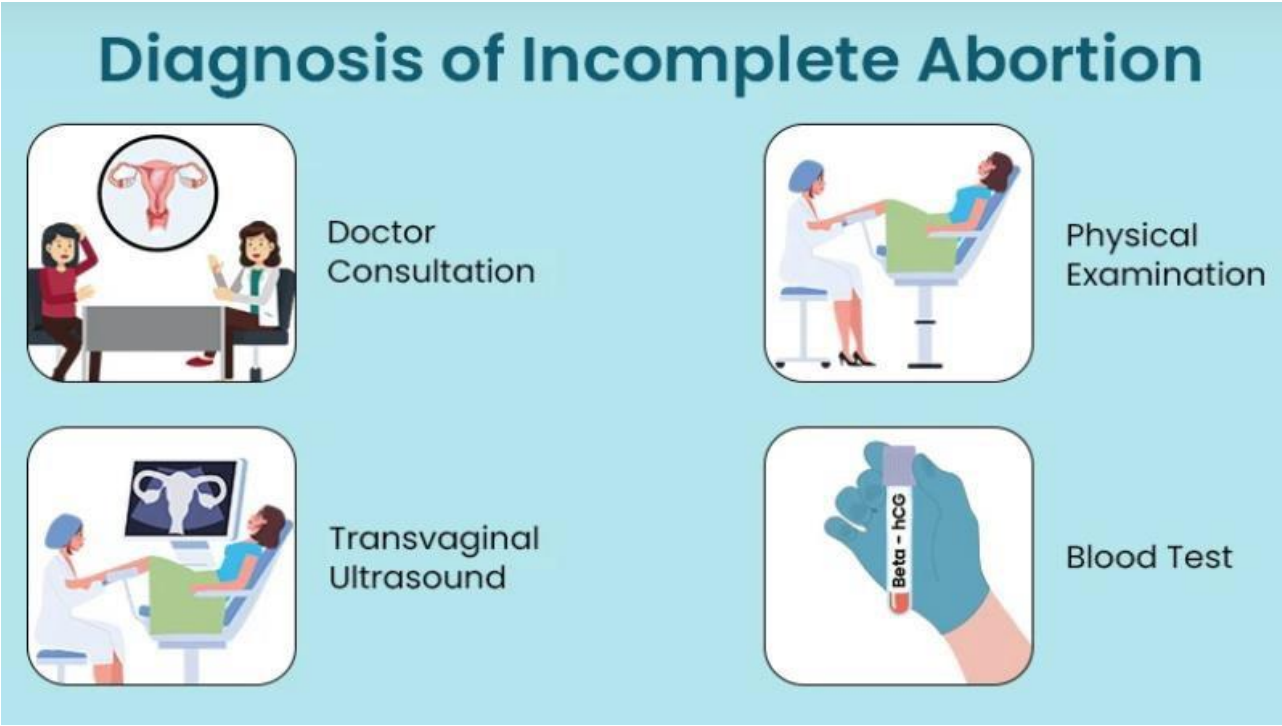
Surgery Simplified

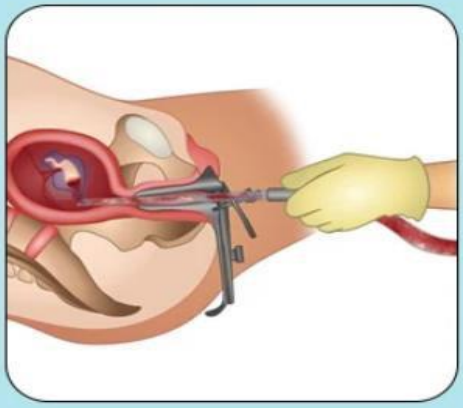


Surgical Treatment for Incomplete Abortion

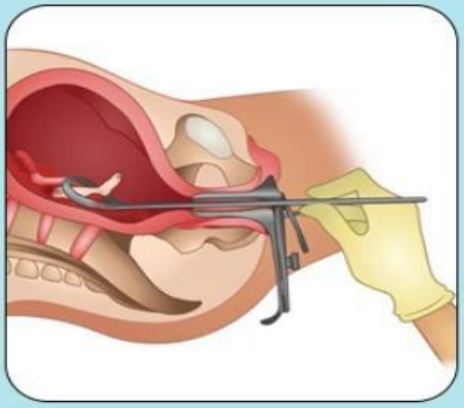
- **Vacuum Aspiration:** Vacuum aspiration, also known as suction aspiration or suction curettage, is a common method used to remove pregnancy tissue from the uterus during an abortion or following a miscarriage. Vacuum aspiration is generally a quick procedure that is performed on an outpatient basis. The actual duration may vary, but it typically takes around 5 to 10 minutes.

- **Dilation and Curettage (D and C):** The D and C procedure is used to treat incomplete abortion and is also used as a prevention method to stop heavy bleeding.

Surgical Treatment



Vacuum Aspiration



D & C

Risks of Incomplete Abortion

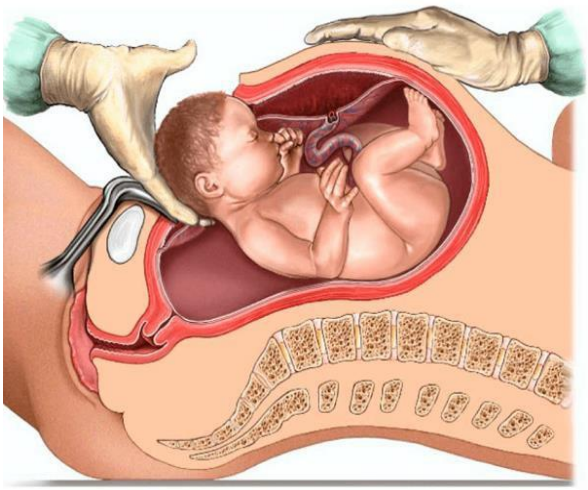
Heavy Bleeding

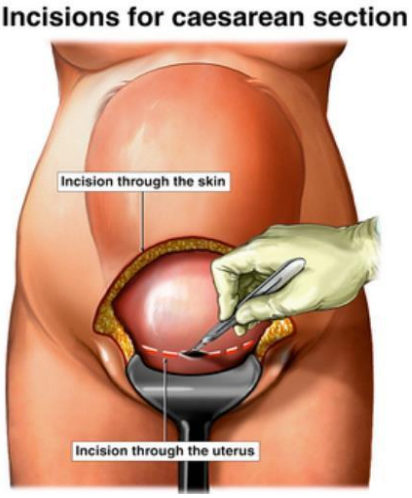
Infection in Uterus

Cramps

Scarring in Uterus

Caesarean section





What is caesarean birth (C-section)?

A caesarean section (C-section or caesarean) is an operation to deliver a baby through a cut in the abdomen (tummy) and uterus (womb).

Team of C S

- obstetrician — doctor who performs the operation and delivers the baby
- anaesthetist — doctor who administers the anaesthetic
- scrub nurse — passes instruments to the obstetrician
- scout nurse — assists the scrub nurse
- anaesthetic nurse — assists the anaesthetist
- paediatrician — doctor who looks after the baby after the birth
- midwife — nurse who looks after the baby until you return to the ward
- theatre technician — looks after the operating theatre and helps you on and off the table

Anesthesia

- **Epidural**

When you get an epidural, you receive a local anaesthetic then a hollow needle and a small, flexible tube (catheter) are inserted near the spinal cord in your back. The needle is removed, leaving the catheter in place. Anaesthetic medicine is injected through the catheter and can be topped up later.

- **Spinal block**

Similar to an epidural, a spinal block injects a single dose of anaesthetic directly into the fluid around the spinal cord. You will go numb very quickly, but the amount of anaesthetic cannot be topped up.

General anaesthetic

- a spinal block or epidural anaesthetic doesn't work
- there isn't time for a spinal block or epidural anaesthetic to be used
- there are concerns for your health or your baby's health
- you request a general anaesthetic

What are the risks and complications of C-sections?

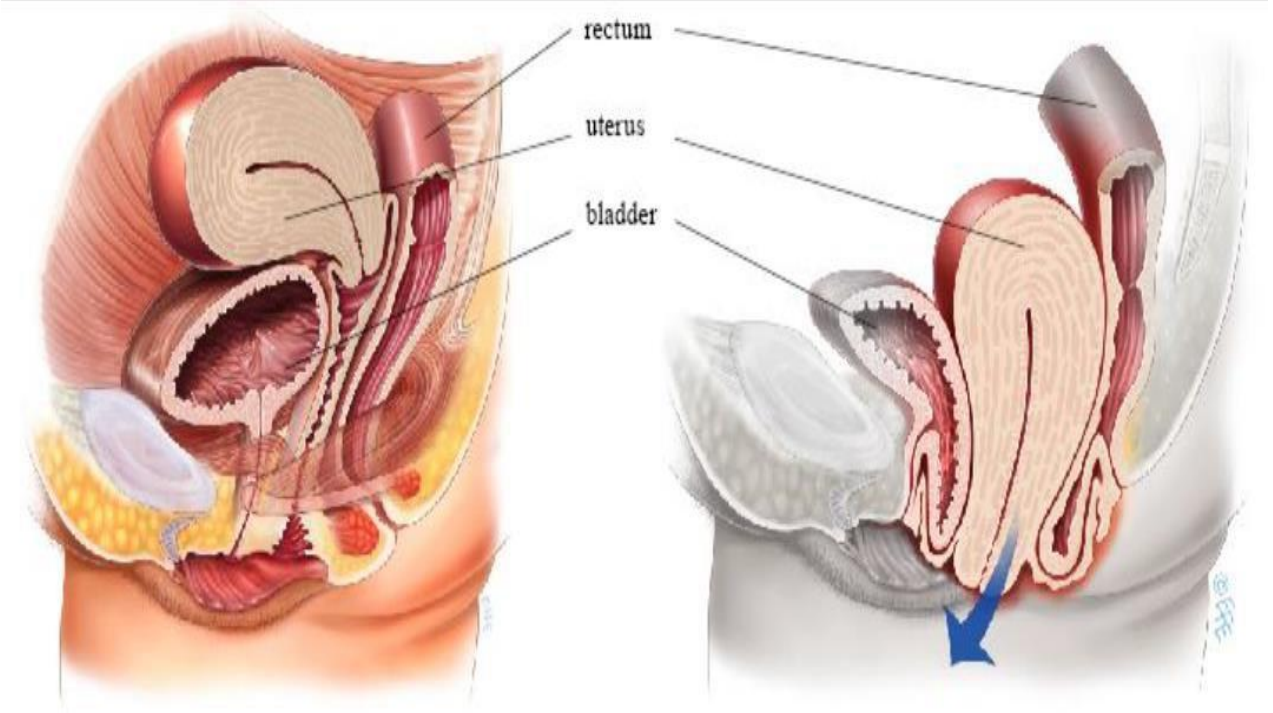
- Blood loss
- Wound infection
- Blood clots
- Possible damage to organs near the operation site, such as your bladder
- Risks from the anaesthetic

Hysterectomy

A hysterectomy is the surgical removal of the uterus, and most likely, the cervix. Depending on the reason for the surgery, a hysterectomy may involve removing surrounding organs and tissues, such as the fallopian tubes and ovaries. The uterus is where a fetus grows during pregnancy. Its lining is the blood you shed during your menstrual period. You won't be able to get pregnant and you won't get your period after a hysterectomy.

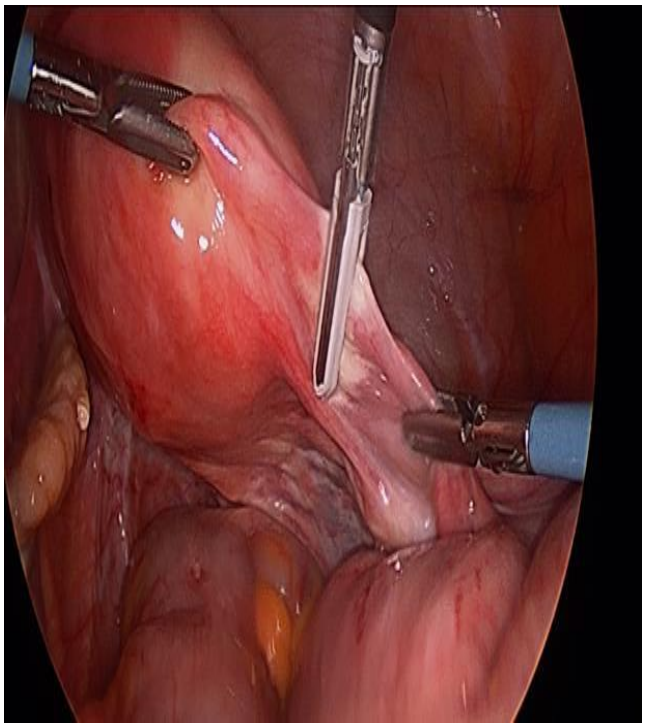
Vaginal hysterectomy

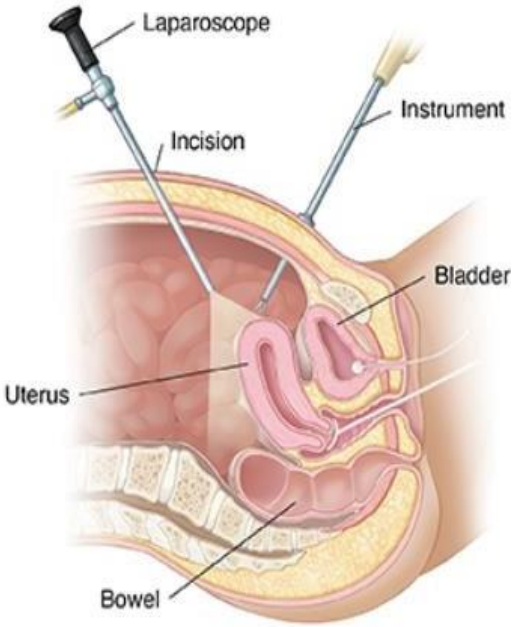
- Your uterus is removed through an incision at the top of your vagina. There isn't an external incision.
- Dissolvable stitches are placed inside your vagina.
- Most commonly used in cases of uterine prolapse and other nonmalignant (or noncancerous) conditions.
- Fewest complications and fastest recovery (up to four weeks) and considered the preferred approach.
- People often go home on the same day of surgery.



Laparoscopic hysterectomy

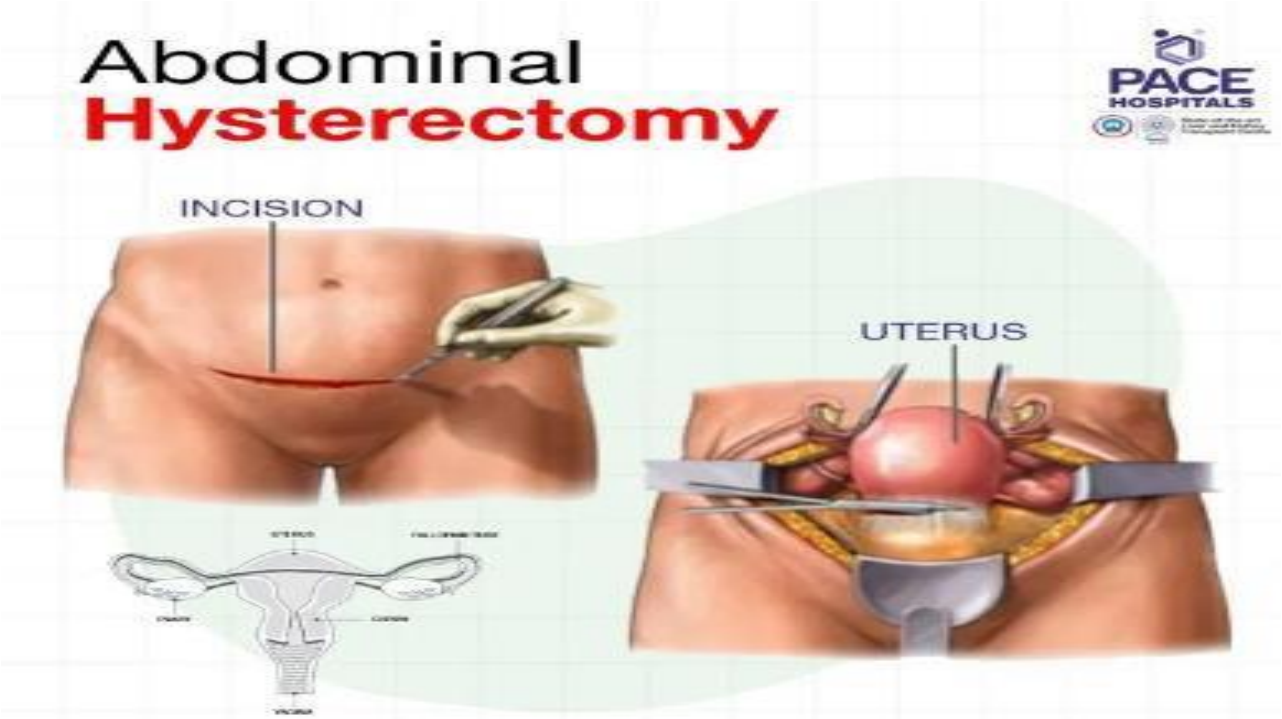
- A laparoscope (a thin tube with a video camera on the end) is inserted in your lower abdomen through a small incision in your belly button.
- Surgical tools are inserted through several other small incisions.
- Your uterus can be removed in small pieces through the incisions in your abdomen or through your vagina.
- Some people go home the same day or after one night in the hospital.
- Full recovery is shorter and less painful than an abdominal hysterectomy.





Abdominal hysterectomy

- Your uterus is removed through a six- to eight-inch-long incision in your abdomen.
- The incision is made either from your belly button to your pubic bone or across the top of your public hairline. The surgeon will use stitches or staples to close the incision.
- Most commonly used when cancer is involved, when the uterus is enlarged or when disease spreads to other pelvic areas.
- It generally requires a longer hospital stay (two or three days) and a longer recovery time.



What are the most common side effects of a hysterectomy?

- Hot flashes.
- Vaginal dryness.
- Loss of libido.
- Difficulty sleeping (insomnia).

What are the advantages of having a hysterectomy?

Having a hysterectomy can help live a more enjoyable life, especially if have constant pelvic pain or heavy and irregular bleeding. If are at a higher risk of uterine cancer, a hysterectomy can lower this risk and potentially be life-saving.

What are the disadvantages of having a hysterectomy?

A hysterectomy is a major surgery with a long recovery. It comes with risks and side effects and is permanent. Depending on the type of surgery have, can go into menopause or experience symptoms of menopause. Also won't be able to become pregnant after the procedure.

What are the complications of a hysterectomy?

- Blood clots.
- Severe infection.
- Bleeding.
- Bowel blockage.
- Torn internal stitches.
- Urinary tract injury.
- Risk related to anesthesia.

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