BIOLOGY PRESENTATION

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Topic;

Phylogenetic Disorders of Human Excretory System

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CONTENTS

INTRODUCTION

The **excretory system** is a passive biological system that removes excess, unnecessary materials from the body fluids of an organism, so as to help maintain internal chemical homeostasis and prevent damage to the body. The dual function of excretory systems is the elimination of the waste products of metabolism and to drain the body of used up and broken down components in a liquid and gaseous state. In humans and other amniotes (mammals, birds and reptiles) most of these substances leave the body as urine and to some degree exhalation, mammals also expel them through sweating.

It includes

Urinary system

Respiratory system

Integumentary system

Billary system

Gastrointestinal tract

Normal structure and Function of excretory System

Urinary system

The kidneys are large, bean-shaped organs which are present on each side of the vertebral column in the abdominal cavity. each kidney is supplied with blood from the renal artery. The kidneys remove from the blood the nitrogenous wastes such as urea, as well as salts and excess water, and excrete them in the form of urine. This is done with the help of millions of nephrons present in the kidney. The filtrated blood is carried away from the kidneys by the renal vein (or kidney vein). The urine from the kidney is collected by the ureter (or excretory tubes), one from each kidney, and is passed to the urinary bladder. The urinary bladder collects and stores the urine until urination. The urine collected in the bladder is passed into the external environment from the body through an opening called the urethra.

Respiratory system

One of the main functions of the lungs is to diffuse gaseous wastes, such as carbon dioxide, from the bloodstream as a normal part of respiration.

Gastrointestinal tract

The large intestine's main function is to transport food particles through the body and expel the indigestible parts at the other end, but it also collects waste from throughout the body. The typical brown colour of mammal waste is due to bilirubin, a breakdown product of normal heme catabolism.[1] The lower part of the large intestine also extracts any remaining usable water and then removes solid waste. At about 10 feet long in humans, it transports the wastes through the tubes to be excreted.

Biliary system

The liver detoxifies and breaks down chemicals, poisons and other toxins that enter the body. For example, the liver transforms ammonia (which is poisonous) into urea in fish, amphibians and mammals, and into uric acid in birds and reptiles. Urea is filtered by the kidney into urine or through the gills in fish and tadpoles. Uric acid is paste-like and expelled as a semi-solid waste (the "white" in bird excrements). The liver also produces bile, and the body uses bile to break down fats into usable fats and unusable waste.

Invertebrates lack a liver, but most terrestrial groups, like insects, possesses a number of blind guts that serve the similar functions. Marine invertebrates do not need the ammonia conversion of the liver, as they can usually expel ammonia directly by diffusion through the skin.

Integumentary system

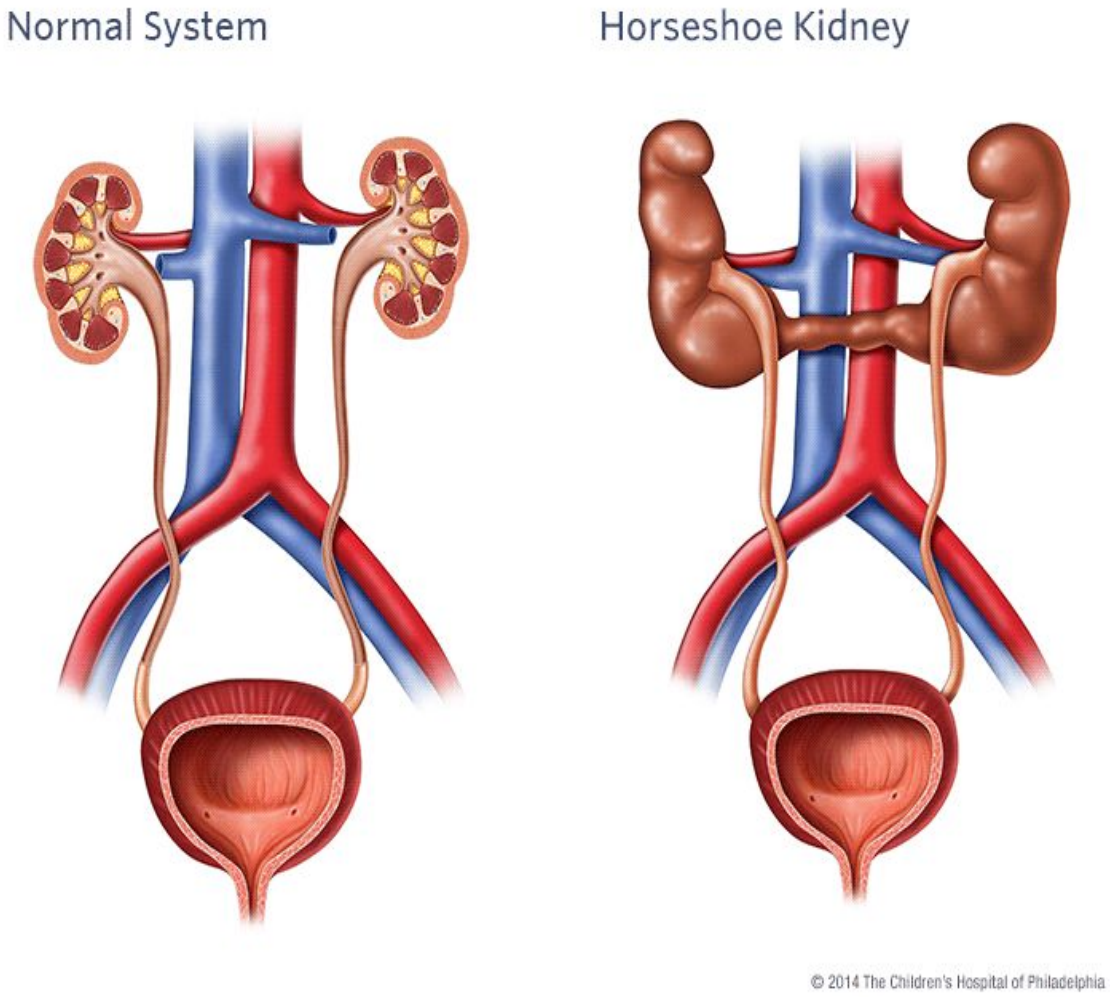
The **integumentary system** comprises the skin and its appendages acting to protect the body from various kinds of damage, such as loss of water or damages from outside. The integumentary system includes hair, scales, feathers, hooves, and nails.

Phylogenetic disorders of Excretory System

1. Horseshoe Kidney.
2. Polycystic Kidney.
3. Renal Agenesis.
4. Renal Hypoplasia.
5. Epispadias.
6. Renal Ectopia [ECTOPIC KIDNEY].
7. Doubling of Ureter.

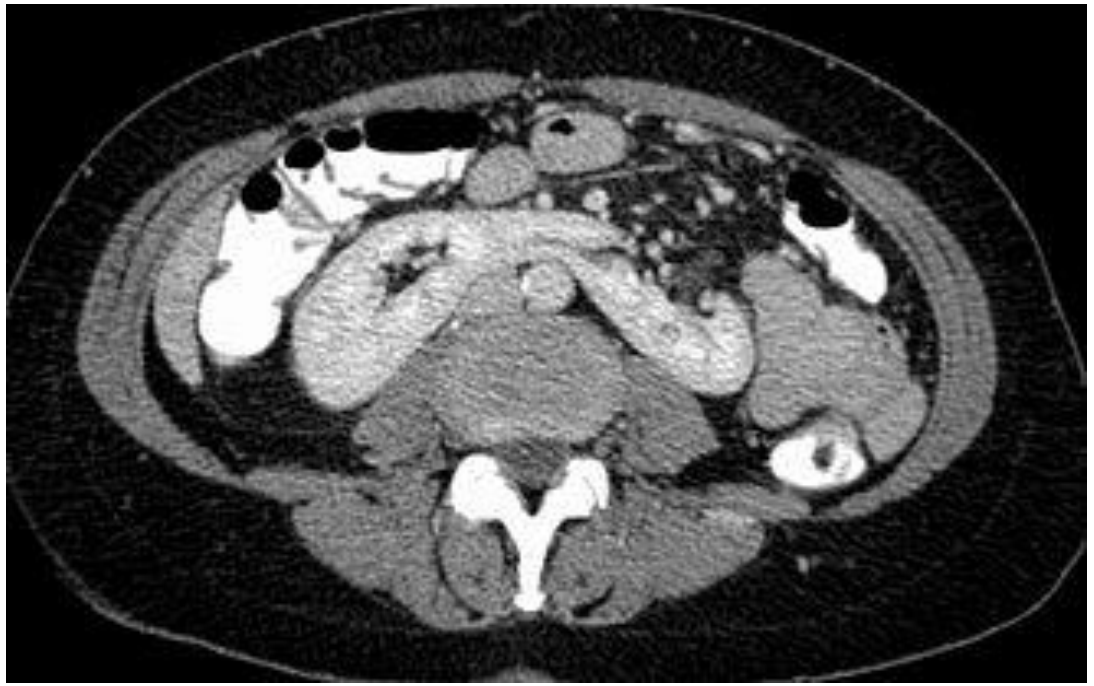
Horseshoe kidney

- **Horseshoe kidney**, also known as *ren arcuatus* (in Latin), renal fusion or super kidney, is a congenital disorder affecting about 1 in 500 people that is more common in men, often asymptomatic, and usually diagnosed incidentally.In this disorder, the patient's kidneys fuse together to form a horseshoe-shape during development in the womb. The fused part is the isthmus of the horseshoe kidney. The abnormal anatomy can affect kidney drainage resulting increased frequency of kidney stones and urinary tract infections as well as increase risk of certain renal cancers.



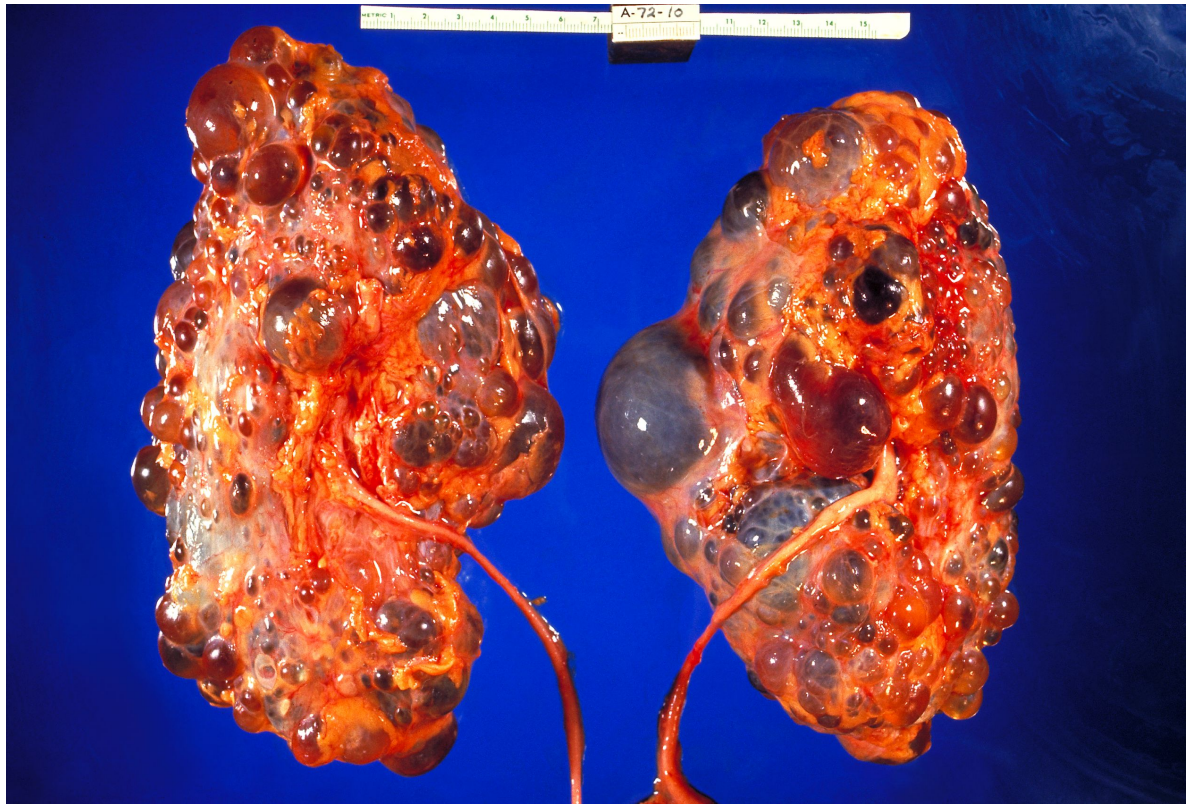
Signs and symptoms

- Although often asymptomatic, the most common presenting symptom of patients with a horseshoe kidney is abdominal or flank pain. However, presentation is often non-specific.[Approximately a third of patients with horseshoe kidneys remain asymptomatic throughout their entire life with over 50% of patients having no medical issues related to their renal fusion when followed for a 25 year period. As a result, it is estimated that approximately 25% of patients with horseshoe kidneys are diagnosed incidentally with ultrasound or CT imaging.[1



Polycystic kidney disease

- **Polycystic kidney disease** (**PKD** or **PCKD**, also known as polycystic kidney syndrome) is a genetic disorder in which the renal tubules become structurally abnormal, resulting in the development and growth of multiple cysts within the kidney.These cysts may begin to develop in utero, in infancy, in childhood, or in adulthood.[6] Cysts are non-functioning tubules filled with fluid pumped into them, which range in size from microscopic to enormous, crushing adjacent normal tubules and eventually rendering them non-functional as well.
- PKD is caused by abnormal genes that produce a specific abnormal protein; this protein has an adverse effect on tubule development. PKD is a general term for two types, each having their own pathology and genetic cause: autosomal dominant polycystic kidney disease (ADPKD) and autosomal recessive polycystic kidney disease (ARPKD)



Symptoms

Polycystic kidney disease symptoms can include:
1. High blood pressure 2. Back or side pain 3. Headache 4. A feeling of fullness in your abdomen 5. Increased size of your abdomen due to enlarged kidneys 6. Blood in your urine 7. Kidney stones 8. Kidney failure 9. Urinary tract or kidney infections

Causes

Abnormal genes cause polycystic kidney disease, which means that in most cases, the disease runs in families. Rarely, a genetic mutation occurs on its own (spontaneous), so that neither parent has a copy of the mutated gene.The two main types of polycystic kidney disease, caused by different genetic flaws, are: 1. Autosomal dominant polycystic kidney disease (ADPKD). Signs and symptoms of ADPKD often develop between the ages of 30 and 40.

Diagnosis

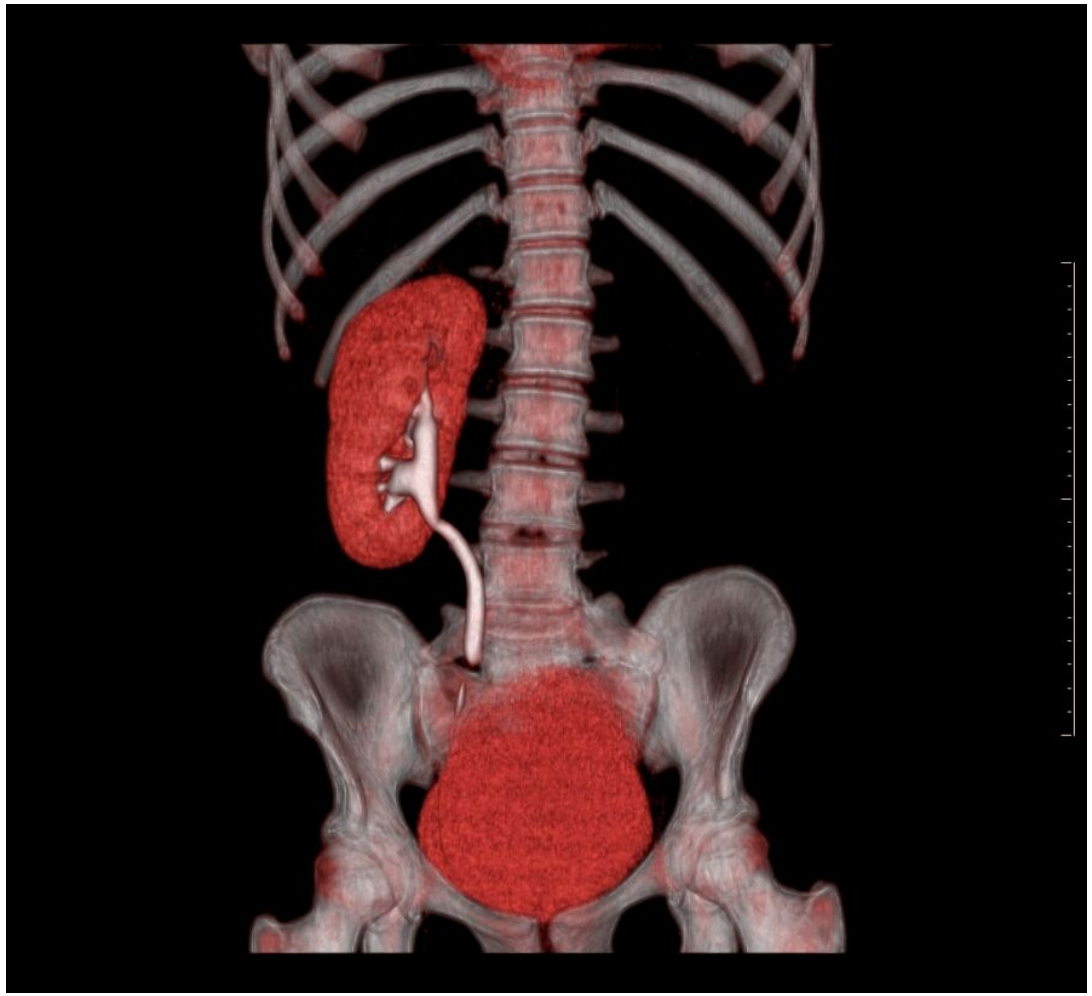
Polycystic kidney disease can be ascertained via a CT scan of abdomen, as well as, an MRI and ultrasound of the same area. A physical exam/test can reveal enlarged liver, heart murmurs and elevated blood pressure

Treatment

There is no FDA-approved treatment. However, recent research indicates that mild to moderate dietary restrictions slow the progression of autosomal dominant polycystic kidney disease in mice. If and when the disease progresses enough in a given case, the nephrologist or other practitioner and the patient will have to decide what form of renal replacement therapy will be used to treat end-stage kidney disease. That will either be some form of dialysis, which can be done at least two different way

Renal Agenesis

- Renal agenesis is a medical condition in which one (unilateral) or both (bilateral) fetal kidneys fail to develop.
- Unilateral and bilateral renal agenesis in humans, mice and zebra fish has been linked to mutations in the gene GREB1L.It has also been associated with mutations in the genes RET or UPK3A. in humans



Bilateral

Bilateral renal agenesis is a condition in which both kidneys of a fetus fail to develop during gestation. It is incompatible with life.It is one causative agent of Potter sequence. This absence of kidneys causes oligohydramnios, a deficiency of amniotic fluid in a pregnant woman, which can place extra pressure on the developing baby and cause further malformations. The condition is frequently, but not always the result of a genetic disorder, and is more common in infants born to one or more parents with a malformed or absent kidney.

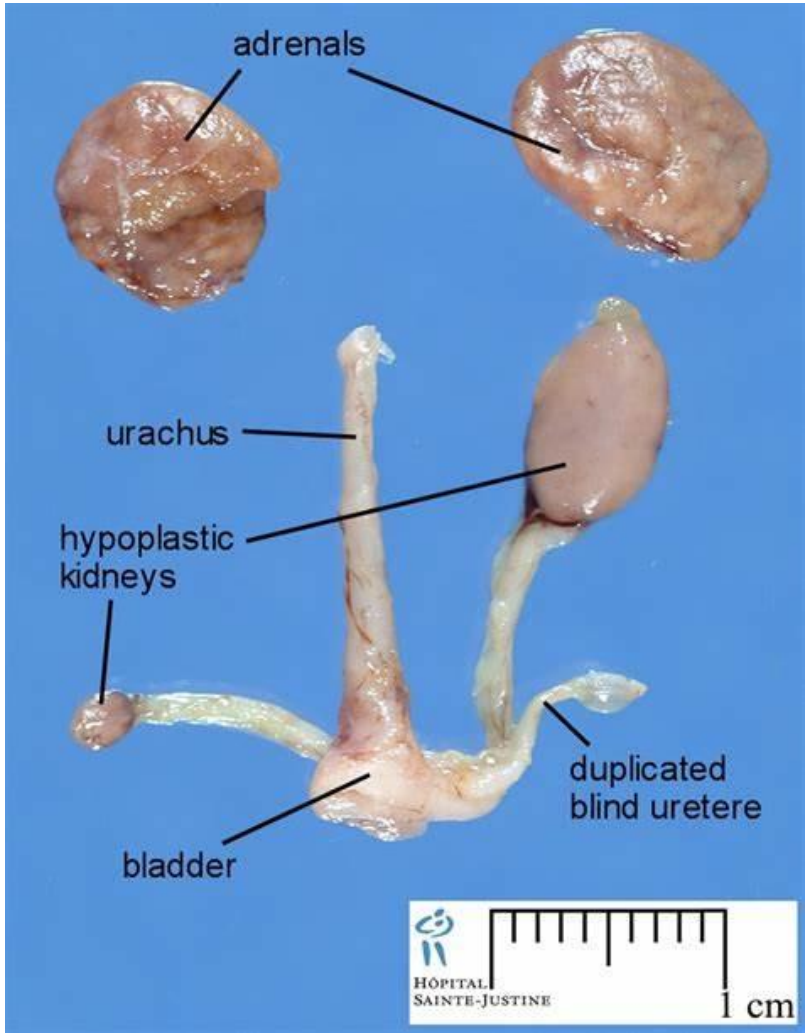
Unilateral

This is much more common, but is not usually of any major health consequence, as long as the single kidney is healthy. However, this kidney tends to be hypertrophied, ectopic and prone to infection and damage.

It may be associated with an increased incidence of Müllerian duct abnormalities, which are abnormalities of the development of the female reproductive tract and can be a cause of infertility, blocked menstrual flow (hematocolpos), increased need for Caesarean sections, or other problems. Herlyn-Werner-Wunderlich syndrome is one such syndrome in which unilaterial renal agenesis is combined with a blind hemivagina and uterus didelphys.[5] Up to 40% of women with a urogenital tract anomaly also have an associated renal tract anomaly

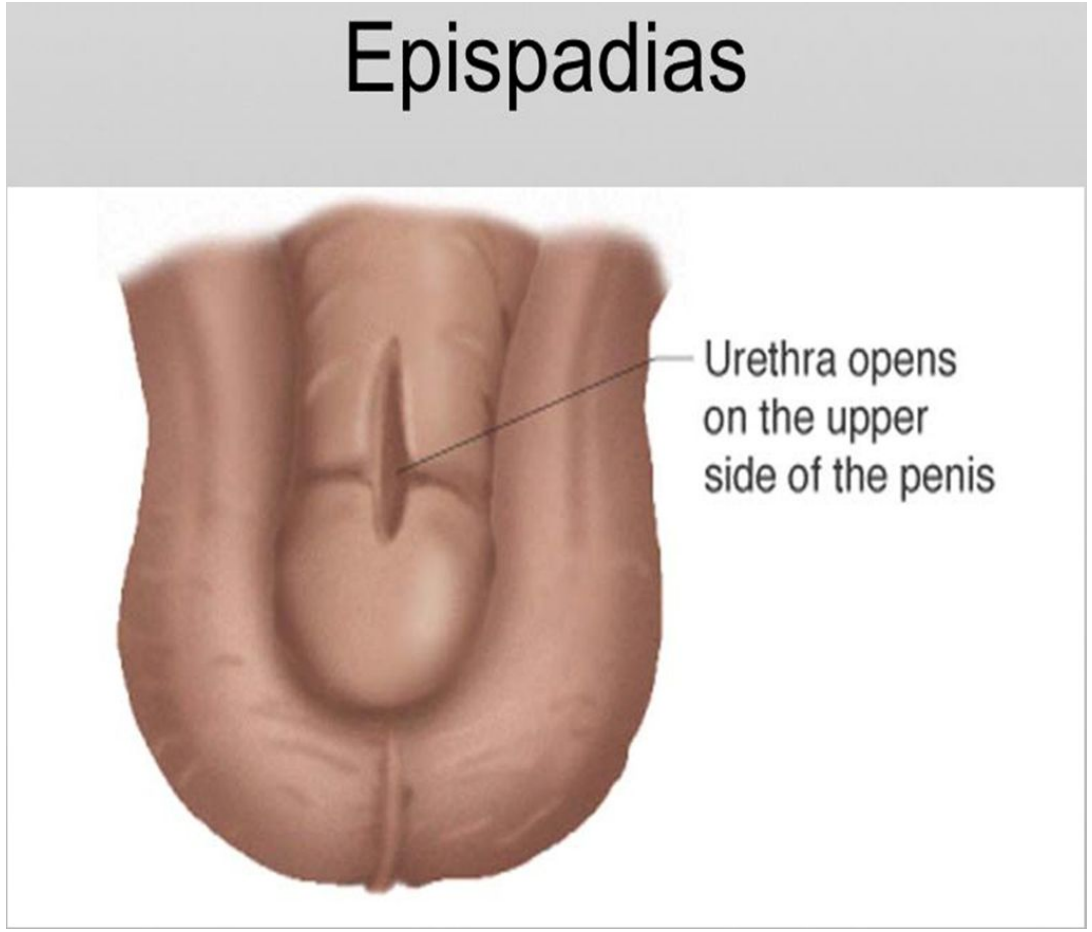
Renal hypoplasia

- Renal hypoplasia is relatively common – it is estimated that one baby in a few hundred is born with a small kidney.It is not always possible to know why renal hypoplasia happens. In the majority of cases, it is not caused by anything that the mother does during her pregnancy, and it is unlikely that a future pregnancy will result in renal hypoplasia or other problems with the kidneys



Epispadias

- An **epispadias** is a rare type of malformation in which the urethra ends, in males, in an opening on the upper aspect of the penis,[1] and in females when the urethra develops too far anteriorly. It occurs in around 1 in 120,000 male and 1 in 500,000 female births.



Signs and symptoms

Most cases involve a small and bifid penis, which requires surgical closure soon after birth, often including a reconstruction of the urethra. Where it is part of a larger exstrophy, not only the urethra but also the bladder (bladder exstrophy) or the entire perineum (cloacal exstrophy) are open and exposed on birth, requiring closure. Many parts of this article are incorrect.

Causes

Epispadias is an uncommon and partial form of a spectrum of failures of abdominal and pelvic fusion in the first months of embryogenesis known as the exstrophy - epispadias complex. It occurs as a result of defective migration of the genital tubercle primordii to the cloacal membrane, and so malformation of the genital tubercle, at about the 5th week of gestation

Treatment

The main treatment for isolated epispadias is a comprehensive surgical repair of the genito-urinary area usually during the first 7 years of life, including reconstruction of the urethra, closure of the penile shaft and mobilisation of the corpora. The most popular and successful technique is known as the modified Cantwell-Ransley approach. In recent decades however increasing success has been achieved with the complete penile disassembly technique despite its association with greater and more serious risk of damage

Prognosis

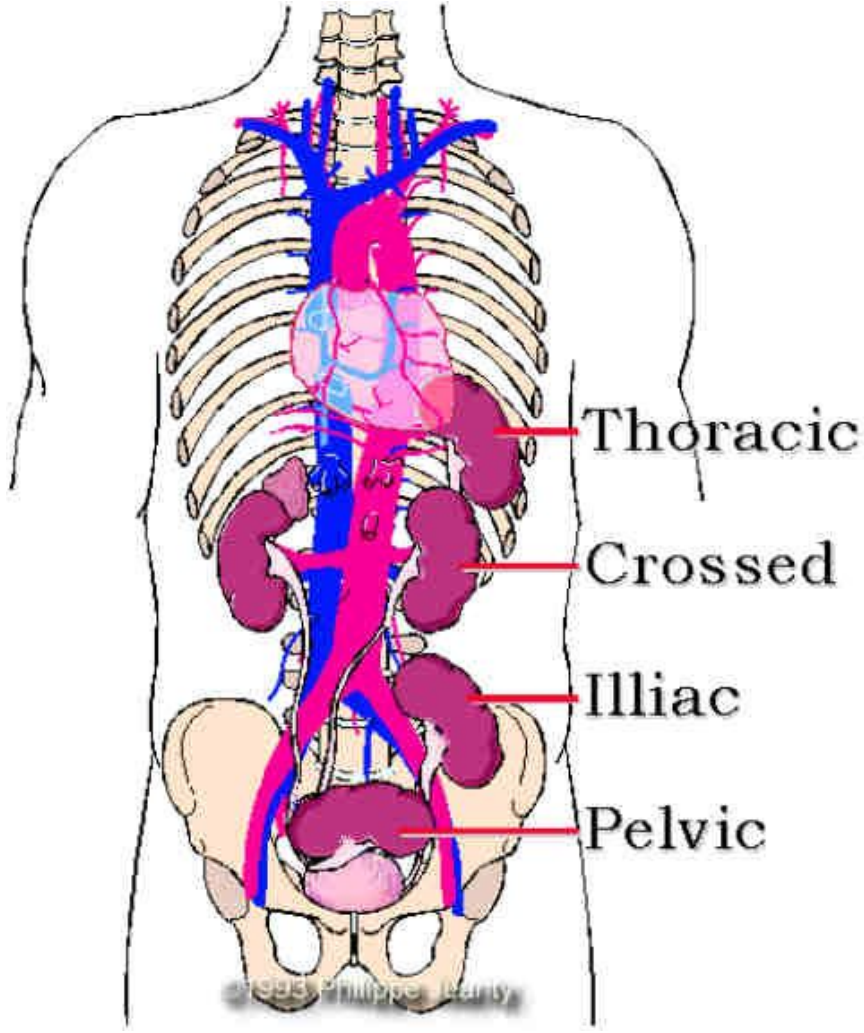
Even with successful surgery, patients may have long-term problems with:[*citation needed*]

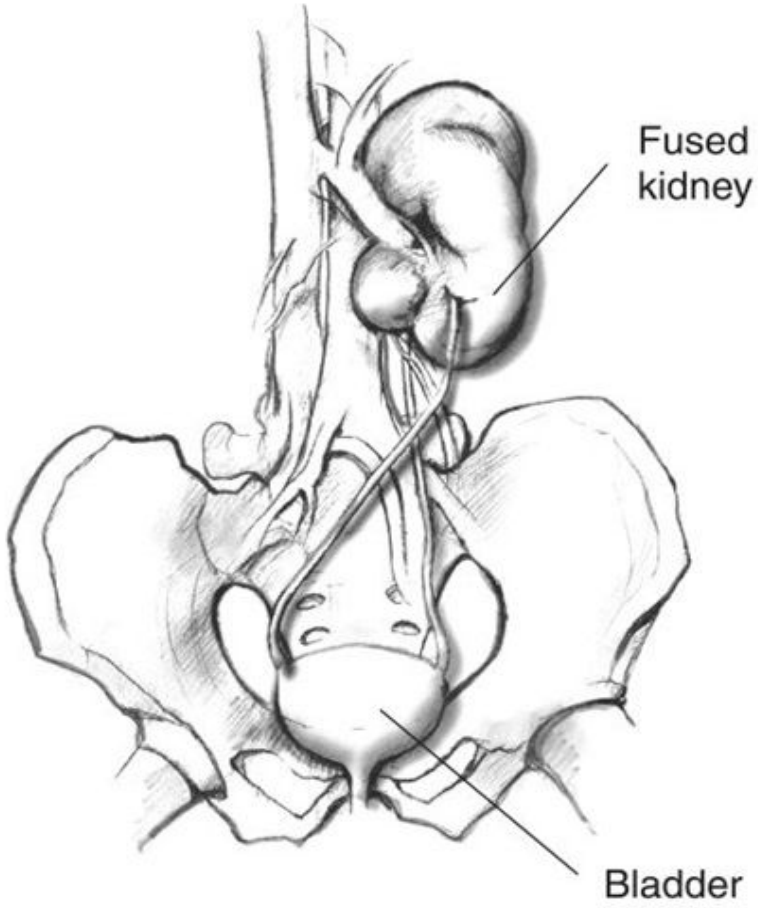
- incontinence, where serious usually treated with some form of continent urinary diversion such as the Mitrofanoff
- depression and psycho-social complications
- sexual dysfunction

Ectopic Kidney

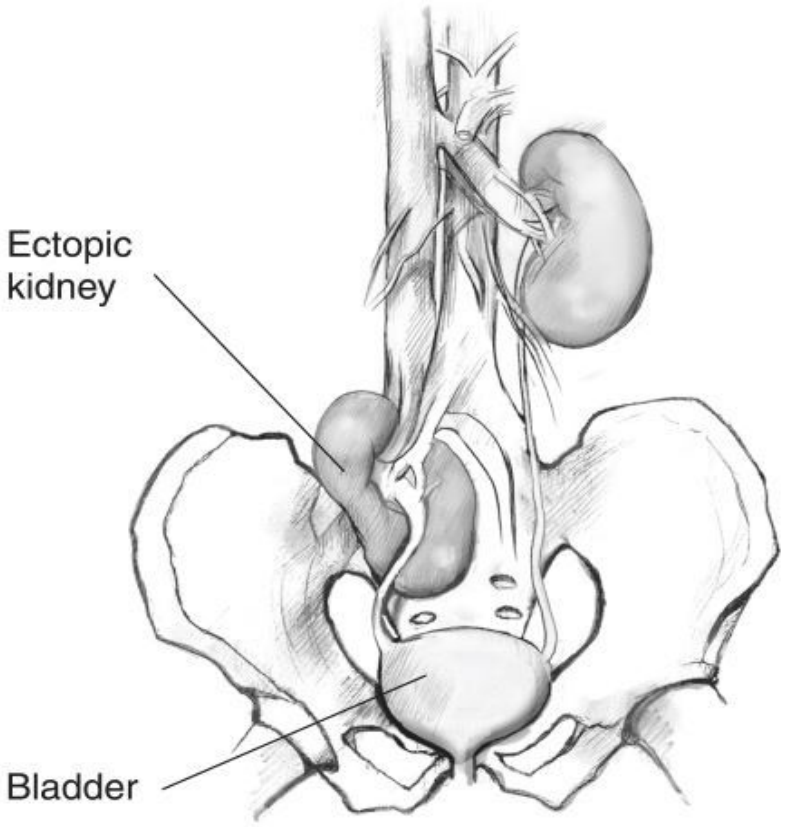
- An ectopic kidney is a kidney located below, above, or on the opposite side of the kidney's normal position in the urinary tract. The two kidneys are usually located near the middle of your back, just below your rib cage, on either side of your spine.

An ectopic kidney usually doesn't cause any symptoms or health problems, and many people never find out that they have the condition. If an ectopic kidney is discovered, it is usually found during a fetal ultrasound—an imaging test that uses sound waves to create a picture of how a baby is developing in the womb—or during medical tests done to check for a urinary tract infection or to find the cause of abdominal pain





An ectopic kidney may cross over and can become fused with the other kidney (crossed renal ectopia).



An ectopic kidney may remain in the pelvis, near the bladder (pelvic kidney).

What are the symptoms of an ectopic kidney?

Most people with an ectopic kidney have no symptoms. If complications occur, however, symptoms may include

- pain in your abdomen or back
- urinary frequency or urgency, or burning during urination
- fever
- hematuria, or blood in the urine
- lump or mass in the abdomen
- high blood pressure

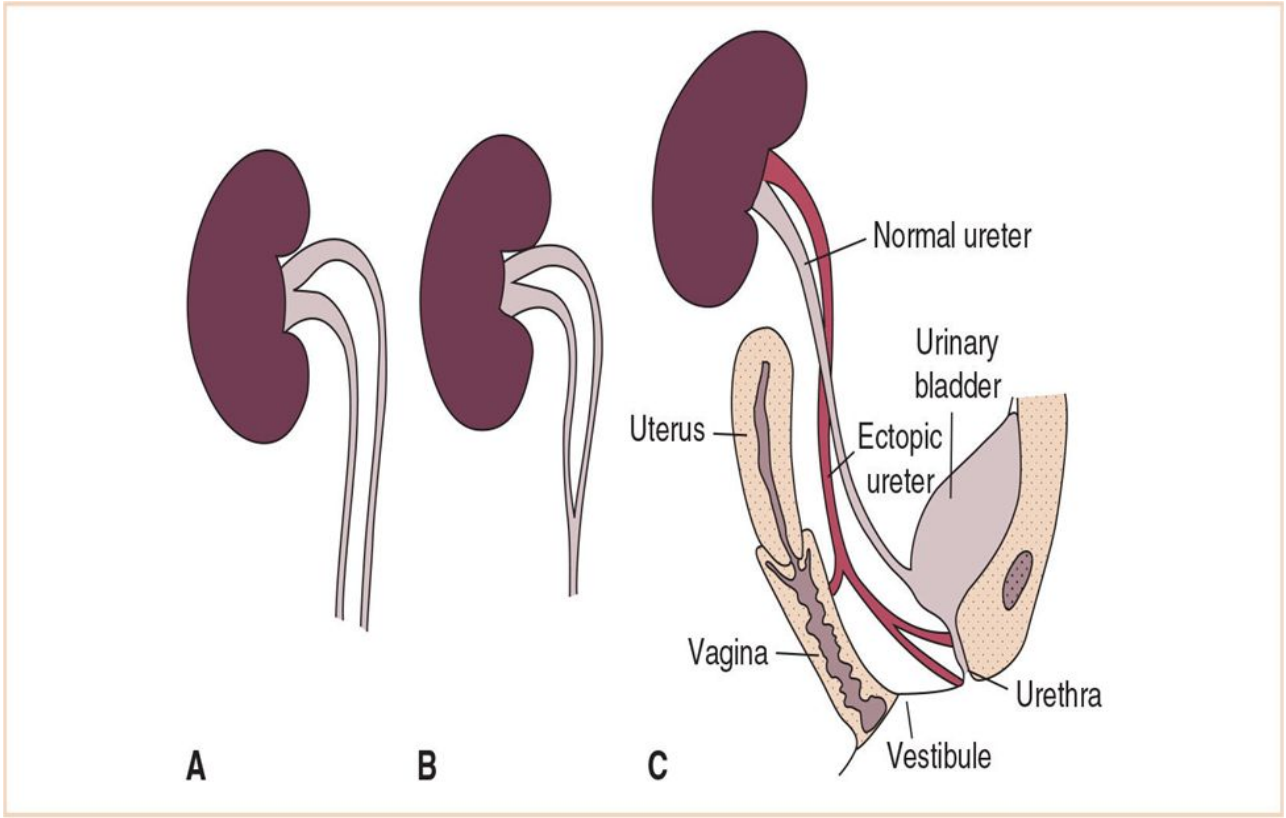
How do health care professionals diagnose an ectopic kidney?

Health care professionals use the following imaging tests to help diagnose and manage an ectopic kidney.

- Ultrasounds
- Voiding cystourethrograms
- Radionuclide scans
- Magnetic resonance imaging (MRI)

Duplicated Ureters

- Ureters are long, narrow tubes that drain urine from the kidneys to the urinary bladder. Normally one ureter leads from each kidney to the bladder. In the case of duplicated ureters, two ureters drain a single kidney. One ureter drains the upper part of the kidney and the other drains the lower part. This condition may affect one or both kidneys.



Duplicated ureters can take one of two forms:

- Incomplete: Two separate ureters are attached to the same kidney but join together at some distance away from the kidney to form a single ureter that enters the bladder.
- Complete: Two separate ureters lead away from the same kidney and remain separate.

How common are duplicated ureters?

About 0.7% of the healthy adult population and 2% to 4% of patients with urinary tract symptoms have duplicated ureters. Incomplete duplication is three times more common than complete duplication, which is estimated to appear in about one of every 500 people.

What causes duplicated ureters?

Duplicated ureters are a result of errors in cell division that occur during the development of a fetus, the baby inside the mother's womb. There is no proof that anything during pregnancy causes the defect. However, there is evidence to show that the condition can be passed from parent to child. If one parent has a duplicated ureter the child has a 50-50 chance of also being born with this condition.

symptoms

A number of symptoms can also occur when one of the ureters is **ectopic**, which means it drains to somewhere other than the bladder. Symptoms of an ectopic ureter include:

- **Hydronephrosis**: An ectopic ureter is usually narrower than it should be, leading to an obstruction in the flow of urine. The urine gets backed up and causes the kidney and ureter to swell.
- **Urinary tract infection (UTI)**: Poor drainage makes it easier for bacteria to enter urine and travel to the bladder. UTIs result in painful urination.
- **Vesicoureteral reflux**: Urine backs up and flows in the wrong direction (up toward the kidney instead of down toward the bladder). It is important for a doctor to grade the amount of reflux, as a child may be able to outgrow a small amount of reflux but may need more extensive treatment if the reflux is large. Kidney infections or other damage can result from reflux.
- **Incontinence (inability to control urination)**:

THANK YOU