

ITEC PATHOLOGY ASSIGNMENT

On 11 body systems & 22 less common pathologies



Image courtesy NASA/JPL-Caltech.

by Tina Jensen Friis

student no. D72878 • at Devon Academy college no. 22061 • 10/11/2009

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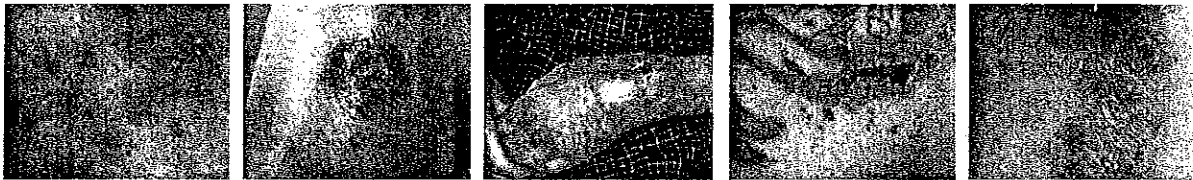
MRSA

A less common pathology of the skin system.

MRSA - Methicillin resistant *Staphylococcus aureus* affecting *Homo sapiens*

Description

Staphylococcus aureus is a skin bacterium that approx. 20-30% of healthy people carry. Excessive use of penicillin antibiotics has led to stronger strains, no longer killed by antibiotics, such as Methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA occur most frequently among persons with weakened immune systems. MRSA in healthy people are known as "community-associated" (CA)-MRSA. These are usually skin infections: abscesses, boils, pus-filled lesions.



Versions of MRSA

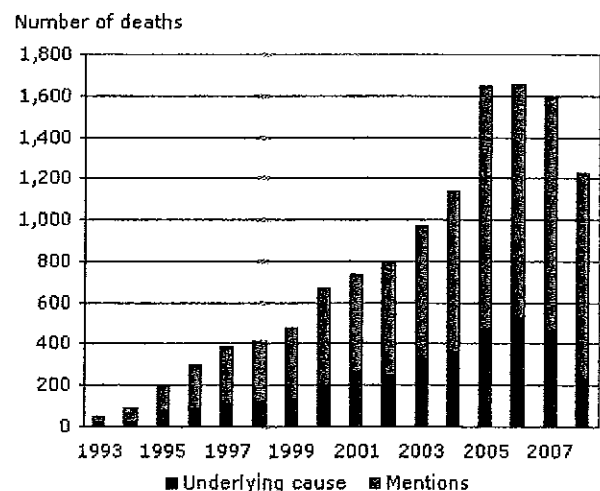
Signs & Symptoms

MRSA generally start as small red bumps that resemble pimples, boils or spider bites. These can feel warm and turn into deep, painful abscesses that require surgical draining. Sometimes the bacteria remain confined to the skin with swollen, red, tender skin lesions, but can also penetrate into the body, causing potentially life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves and lungs.

If you are diagnosed with a staph infection and you have minimal improvement in your symptoms after a few days, the infection may be a CA-MRSA infection. Signs that you may have a CA-MRSA infection include having the above symptoms coupled with:

1. Little to no improvement with antibiotics after 2-3 days
2. Rapid spread of the infection

It is rare for any staph infection to become life threatening in a healthy person. While resistant to penicillin and penicillin-related antibiotics, most MRSA infections can be successfully treated with many other antibiotics.



Number of death certificates mentioning *Staphylococcus aureus* by methicillin resistance, England and Wales

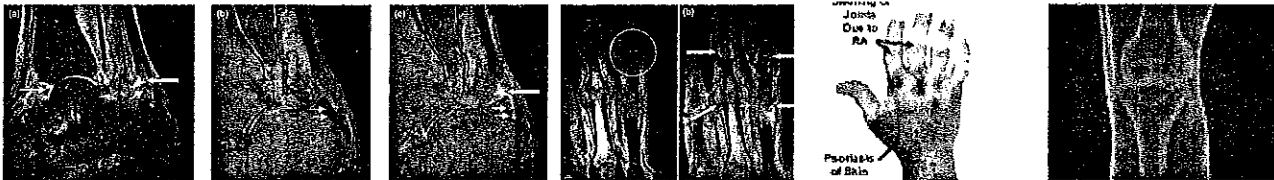
PSORIATIC ARTHRITIS

A less common pathology of the skeletal system.

Psoriatic Arthritis - an inflammatory joint disease associated with psoriasis affecting *Homo sapiens*

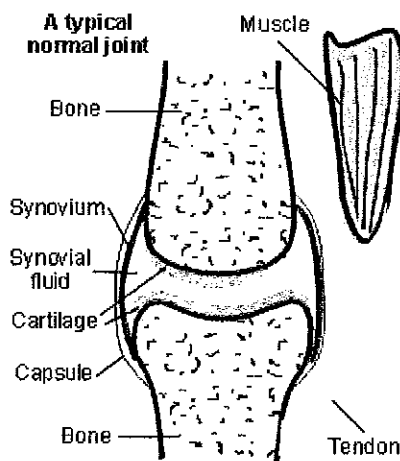
Description

Psoriatic arthritis is a chronic disease characterized by inflammation of the skin and joints. The cause of psoriatic arthritis is currently unknown. A combination of genetic and immune as well as environmental factors are likely involved. Five different types of psoriatic arthritis have been identified: Symmetric, Asymmetric, Arthritis mutilans, Spondylitis and Distal interphalangeal predominant.



Psoriatic Arthritis precedes the arthritis by months to years

Signs & Symptoms



The drawing shows a typical, normal joint. Inflammation develops in the synovium of affected joints (the tissue that surrounds each joint), sometimes also in tendons and ligaments. It is not clear what triggers the inflammation

The arthritis can involve knees, ankles and joints in the feet. A few joints are inflamed and become painful, swollen, hot, and red. Sometimes, joint inflammation in the fingers or toes can cause swelling of the entire digit, giving appearance of a "sausage." Joint stiffness is common, typically worse early in the morning. Psoriatic arthritis may involve many joints of the body in a symmetrical fashion.

Psoriatic arthritis can also cause spondylitis, causing pain and stiffness in the low back, buttocks, neck and upper back. Patients can also develop tendinitis and also inflammation around cartilage.

Inflammation of the tendon behind the heel causes Achilles tendinitis, leading to pain with walking and climbing stairs. Inflammation of the chest wall and of the cartilage that links the ribs to the sternum can cause chest pain. Psoriatic arthritis can cause inflammation in other organs, such as the eyes (Iritis), lungs (Pleuritis), and aorta (Aortitis).

Acne and nail changes are commonly seen in psoriatic arthritis. Pitting and ridges are seen in finger and toe nails of 80% of patients with psoriatic arthritis.

ACHILLES BURSITIS

A less common pathology of the muscular system.

Achilles Bursitis - an inflammation of either the deep retrocalcaneal bursa lying between the achilles tendon and the calcaneus affecting *Homo sapiens*

Description

Achilles tendon bursitis is a common foot pain in athletes, particularly runners. It can often be mistaken for Achilles tendinitis or can also occur in conjunction with Achilles tendinitis.



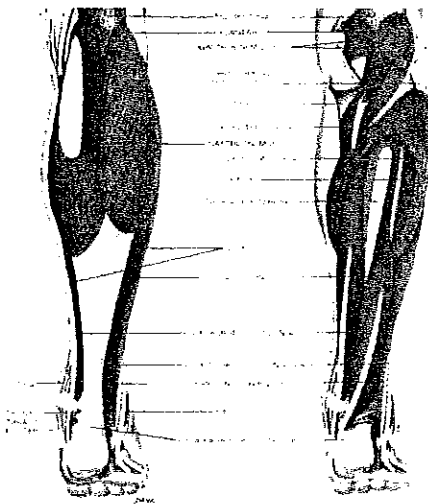
Achilles Bursitis causes pain around the calcaneus bone of the foot.

A bursa is a small sack of fluid between a tendon and a bone in the feet to help the tendon move smoothly over the bone. The retrocalcaneal bursa is situated in the feet between the Achilles tendon and the calcaneus. Repeated trauma of the bursa can cause an inflammation.

Signs & Symptoms

As you can see from below diagram, the Achilles tendon is located at the posterior of the bottom half of the lower leg.

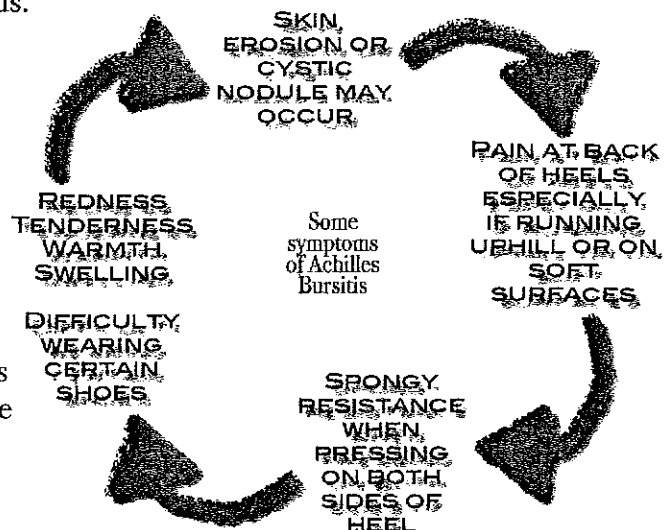
In the diagram it is represented by the thick band of connective fiber that runs from bottom of the Gastrocnemius muscle to the heel bone



Early symptoms may be limited to redness, pain, and warmth. Later, superficial skin erosion may occur. After months or longer and not treated, a fluctuant, tender, cystic nodule 1- to 3-cm in diameter can develop. It is red or flesh-colored. In chronic cases, the bursa becomes fibrotic. Bursitis causes pain and tenderness around the affected bone or tendon. In the case of the Achilles Bursitis the pain and tenderness will affect the foot area, particularly around calcaneus.

The bursa sacs may swell, often making movement difficult.

Some of the symptoms of Achilles Bursitis are shown in the diagram on the right.



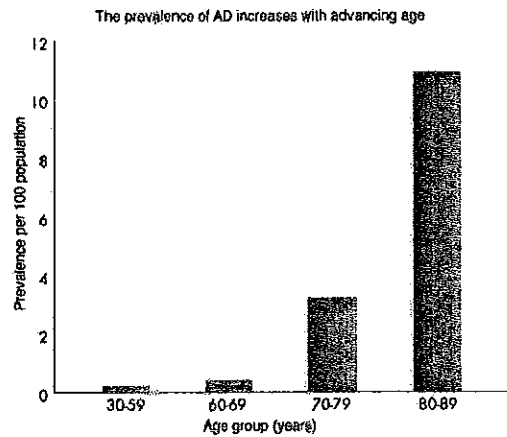
ALZHEIMER'S DISEASE

A less common pathology of the nervous system.

Alzheimer's Disease - the most common form of dementia affecting *Homo sapiens*

Description

Alzheimer's disease is a brain disorder named for German physician Alois Alzheimer, who first described it in 1906. Today we know that Alzheimer's: 1: Is a progressive and fatal brain disease; 2: Is the most common form of dementia; 3: So far, it has no cure.



Graph to illustrate the impact of aging on the prevalence of Alzheimer's disease (AD) (Source: ABFI)

Signs & Symptoms

Signs and symptoms are divided into 7 stages:

STAGE	SIGNS & SYMPTOMS OF ALZHEIMER'S
Stage 1:	No memory problems and none are evident during a medical interview.
Stage 2:	Very mild cognitive decline. Memory loss and lapses, especially in forgetting familiar words or names or the location of keys, eyeglasses etc. Not evident.
Stage 3:	Mild cognitive decline. Evident memory/concentration problems. Difficulties in word- or name-finding; ability to remember new people; performance in social or work settings; reading and retaining material; ability to plan/organize. Losing or misplacing items.
Stage 4:	Moderate cognitive decline. Clear-cut deficiencies in: knowledge of recent occasions or current events; ability to perform challenging mental arithmetic; capacity to perform complex tasks; memory of personal history. Subdued/withdrawn in social/mental situations.
Stage 5:	Moderately severe cognitive decline. Major gaps in memory and deficits in cognitive function emerge. Essential with assistance. Unable to recall current address, telephone number and the names of their spouse or children etc.; confused about where they are or about date, day, season; trouble with less challenging mental arithmetic; need help choosing clothing.
Stage 6:	Severe cognitive decline. Personality/behavioral symptoms, incl. suspiciousness, hallucinations and delusions or compulsive, repetitive behaviors as hand-wringing or tissue shredding. Lose awareness of recent experiences/events/surroundings; recollect their personal history imperfectly; generally recall their own name; forget the name of their spouse; can distinguish familiar from unfamiliar faces; need extensive help getting dressed, handling details of toileting; disruption of their normal sleep. Tend to wander and become lost.
Stage 7:	Very severe cognitive decline. Lose the ability to respond, to speak and, ultimately, to control movement, to sit without support, to smile, and to hold their head up. Lose their capacity for recognizable speech. Need help with eating, toileting, walking without assistance. Reflexes become abnormal and muscles grow rigid. Swallowing is impaired.

HYPERVENTILATION

A less common pathology of the respiratory system.

Hyperventilation - excessive ventilation of the lungs
affecting *Homo sapiens*

Description

Hyperventilation is breathing in excess of what the body needs. This is sometimes called over breathing. Hyperventilation are known as Hyperventilation Syndrome and Panic Attack.



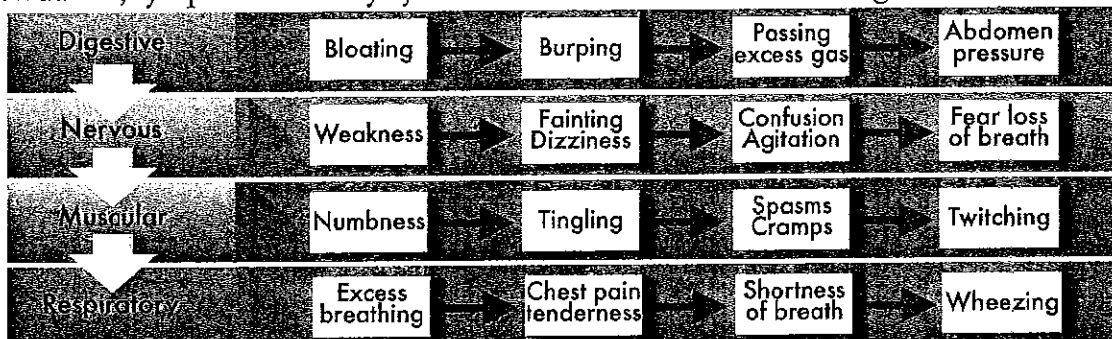
Both forms of hyperventilation: Hyperventilation syndrome & panic attacks are unpleasant.

Although hyperventilation syndrome may seem very similar to panic attacks, the 2 disorders are different. Hyperventilation syndrome is more specific and relates to an over breathing pattern that happens under certain conditions.

Signs & Symptoms

In its everyday form, hyperventilation syndrome, may be hard to detect. The sudden form, hyperventilation panic attacks, comes on rapidly and has more intense symptoms. Symptoms can be: Bloating; Burping; Passing excess gas; Pressure sensation in the abdomen. Anxiety can increase air movement through the mouth can cause a dry mouth feeling. Hyperventilation causes the carbon dioxide level in the blood to decrease. This lower level of carbon dioxide reduces blood flow to the brain, causing: Weakness; Fainting; Dizziness; Confusion; Agitation; A feeling of being outside yourself; Seeing images that aren't there; Feeling as if you can't breathe. Excess breathing can also cause the calcium levels to drop in your blood, which may result in the following nervous system complaints: Numbness and tingling (usually in both arms or around the mouth); Spasms or cramps of the hands and feet; Muscle twitching. Factors can cause chest symptoms with hyperventilation syndrome: Chest pains or tenderness; Shortness of breath; Wheezing.

If schematized, symptoms in body systems can be a mix of the following:



SEPTAL DEFECT

A less common pathology of the cardiovascular system.

Septal Defect / Hole in the heart - an opening in the wall (septum) between the heart chambers affecting *Homo sapiens*

Description

Holes in the heart are congenital heart defects. The two sides of the heart is separated by an inner wall called the septum. With each heartbeat, the right side of the heart receives oxygen-poor blood from the body and pumps it to the lungs. The left side of the heart receives oxygen-rich blood from the lungs and pumps it to the body. The septum prevents mixing of blood between the two sides of the heart. Some are born with holes in the upper or lower septum. If between the heart's two upper chambers it is called an atrial septal defect (ASD). If between the heart's two lower chambers it is called a ventricular septal defect (VSD).

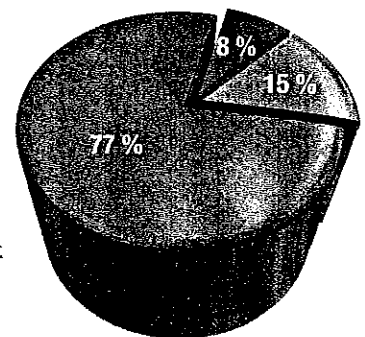


A hole in the heart is a congenital disease

ASDs and VSDs allow blood to pass from the left side of the heart to the right side. This means that oxygen-rich blood can mix with oxygen-poor blood. As a result, some oxygen-rich blood is pumped to the lungs instead of out to the body.

The graph shows percentage of children born each year with ASD, VSD & Normal Heart Function

- Atrial Septal Defect
- Ventricular Septal Defect
- Normal heart function



Signs & Symptoms

ASDs may have no signs or symptoms. When signs and symptoms do occur, heart murmur is the most common - an extra or unusual sound heard during a heartbeat. However, many healthy children have heart murmurs. Over time, if a large ASD isn't repaired, the extra blood flow to the right side of the heart can damage the heart and lungs and cause heart failure. This doesn't occur until adulthood. Signs and symptoms of heart failure include:

1. Fatigue (tiredness); Shortness of breath
2. Tiring easily during physical activity
3. A buildup of blood and fluid in the lungs; and of fluid in the feet, ankles, and legs

The signs and symptoms of heart failure from VSD are similar to those listed above for ASD, but they occur in infancy. A major sign of heart failure in infancy is difficulty feeding and poor growth. VSD signs and symptoms are rare after infancy because the defect either decreases in size on its own or is repaired.

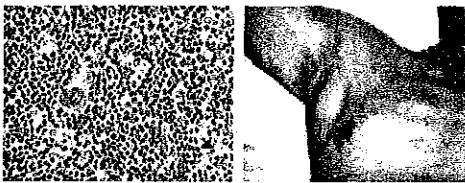
HODGKIN'S DISEASE

A less common pathology of the lymphatic system.

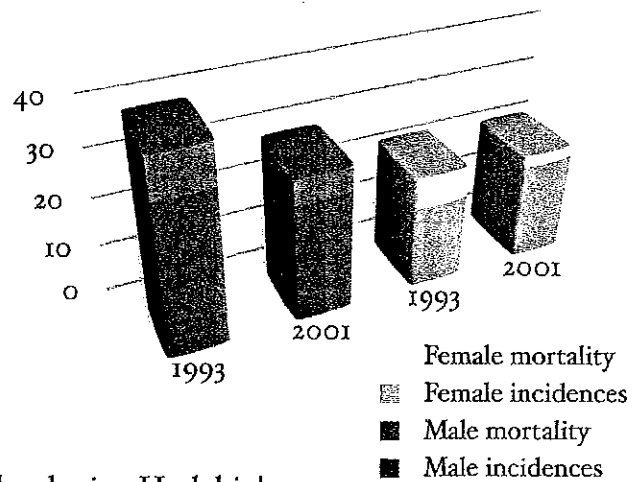
Hodgkin's Disease - one of a group of cancers called lymphomas affecting *Homo sapiens*

Description

Lymphoma is a general term for cancers that develop in the lymphatic system. Hodgkin's disease is an uncommon lymphoma. Other cancers of the lymphatic system are called non-Hodgkin's lymphomas (please see page 17).



Hodgkin's Disease can cause swelling of lymph nodes, however can only be diagnosed by a biopsy



Signs & Symptoms

People who are concerned about the chance of developing Hodgkin's disease should talk with their doctor about the disease, the symptoms to watch for, and an appropriate schedule for checkups. The doctor's advice will be based on the person's age, medical history, and other factors. Doctors can diagnose Hodgkin's disease with a biopsy. This involves removing and examining a piece of tissue under a microscope. Treatment varies depending on how far the disease has spread and often includes radiation therapy or chemotherapy.

SYMPTOMS OF HODGKIN'S DISEASE MAY BE:	
1	A painless swelling in the lymph nodes in the neck, underarm, or groin
2	Unexplained recurrent fevers and chills
3	Night sweats
4	Unexplained weight loss and loss of appetite
5	Itchy skin

When symptoms like these occur, they are not sure signs of Hodgkin's disease. In most cases, they are actually caused by other, less serious conditions, such as the flu. When symptoms like these persist, however, it is important to see a doctor so that any illness can be diagnosed and treated. Do not wait to feel pain; early Hodgkin's disease may not cause pain. The earlier the disease is diagnosed, the more effective the treatment. In most cases, Hodgkin's disease can be cured.

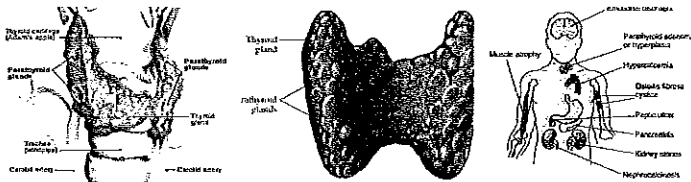
HYPERPARATHYROIDISM

A less common pathology of the endocrine system

Hyper-para-thyroid-ism - excess secretion of parathormone by the parathyroid glands altering the calcium metabolism affecting *Homo sapiens*

Description

If the parathyroid glands secrete too much hormone, as happens in primary hyperparathyroidism, the balance is disrupted: Blood calcium rises, a condition called hypercalcemia. In 85 percent cases of hyperparathyroidism, a benign tumor (noncancerous) called an adenoma has formed on one of the parathyroid glands, making it overactive. Excess hormone mainly comes from two or more enlarged parathyroid glands, a condition called hyperplasia. Very rarely, hyperparathyroidism is caused by cancer of a parathyroid gland.



First 2 diagrams on left show the thyroid glands.

Last diagram shows how hyperparathyroidism can affect various parts of the body and have a wide range of symptoms throughout the body

Signs & Symptoms

There may be severe, subtle, or no symptoms at all. Routine blood tests screening for a wide range of conditions, incl. high calcium levels, are alerting doctors to mild forms of the disorder even though they are symptom-free.

If symptoms appear they are often mild and non-specific. At the more severe disease, loss of appetite, nausea, vomiting, constipation, confusion, increased thirst/urination, may be symptoms. Thinning of the bones adds risk of fractures. Increased calcium and phosphorus excretion in the urine may cause kidney stones.

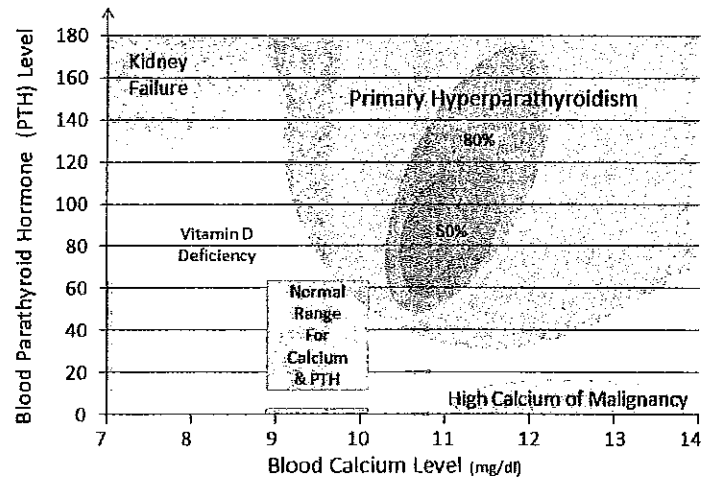


Chart shows at which Blood Calcium and Blood Parathyroid Hormone levels Hyperparathyroidism develops

- Feeling weak, fatigue or tired most of the time; muscle weakness and pain
- General aches and pains throughout your body; Itchy skin
- Depression; Personality changes
- Nausea and vomiting; Upper abdominal pain; Constipation; Loss of appetite
- High blood pressure; Heartburn
- Increase in bone fractures or breaks; Bone pain/tenderness; Decreased height
- Confusion and impaired thinking / poor memory; Blurred vision (cataracts)
- Kidney stones; Increased urine output/Increased thirst
- Stupor and possibly coma

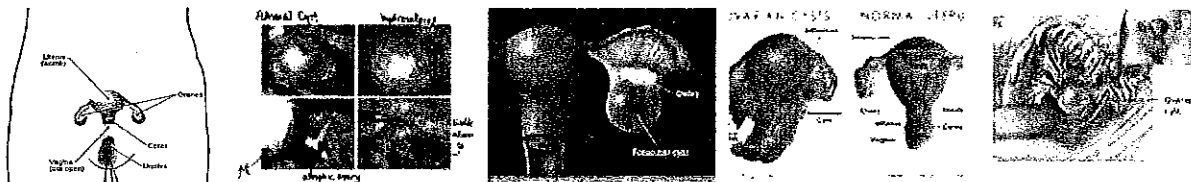
OVARIAN CYSTS

A less common pathology of the reproductive system

Ovarian Cysts - a fluid filled sac which develops in an ovary affecting *Homo sapiens*

Description

Ovarian cysts form for numerous reasons, most common is a follicular cyst, which results from the growth of a follicle. A follicle is the normal fluid-filled sac that contains an egg. Follicular cysts form when the follicle grows larger than normal during the menstrual cycle and does not open to release the egg. Usually, follicular cysts resolve spontaneously over the course of days to months. Cysts can contain blood (hemorrhagic cysts) from injury or leakage of tiny blood vessels into the egg sac. Another type of ovarian cyst that is related to the menstrual cycle is a corpus luteum cyst. Occasionally, the tissues of the ovary develop abnormally to form other body tissues such as hair or teeth. Cysts with these abnormal tissues are called benign cystic teratomas or dermoid cysts. Endometriosis is a condition in which cells grow outside the uterus. When endometriosis involves the ovary, the area of endometrial tissue may grow and bleed over time, forming a brown-colored cystic area sometimes referred to as a chocolate cyst or endometrioma. Both benign and malignant tumors of the ovary may also contain cysts. Furthermore, the condition known as polycystic ovarian syndrome (Stein Leventhal Syndrome) is characterized by the presence of multiple cysts within both ovaries.



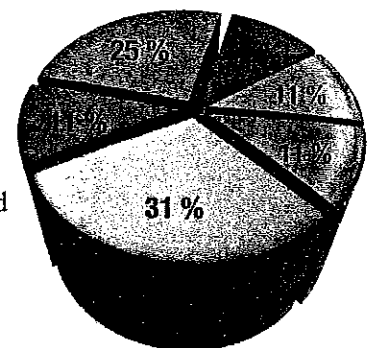
Signs & Symptoms

Most ovarian cysts are never noticed and resolve without women ever realizing that they are there. When a cyst causes symptoms, pain in the belly or pelvis is by far the most common one. The pain can be caused from:

- rupture of the cyst
- rapid growth and stretching
- bleeding into the cyst
- twisting of the cyst around its blood supply (known as torsion)

Appearance and development of ovarian cysts

- Disappeared
- Increased in size
- Disappeared and reappeared
- No change in size
- Decreased in size
- Additional cysts appeared



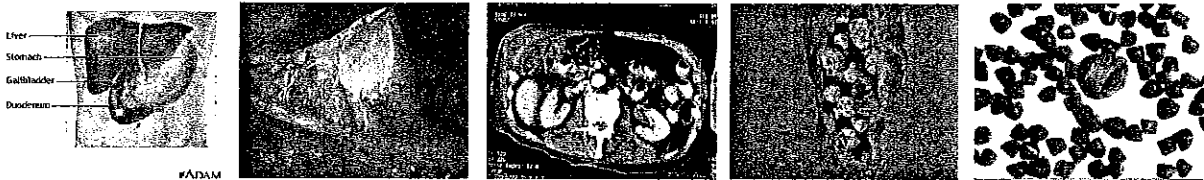
INFLAMED GALL BLADDER

A less common pathology of the digestive system.

Inflamed Gall Bladder - infectious material lodged in bile duct or a gallstone blocking the overflow of pancreatic juice affecting *Homo sapiens*

Description

An inflamed gallbladder, also called cholecystitis, normally occurs when gallstones are developed. Gallstones are small hardened chemical deposits which form within the gallbladder. These stones block bile ducts in the gallbladder and cause inflammation. Other causes include blockages of bile ducts from cancer or narrowed bile ducts caused from scarring due to surgery or infection.



Signs & Symptoms

Symptoms of an inflamed gallbladder include weight loss, fatigue, abdominal pain on right side under the rib cage, yellowing of the skin or whites of the eyes indicating jaundice, brown urine and greasy stools. Fever, chills, nausea and vomiting may also be experienced. Symptoms of gall bladder inflammation can be sudden and severe, or they may be mild and come and go. The symptoms will depend on blockage of bile ducts and the size of gallstones.

One of the first inflamed gall bladder symptoms individuals may experience is abdominal pain on the right side of the body. This pain can occur after eating a meal - especially one where a lot of fat was consumed - or when taking a deep breath. The abdominal area is tender when touched.

Another symptom of an inflamed gallbladder is chest pain and heartburn. These pains are not always located in the central area of the chest. Instead, they are located under the breastbone. When the gallbladder becomes severely inflamed, individuals often experience episode of chills accompanied by shaking and sweating. Fever occurs when the body's temperature exceeds 98.6 degrees Fahrenheit. As the body's defense mechanism, it works with the other inflamed gallbladder symptoms to warn individuals that infected material has become trapped inside. Jaundice occurs when something is not functioning properly in the liver and gallbladder. This inflamed gallbladder symptom causes the skin to turn yellow due to the buildup of bilirubin, a fluid produced when hemoglobin breaks down.

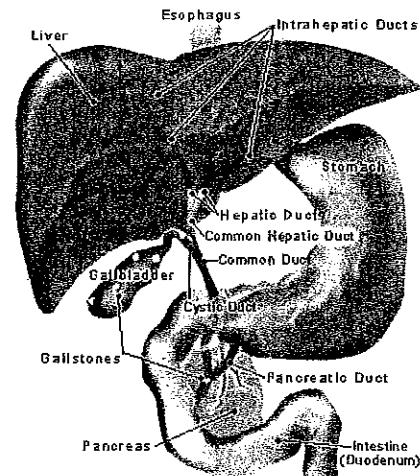


Diagram shows gall bladder position

RENAL FAILURE

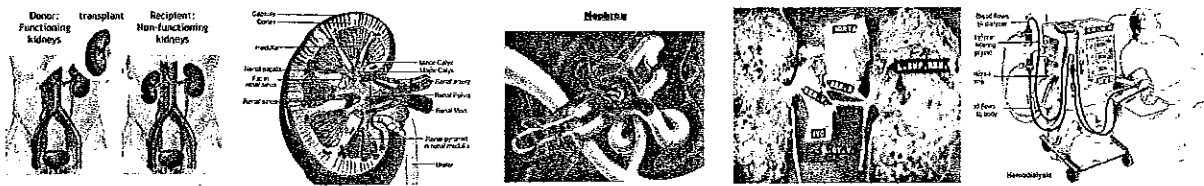
A less common pathology of the urinary system.

Renal Failure - failure to adequately kidney function affecting *Homo sapiens*

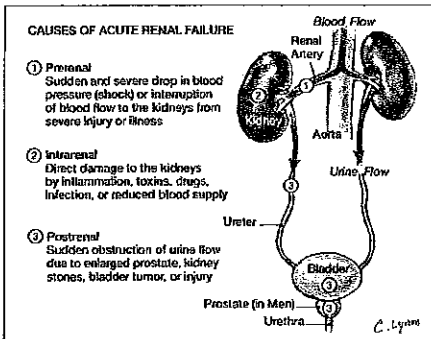
Description

Kidney failure can occur from an acute situation or from chronic problems.

In acute renal failure, kidney function is lost rapidly and can occur from a variety of insults to the body. Chronic renal failure develops over months and years.



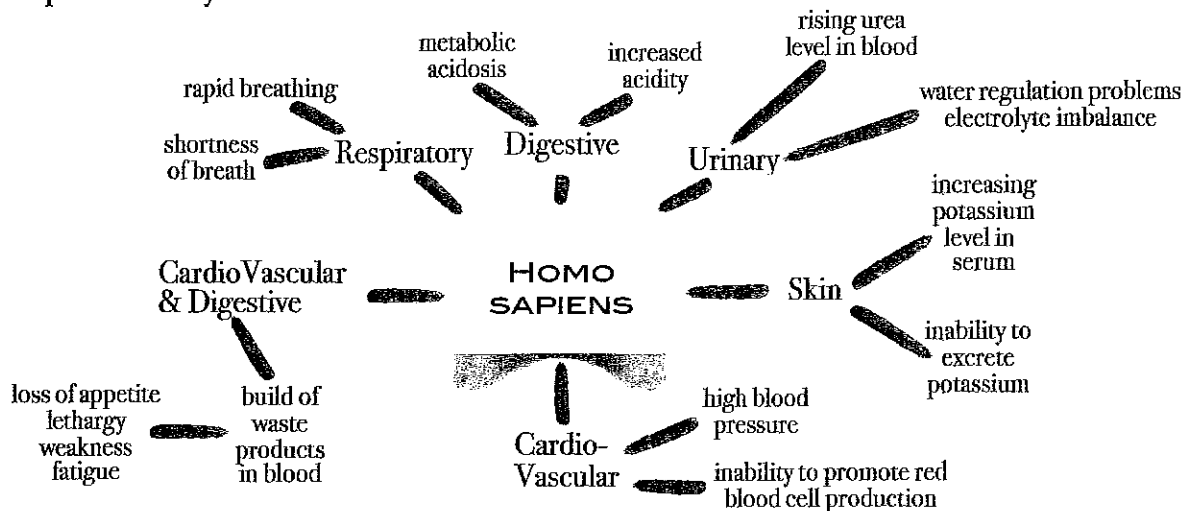
Signs & Symptoms



In the beginning, kidney failure may be asymptomatic. As kidney function decreases, the symptoms are related to the inability to regulate water and electrolyte balances, to clear waste products from the body, and to promote red blood cell production.

Lethargy, weakness, shortness of breath, and generalized swelling may occur. Unrecognized or untreated, life-threatening circumstances can develop. Other symptoms can be: Metabolic acidosis, or increased acidity of the body; Inability to excrete potassium and rising potassium levels in the serum; Rising urea levels in the blood; As waste products build in the blood, loss of

appetite, lethargy, weakness and fatigue become apparent; Breathing becomes more rapid and blood pressure may rise.



Symptoms of renal failure in body systems

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