

Congenital abnormalities of the kidney and ureter

Embryology of the kidney and ureter

- Mammals develop three kidneys in the course of intrauterine life.
- The embryonic kidneys are, in order of their appearance, the *pronephros*, the *mesonephros*, and the *metanephros*.
- The first two kidneys regress *in utero*, and the third becomes the permanent kidney.

Embryologically, all three kidneys develop from the intermediate mesoderm •

mammalian *pronephros* is a transitory, nonfunctional kidney.

In humans, the first evidence of pronephros is seen late in the third week, and it completely degenerates by the start of the fifth week. The pronephros develops as five to seven paired segments in the region of the future neck and thorax .

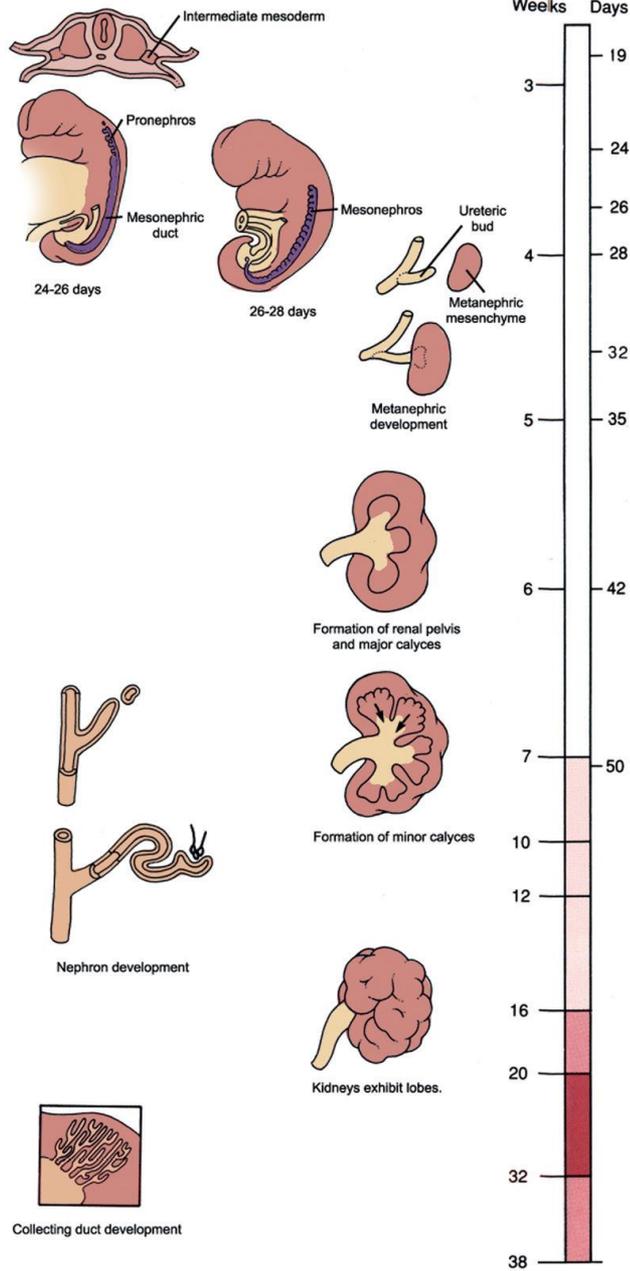
Development of the pronephric tubules starts at the cranial end of the nephrogenic cord and progresses caudally. As each tubule matures it immediately begins to degenerate along with the segment of the nephric duct to which the tubules are attached.

The second kidney, the *mesonephros*, is also transient, but in mammals it serves as an excretory organ for the embryo while the definitive kidney, the *metanephros*, begins its development.

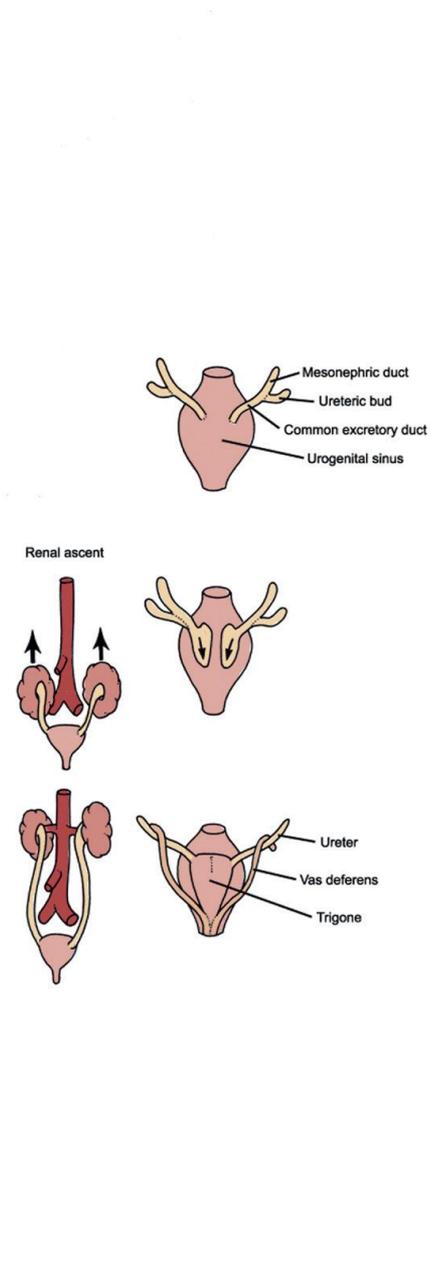
**In males,
some of the cranially located mesonephric tubules become the
efferent ductules of the testes. The epididymis and vas
deferens are also formed from the nephric (wolffian) ducts. In
females, remnants of cranial and caudal mesonephric tubules
form small, nonfunctional mesosalpingeal structures termed
the *epoֿphoron* and *paroֿphoron*.**

The definitive kidney, or the *metanephros*, forms in the sacral region as a pair of new structures, called the *ureteric buds*, sprout from the distal portion of the nephric duct and come in contact with the condensing blastema of *metanephric mesenchyme* at about the 28th day . The ureteric bud penetrates the metanephric mesenchyme and begins to divide dichotomously. The tip of the dividing ureteric bud, called the *ampulla*, interacts with the metanephric mesenchyme to induce formation of future nephrons via mesenchymal-epithelial interaction. As the ureteric bud divides and branches, each new ampulla acquires a caplike condensation of metanephric mesenchyme, thereby giving the metanephros a lobulated appearance

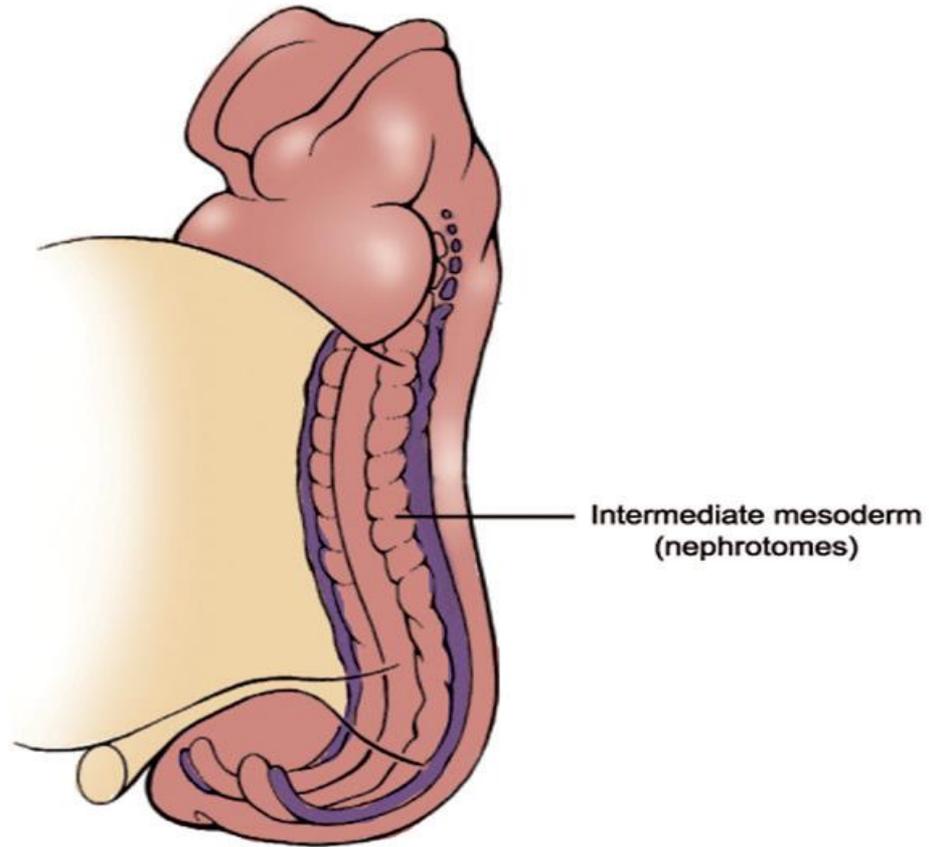
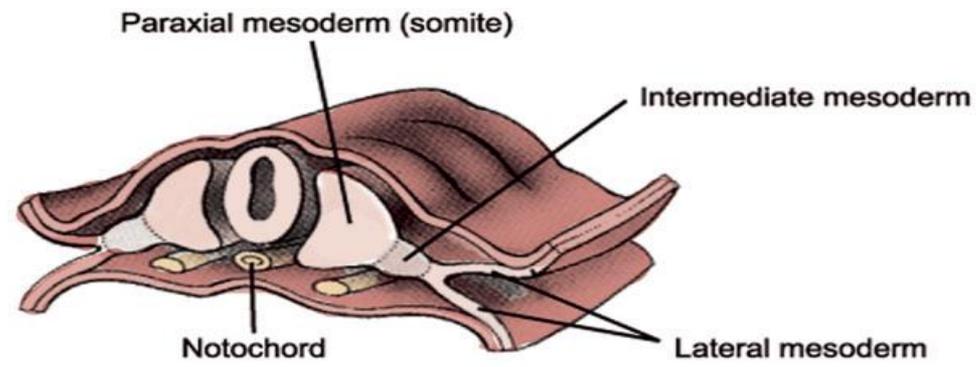
The nephron, which consists of the glomerulus, proximal tubule, loop of Henle, and distal tubule, is thought to derive from the metanephric mesenchyme, while the collecting system, consisting of collecting ducts, calyces, pelvis and ureter, is formed from the ureteric bud .



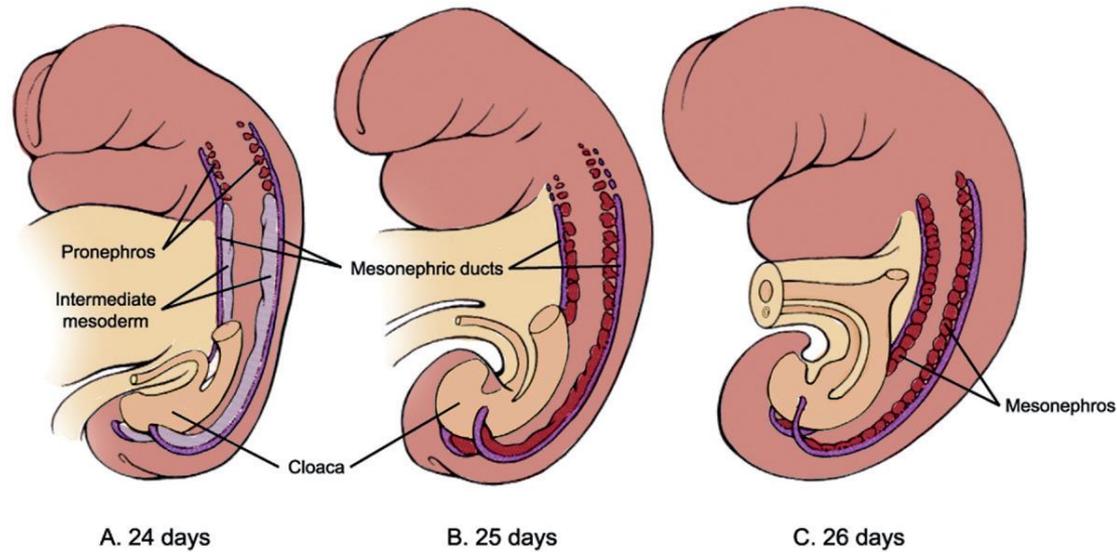
A. Kidney development



B. Ureter and bladder development



23 days



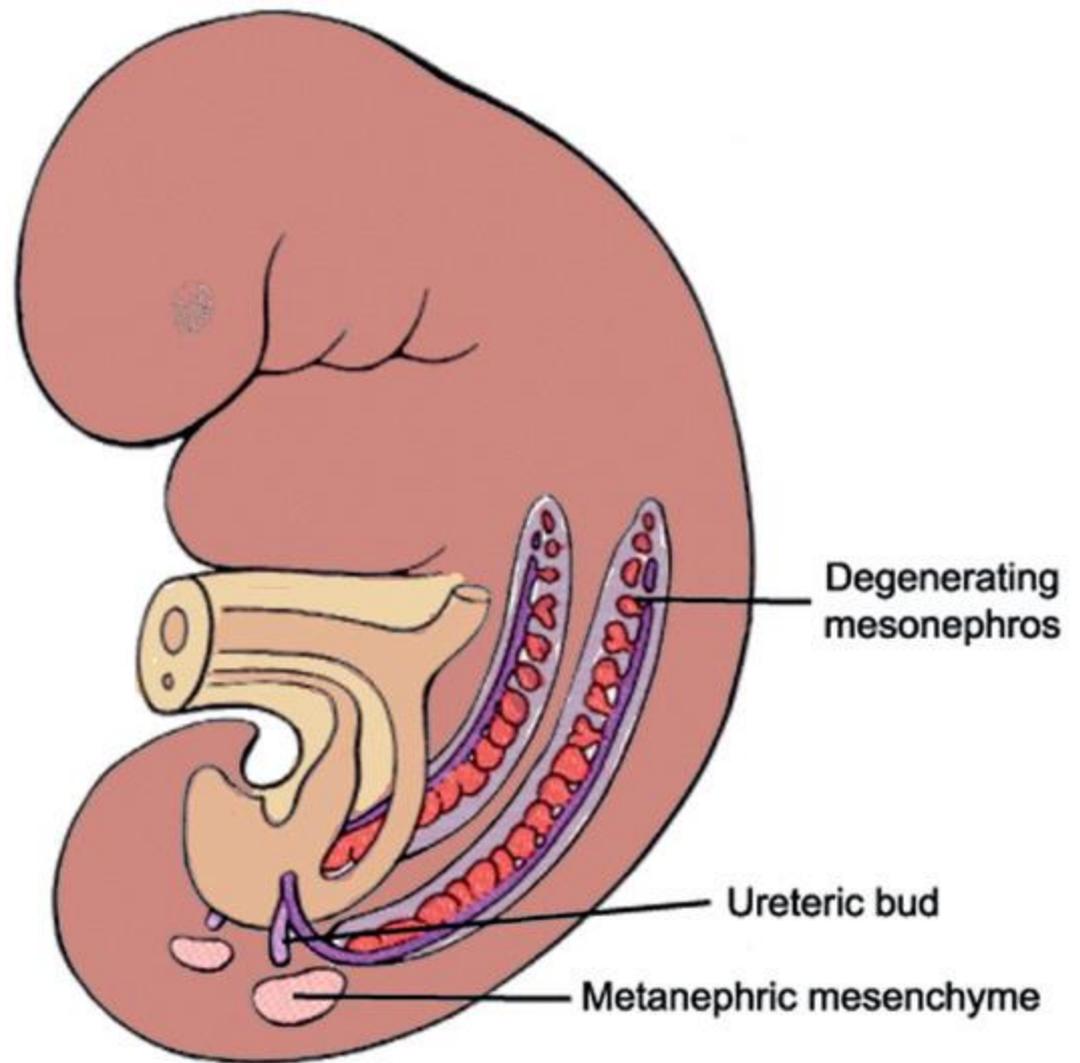
A. 24 days

B. 25 days

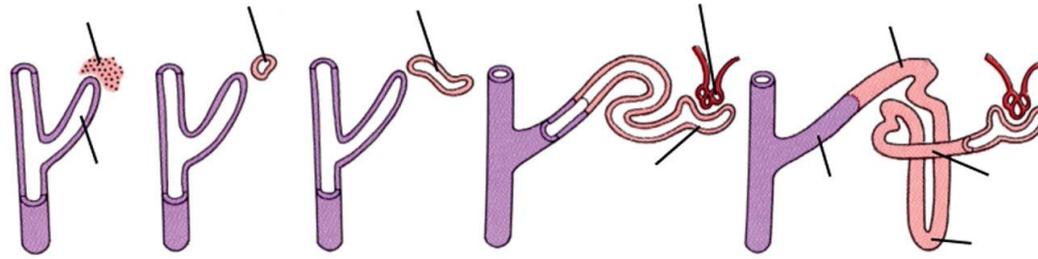
C. 26 days

Development of pronephros and mesonephros. **A**, Pronephros develops in each of five to seven cervical segments, but this primitive renal structure degenerates quickly during the fourth week. The (meso)nephric ducts first appear on day 24. **B** and **C**, Mesonephric vesicles and tubules form in a craniocaudal direction throughout the thoracic and lumbar regions. The cranial pairs degenerate as caudal pairs develop, and the definitive mesonephros contains about 20 pairs confined to the first three lumbar segments.

Metanephric mesenchyme condenses from the intermediate mesoderm during the early part of the fifth week and comes into contact with the ureteric bud, an outgrowth of the nephric duct, while the cranial mesonephros continues to degenerate.



28 days

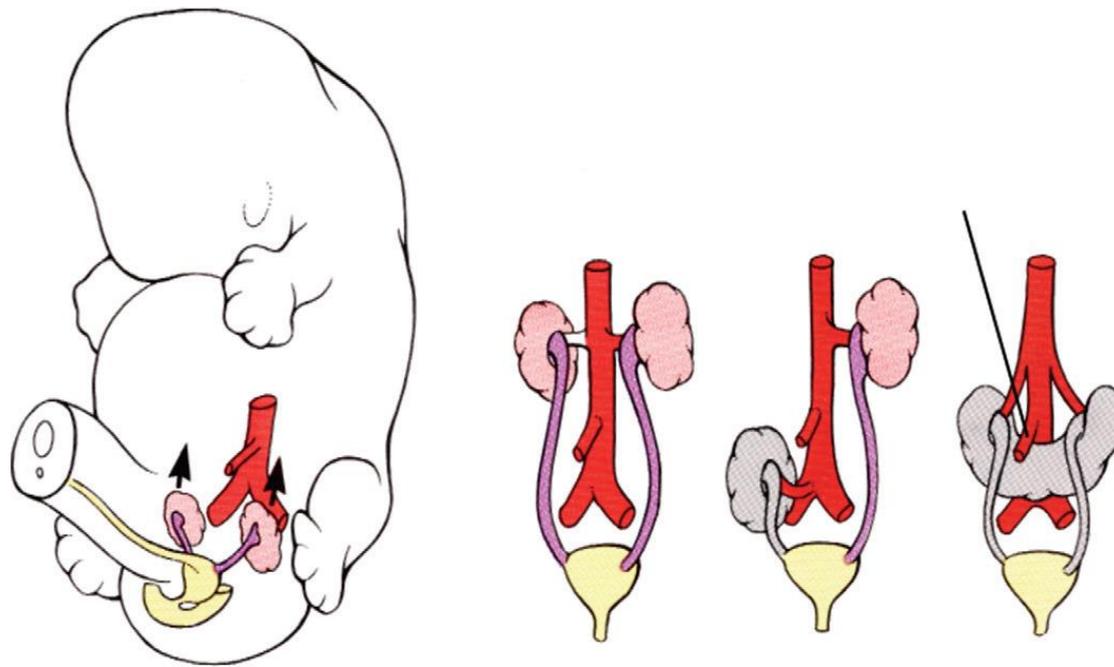


Development of the renal collecting ducts and nephrons. The tip of the dividing ureteric bud induces the metanephric mesenchyme (*in pink*) to condense, which then differentiates into a renal vesicle. This vesicle coils into an S-shaped tubule and ultimately forms a Bowman capsule as well as the proximal convoluted tubules, distal convoluted tubules, and loops of Henle. The ureteric bud (*in purple*) contributes to the formation of collecting ducts.

Renal Ascent

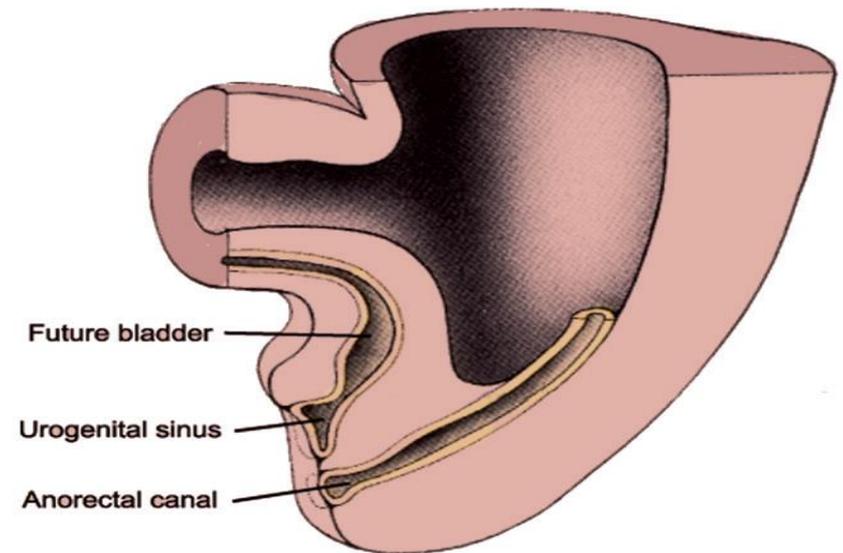
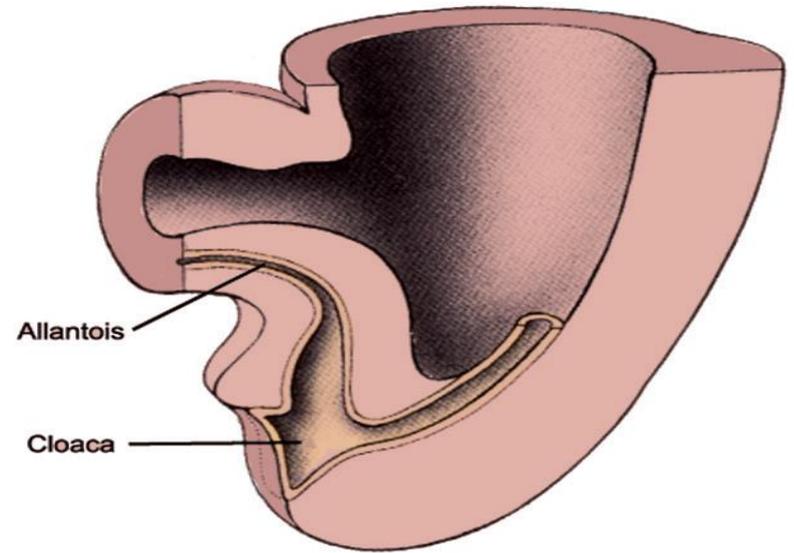
Between the sixth and ninth weeks the kidneys ascend to a lumbar site just below the adrenal glands . The precise mechanism responsible for renal ascent is not known, but it is speculated that the differential growth of the lumbar and sacral regions of the embryo plays a major role.

As the kidneys migrate they are vascularized by a succession of transient aortic sprouts that arise at progressively higher levels. These arteries do not elongate to follow the ascending kidneys but instead degenerate and are replaced by successive new arteries. The final pair of arteries forms in the upper lumbar region and becomes the definitive renal arteries.



Normal and abnormal ascent of the kidneys. **A** and **B**, The metanephros normally ascends from the sacral region to its definitive lumbar location between the sixth and ninth weeks. **C**, Rarely, a kidney may fail to ascend, resulting in a pelvic kidney. **D**, If the inferior poles of the kidneys fuse before ascent, the resulting horseshoe kidney does not ascend to a normal position owing to entrapment by the inferior mesenteric artery

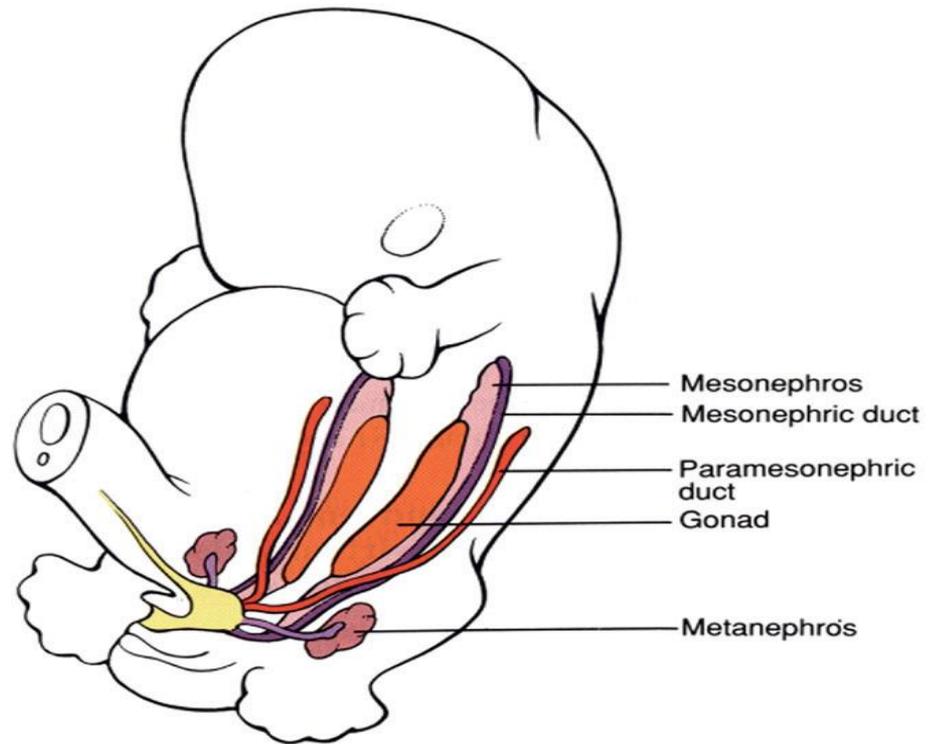
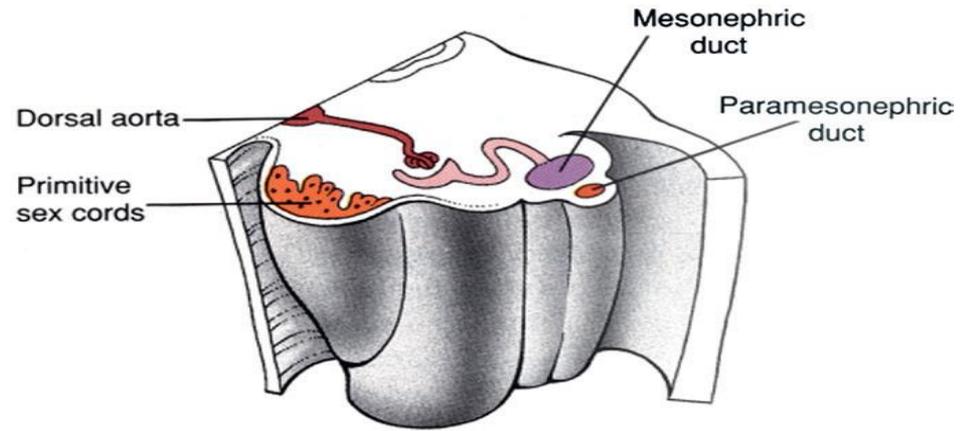
Development of the urogenital sinus.
Between the fourth and sixth weeks the cloaca is divided into an anterior urogenital sinus and a posterior anorectal canal. The superior part of the urogenital sinus, continuous with the allantois, forms the bladder. The constricted narrowing at the base of the urogenital sinus forms the pelvic urethra. The distal expansion of the urogenital sinus forms the vestibule of the vagina in females and the penile urethra in males.



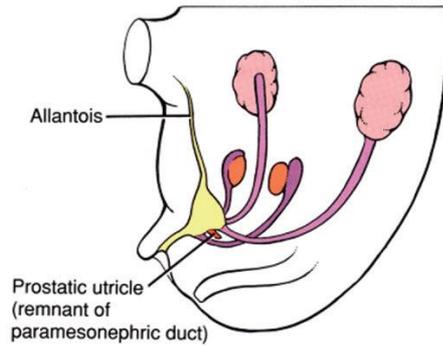
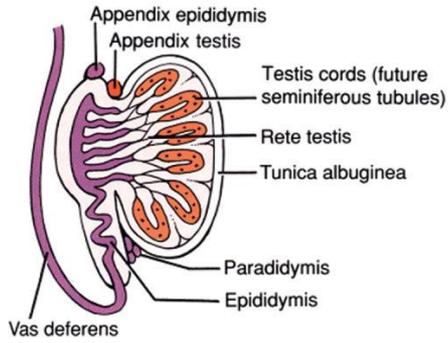
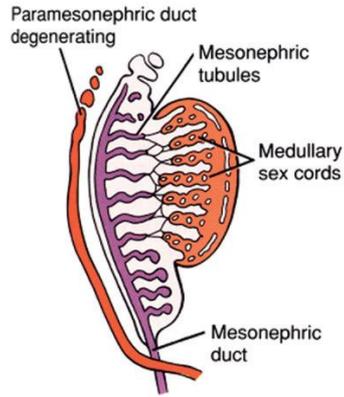
The entrance of the nephric duct into the primitive urogenital sinus serves as a landmark distinguishing the cephalad vesicourethral canal from the caudal urogenital sinus. The vesicourethral canal gives rise to the bladder and pelvic urethra, whereas the caudal urogenital sinus forms the phallic urethra for males and distal vaginal vestibule for females.

The right and left common excretory ducts fuse in the midline as a triangular area, forming the primitive trigone, structurally different from bladder and urethra

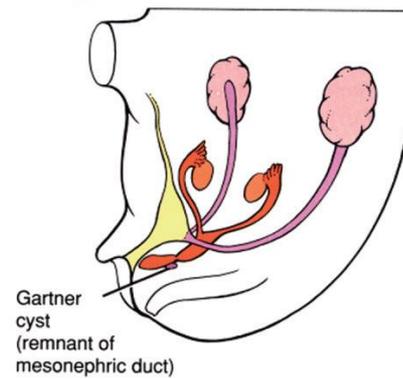
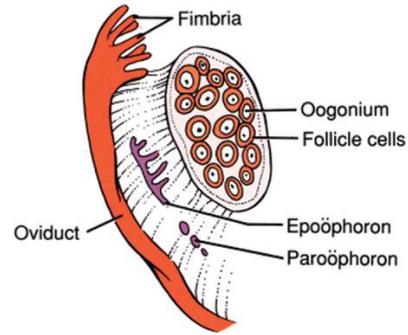
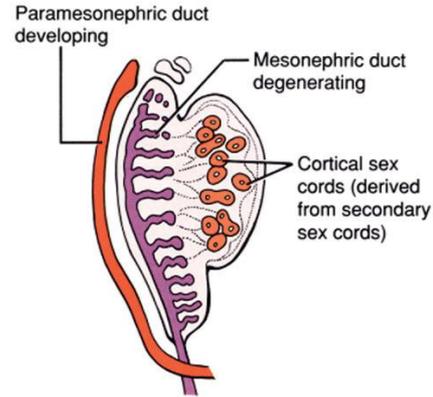
Formation of genital ridges and paramesonephric ducts. **A**, During the fifth and sixth weeks the genital ridges form in the posterior abdominal wall just medial to the developing mesonephros. The primordial germ cells induce the coelomic epithelial cells lining the peritoneal cavity and the cells of the mesonephros to proliferate and form the primitive sex cords. **B**, During the sixth week, the paramesonephric ducts develop lateral to the mesonephros. The caudal tips of the paramesonephric ducts fuse with each other as they connect with the urogenital sinus.



Male



Female



Male and female gonad and genital development. The male and female genital structures are virtually identical through the seventh week. In males, SRY protein produced by the Sertoli cells causes the medullary sex cords to become presumptive seminiferous tubules and causes the cortical sex cords to regress. Müllerian-inhibiting substance (MIS), a glycoprotein hormone produced by the Sertoli cells, then causes the paramesonephric ducts to regress, leaving behind appendix testis and prostatic utricle as remnants. Appendix epididymis and paradidymis arise from the mesonephric ducts.

In females, cortical sex cords invest the primordial germ cells and become the ovarian follicles. In the absence of MIS, the mesonephric ducts degenerate and the paramesonephric ducts give rise to the fallopian tubes, uterus, and the upper vagina. The remnants of the mesonephric ducts are found in the ovarian mesentery as the epoֹphoron and paroֹphoron, and in the anterolateral vaginal wall as the Gartner's duct cysts.

Anomalies of the Upper Urinary Tract

Anomalies of Number

Bilateral Renal Agenesis

- * Forty percent of the affected infants are stillborn.
- * Most of the children who are born alive do not survive beyond 48 hours due to respiratory distress associated with pulmonary hypoplasia.
- * The characteristic Potter facies and the presence of oligohydramnios are pathognomonic.
- * The ureters are almost always absent, and the bladder is either absent or hypoplastic. The adrenal glands are usually positioned normally.
- * Müllerian duct anomalies are commonly observed



An anephric child who lived 2 days has the typical Potter facial appearance. **A**, Note the prominent fold and skin crease beneath each eye, blunted nose, and depression between lower lip and chin. **B**, The ears give an impression of being low set because lobes are broad and drawn forward, but actually the ear canals are located normally.

Unilateral Renal Agenesis

Complete absence of one kidney occurs more frequently than BRA but is not easily detected from findings on physical examination. Over the past two decades, prenatal ultrasound examinations have been performed more routinely, and URA is being detected with increased frequency. A familial tendency has been noted .

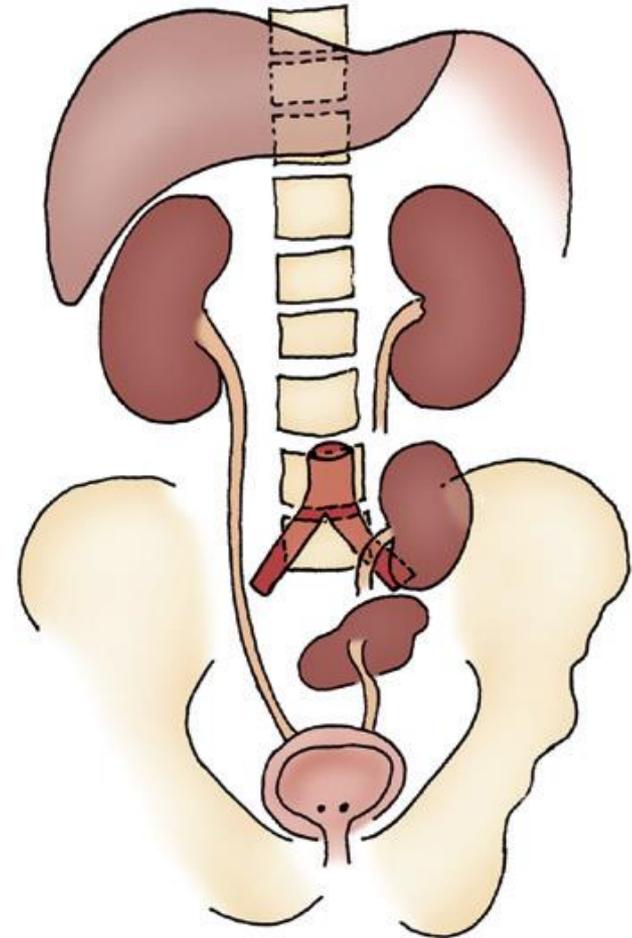
- * Unilateral agenesis occurs once in 1100 births.
- * Males predominate with a ratio of 1.8 : 1. Absence of one kidney occurs somewhat more frequently on the left side.
- * The ipsilateral ureter is completely absent in about half of the patients.
- * Despite the predominance of males with URA, müllerian duct abnormalities occur in 25% to 50% of cases of females
- * with URA compared with wolffian duct anomalies in 10% to 15% of males with URA.
- * Approximately one fourth to one third of women with müllerian duct anomalies are found to have URA.
- * Anomalies of other organ systems are found frequently in affected individuals. The more common sites involve the cardiovascular, gastrointestinal, and musculoskeletal systems.
- **Dysplasia is a histologic diagnosis made by the presence of embryonic, immature mesenchyme, and primitive renal components .**

Supernumerary Kidney

- * The supernumerary kidney is a definitive accessory organ with its own collecting system, blood supply, and distinct encapsulated parenchyma.
- * The supernumerary kidney may be either completely separate or loosely attached to the kidney on the ipsilateral side.
- * The ureteral inter-relationships on the side of the supernumerary kidney can be variable.

Anomalies of Ascent

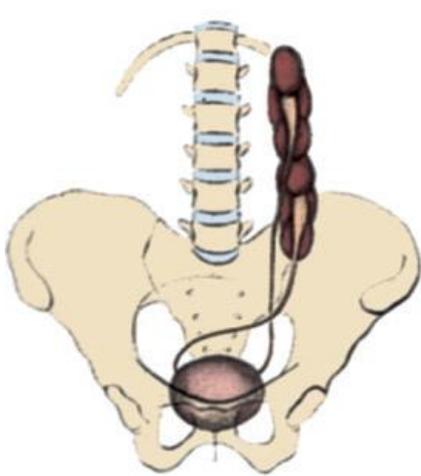
Simple Renal Ectopia



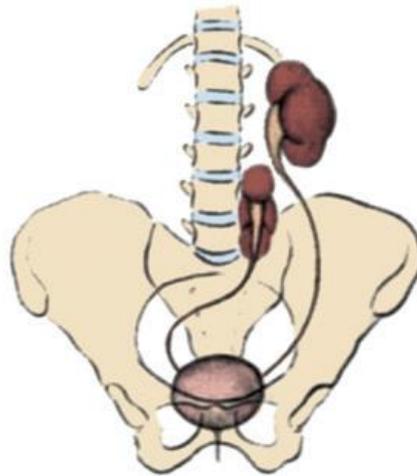
**Cephalad Renal Ectopia---
Thoracic Kidney**

Anomalies of Form and Fusion

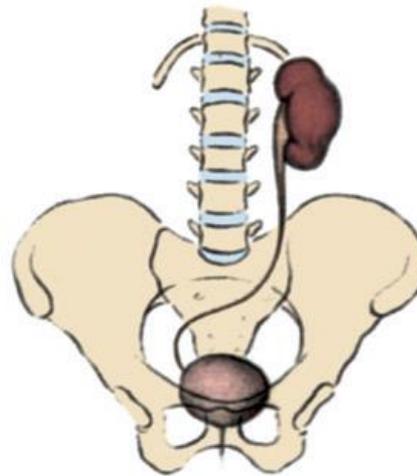
Crossed Renal Ectopia with and without Fusion



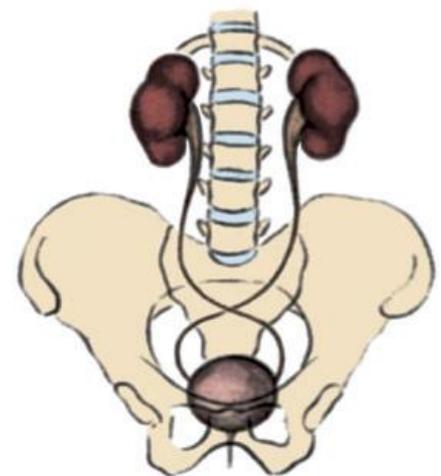
Crossed renal ectopia
With fusion



Crossed renal ectopia
without fusion

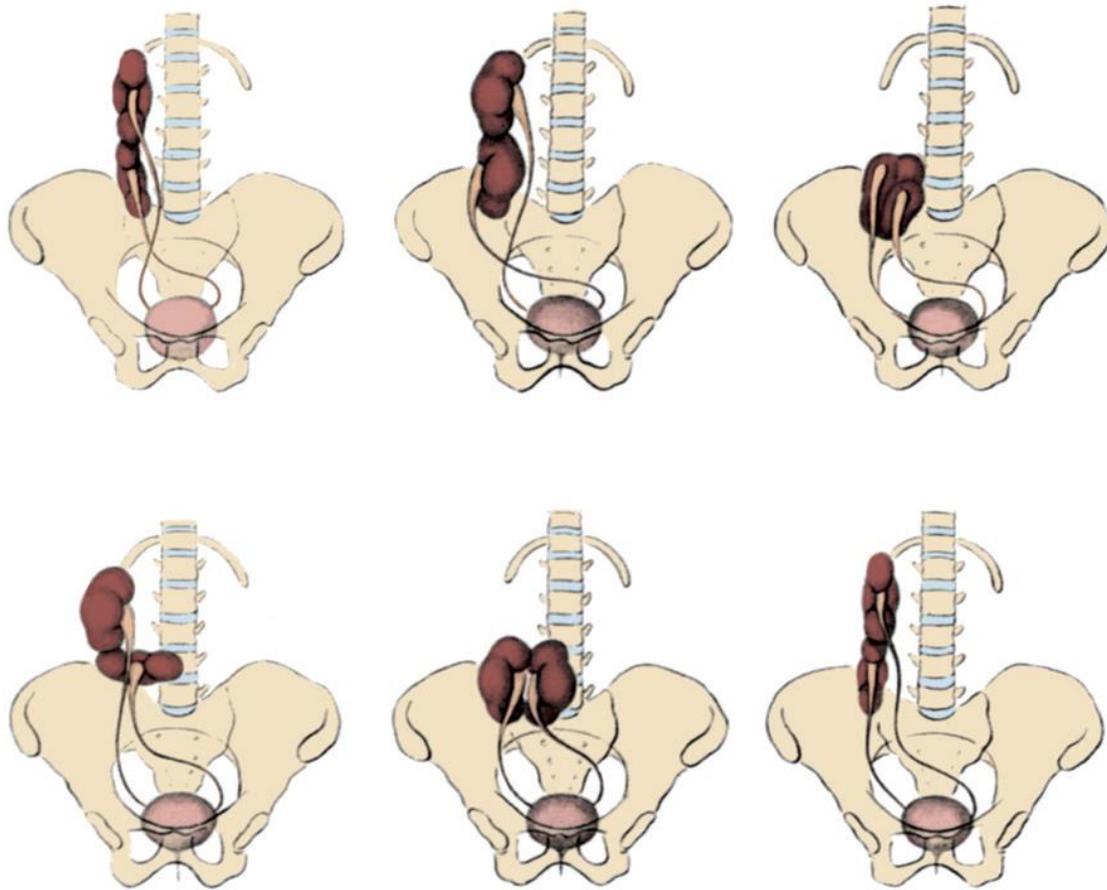


Solitary crossed
renal ectopia



Bilaterally crossed
renal ectopia

Four types of crossed renal ectopia.



Unilateral fused kidney (inferior **ectopia**)

Sigmoid or S-shaped kidney

Lump kidney

L-shaped kidney

Disc kidney

Unilateral fused kidney (superior ectopia)

Six forms of crossed renal ectopia with fusion.

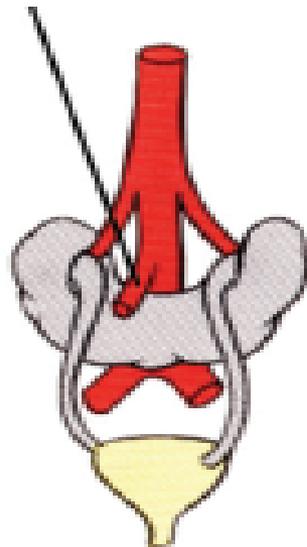
Crossed Renal Ectopia with and without Fusion

- * When a kidney is located on the side opposite from that in which its ureter inserts into the bladder, the condition is known as crossed ectopia.
- * Ninety percent of crossed ectopic kidneys are fused with their mate; the superior pole of the ectopic kidney usually joins with the inferior aspect of the normal kidney.
- * In all the types of fusion anomalies, the ureter from each kidney is usually orthotopic.
- * The highest incidence of associated anomalies occurs in children with solitary renal ectopia and involves both the skeletal system and genital organs.

Horseshoe Kidney

* The horseshoe kidney is the most common of all renal fusion anomalies. Horseshoe kidney occurs in 0.25% of the population, or about 1 in 400 persons .

* In 95% of cases, the kidneys join at the lower pole, which occurs before the kidneys have rotated on their long axes. In a small subset, an isthmus connects both upper poles .Generally, the isthmus is bulky and consists of parenchymatous tissue with its own blood supply



- * The calyces are normal in number and are atypical in orientation. Because the kidney fails to rotate, the calyces point posteriorly, and the axis of each pelvis remains in the vertical or obliquely lateral plane (on a line drawn from lower to upper poles). The ureter may insert high on the renal pelvis and lie laterally.**
- * The blood supply to the horseshoe kidney can be quite variable. The horseshoe kidney is frequently associated with other congenital anomalies.**
 - Stone formation has been commonly seen in horseshoe kidney.**
 - In the modern era, horseshoe kidneys are frequently discovered incidentally, and their apparent hydronephrosis often shows a nonobstructed pattern on radionuclide scanning.**
 - The classic radiologic features on a plain film of the abdomen include kidneys that are somewhat low lying and close to the vertebral column and have a vertical or outward axis with the lower poles being more medial than in the normal kidney.**

Although a fixed mass below the umbilicus may suggest a horseshoe kidney, the final diagnosis is established by IVU. The most characteristic finding is that the lowest calyx on each side is reversed in position (i.e. it means directed towards the vertebral column) While horseshoe is not a contraindication to pregnancy urinary complications are more frequent

Anomalies of Rotation

The kidney and renal pelvis normally rotate 90 degrees ventromedially during ascent so that the calyces point laterally and the pelvis faces medially. When this alignment is not exact, the condition is known as malrotation.

It is frequently associated with Turner syndrome.

Anomalies of Renal Vasculature

**Aberrant, Accessory,
or Multiple Vessels**

Renal Artery Aneurysm

Renal Arteriovenous Fistula

Anomalies of the Collecting System
Calyceal Diverticulum



Hydrocalycosis

Megacalycosis

Megacalycosis is defined as nonobstructive enlargement of calyces resulting from malformation of the renal papillae

Unipapillary Kidney

The unipapillary kidney is a rare anomaly with only 18 cases reported

Extrarenal Calyces

Extrarenal calyces are an uncommon congenital anomaly in which the major calyces and the renal pelvis are outside the parenchyma of the kidney,

Pelvis

Extrarenal Pelvis

Bifid Pelvis

Approximately 10% of normal renal pelves are bifid.

Cystic Diseases of the Kidney

Renal cysts are cavities derived primarily from tubules and are composed of a layer of partially dedifferentiated epithelial cells enclosing a cavity filled with urine-like liquid or semisolid material. They may develop in any tubular segment between the Bowman capsule and the tip of the renal papilla, depending on the nature of the underlying disorder.

The fundamental processes that are essential for the development and progressive enlargement of renal cysts include

- (1) Proliferation of epithelial cells in segments of renal tubule,
- (2) accumulation of fluid within the expanding tubule segment, and
- (3) disturbed organization and metabolism of the extracellular matrix .

CLASSIFICATION

Inheritable

Autosomal recessive (infantile) polycystic kidney disease

Autosomal dominant (adult) polycystic kidney disease

Juvenile nephronophthisis/medullary cystic disease complex

Juvenile nephronophthisis (autosomal recessive)

Medullary cystic disease (autosomal dominant)

Congenital nephrosis (familial nephrotic syndrome) (autosomal recessive)

Familial hypoplastic glomerulocystic disease (autosomal dominant)

Multiple malformation syndromes with renal cysts (e.g., tuberous sclerosis, von Hippel-Lindau disease)

Noninheritable

Multicystic kidney (multicystic dysplastic kidney)

Benign multilocular cyst (cystic nephroma)

Simple cysts

Medullary sponge kidney

Sporadic glomerulocystic kidney disease

Acquired renal cystic disease

Calyceal diverticulum (pyelogenic cyst)

Autosomal Recessive Polycystic Kidney Disease

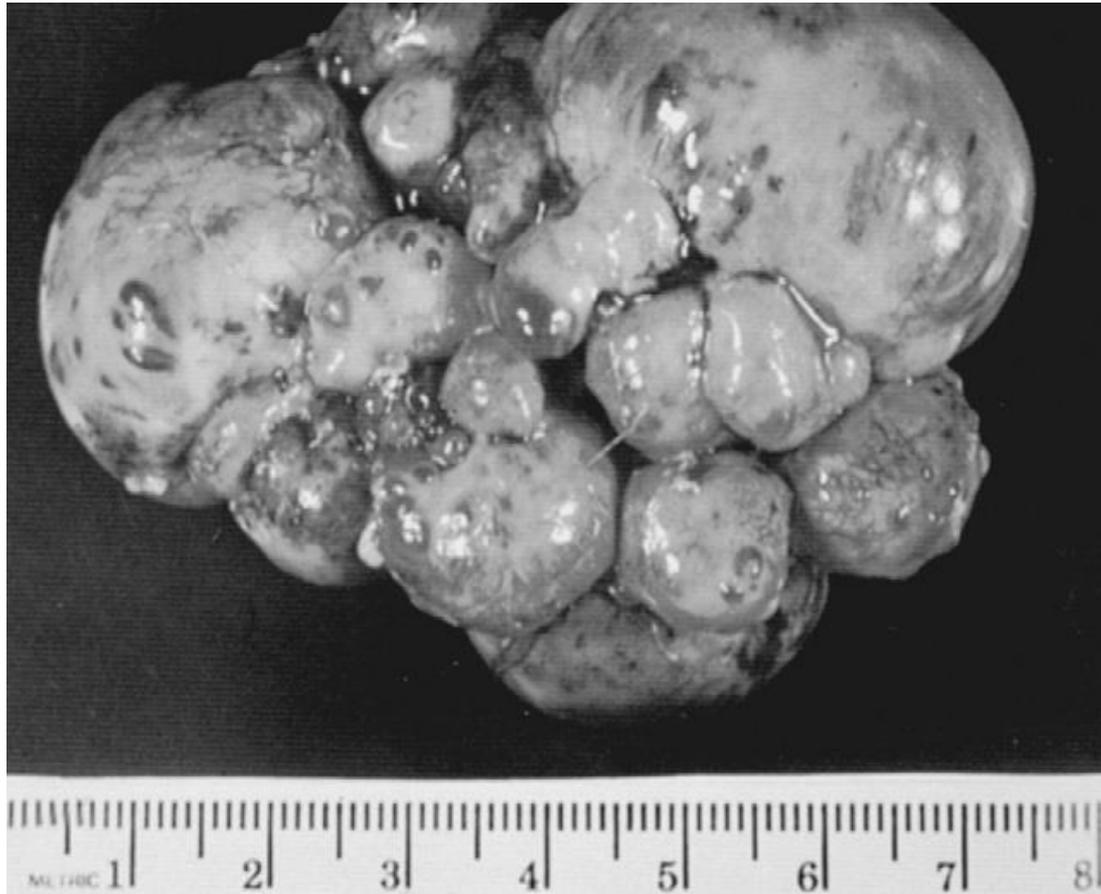
- * ARPKD is secondary to a mutation of the *PKHD1* gene on chromosome 6.
- * The severe form presents in utero or in infancy; milder cases can present later in childhood and rarely into the early 20s.
- * All affected individuals have some degree of congenital hepatic fibrosis.
- * When it manifests early, it is associated most often with very large kidneys that are homogeneously hyperechogenic.
- Discrete cysts appear more often as the child gets older.
- Renal ultrasonography reveals bilateral, very enlarged, diffusely echogenic kidneys, and the increased echogenicity is due to the presence of numerous microcysts (created by tightly compacted, dilated collecting ducts) that result in innumerable interfaces.
- * Considerable overlap in clinical presentation and imaging findings can occur between ADPKD and ARPKD.

Autosomal Dominant Polycystic Kidney Disease

- * ADPKD is the most common inheritable form of renal cystic disease.
- * ADPKD most often becomes clinically apparent after age 30 years but may present at any age, including in utero.
- * Ninety-nine percent of affected individuals have a mutation either of the *PKD1* gene on chromosome 16 or, less often, of the *PKD2* gene on chromosome 4.
- * The protein products of *PKD1* and *PKD2* are polycystin-1 and polycystin-2, and they inhibit cell proliferation through several pathways.
- * Cysts can be identified sonographically before age 20 years in almost all affected individuals.
- * ADPKD is associated with a high incidence of liver cysts that increases with age.
- * Signs or symptoms first occur between the ages of 30 and 50 years and include hematuria, flank pain, gastrointestinal symptoms, renal colic, and hypertension.
- * Hepatic cysts occur in virtually all patients with ADPKD by the age of 50 years and are rarely symptomatic.
- * ICAs of the circle of Willis (berry aneurysm) occur in 10% to 30% of patients, and approximately 9% of these patients die because of subarachnoid hemorrhages.
- * The incidence of RCC in ADPKD patients is no higher than that of the general population.

Multicystic Dysplastic Kidney

- * Multicystic dysplastic kidney is a developmental anomaly resulting in multiple cysts of varying sizes, is without identifiable normal renal parenchyma, is associated with active expression of genes involved with nephrogenesis, and has a changing morphology.
- * Kidneys usually get smaller or disappear from view on imaging studies (i.e., renal aplasia), very occasionally increase in size, and, very rarely, are associated with Wilms tumor.
- * There is no clear indication for removal of the kidney, unless an increased amount of solid tissue is identified.
- * Large series data indicate that MCDK is not associated with an increased risk for hypertension or neoplasm.
- * Fifteen percent of patients have associated contralateral reflux, and debate exists regarding whether or not to obtain a voiding cystourethrogram in all or only in those with some degree of fullness in the contralateral collecting system.



A typical multicystic dysplastic kidney having the appearance of a bunch of grapes. The kidney was composed almost entirely of cysts with very little stroma.

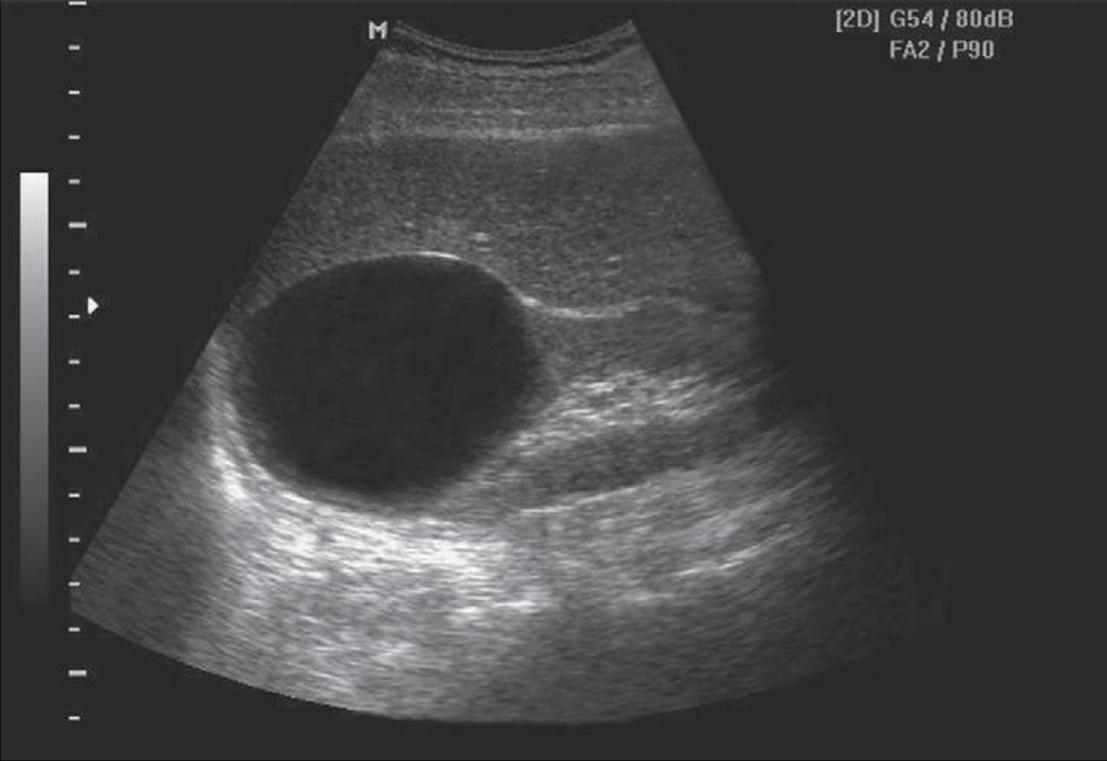
Simple Cysts:

- * **Simple cysts are the most common cystic lesions found in the human kidney.**
- * They are usually oval to round, may be solitary or multiple, unilateral or bilateral, and are filled with plasma-like clear or straw-colored fluid . They are not connected to any part of the nephron, although they may originate initially from a portion of the nephron.
- * Simple cysts are seldom seen in children; in adults, simple cysts are seen increasingly more frequently with age.
- * To diagnose a benign simple cyst on ultrasonography, it should
 - (1) have no internal echoes,
 - (2) have a sharply defined, thin, distinct smooth wall,
 - (3) be spherical or oval with no internal echoes, and
 - (4) have good transmission of sound waves with acoustic enhancement behind the cyst.
- * When these criteria are not met, CT with contrast enhancement must be performed.
- * Relevant guidelines for determining when to explore or remove a complex cyst are often based on the Bosniak CTclassification

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TREATMENT:

Once malignancy has been ruled out, surgical intervention for an asymptomatic cyst is not indicated. Treatment of the simple cyst must thus be directed to the symptomatology.

When a benign simple cyst causes pyelocalyceal obstruction or hypertension, the problem may be corrected either surgically, by unroofing the cyst, or percutaneously, by aspirating the fluid and perhaps injecting a sclerosing agent, particularly if fluid has reaccumulated after an earlier aspiration. Several sclerosing agents have been used, including glucose, phenol, iophendylate (Pantopaque), bismuth phosphate, and absolute ethanol, but none has been sufficiently impressive for its use to become dominant. Infected cysts must be drained and appropriate antibiotics given.

Percutaneous resection, intrarenal marsupialization, and laparoscopic unroofing (either transperitoneally or retroperitoneally) are all reasonable options for the treatment of symptomatic simple cysts.

Medullary Sponge Kidney

* Medullary sponge kidney is usually a nonheritable condition associated with dilated collecting ducts that appear as bristles on a brush on intravenous pyelography, and the ducts are sometimes filled with calcifications.

* There is a high incidence of renal colic (50% to 60%), urinary tract infections (20% to 33%), gross hematuria (10% to 18%), and hypercalciuria (33%).

• In general, intravenous urography is more sensitive than CT in detecting mild cases of medullary sponge kidney.

• **The urographic features of the disorder are as follows:**

- (1) enlarged kidneys, sometimes with calcification, particularly in the papillae;**
- (2) elongated papillary tubules or cavities that fill with contrast medium; and**
- (3) Papillary contrast blush and persistent medullary opacification.**

* Calcium deposits within the tubules may appear as renal calculi or nephrocalcinosis.

It is the complications of medullary sponge kidney, calculus formation and infection, that require management.

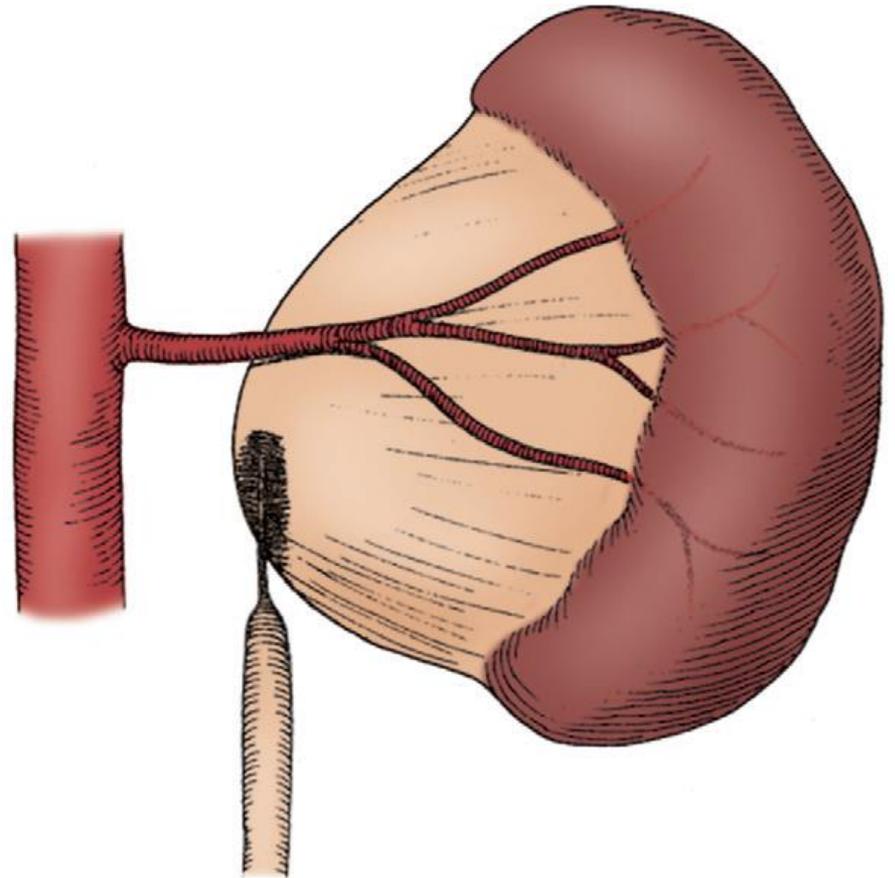
* In addition to liberal fluid intake, **thiazides are effective for lowering hypercalciuria and limiting stone formation**

Congenital PUJ Obstruction:

A ureteropelvic junction (UPJ) obstruction can be considered a restriction to flow of urine from the renal pelvis to the ureter, which, if left uncorrected, will lead to progressive renal deterioration.

UPJ obstruction is the most common cause of significant dilation of the collecting system in the fetal kidney.

**AGE:
SEX
SIDE
LATRALITY**



Etiology

Intrinsic;

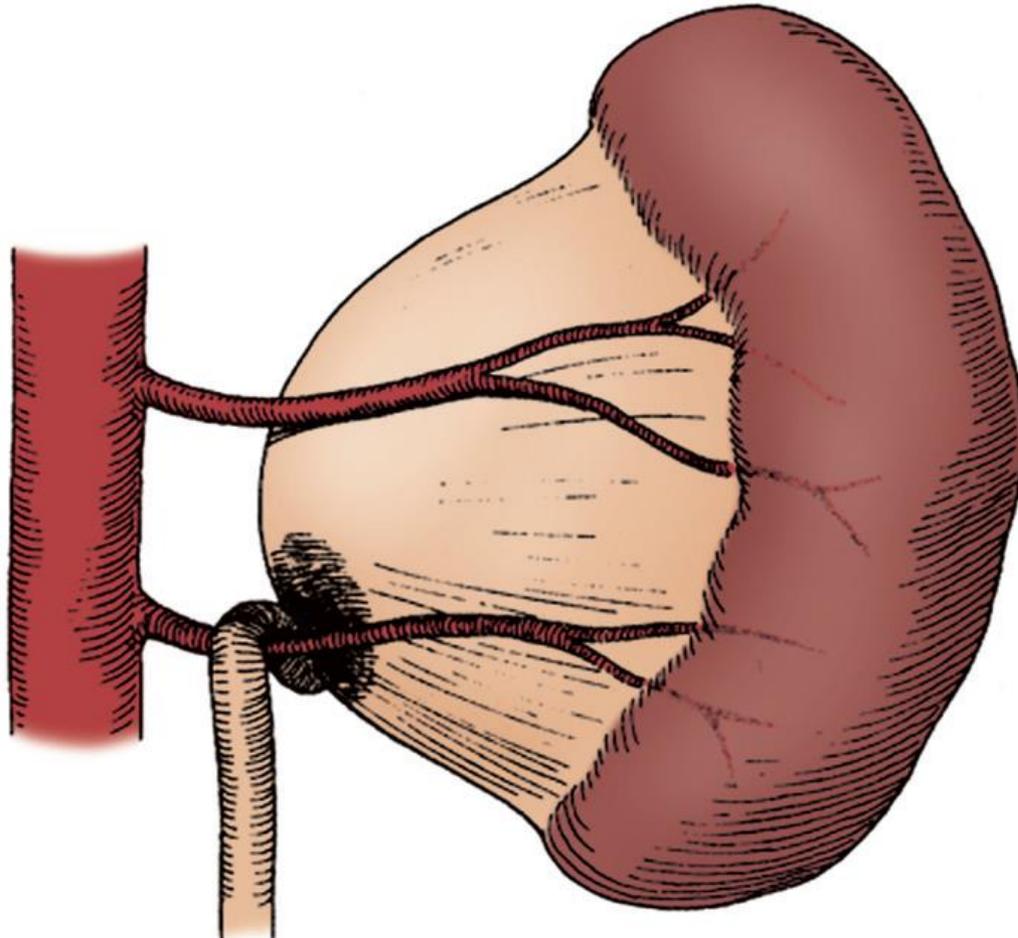
The muscle fibers become widely separated and attenuated, leading to a functional discontinuity of the muscular contractions and ultimately to insufficient emptying

Extrinsic;

An aberrant, accessory, or early-branching lower-pole vessel is the most common cause of extrinsic UPJ obstruction .

These vessels pass anteriorly to the UPJ or proximal ureter and contribute to mechanical obstruction.

Whether the aberrant vessel causes the obstruction or is a covariable that exists along with intrinsic narrowing is unclear



SYMPTOMS/PRESENTATION

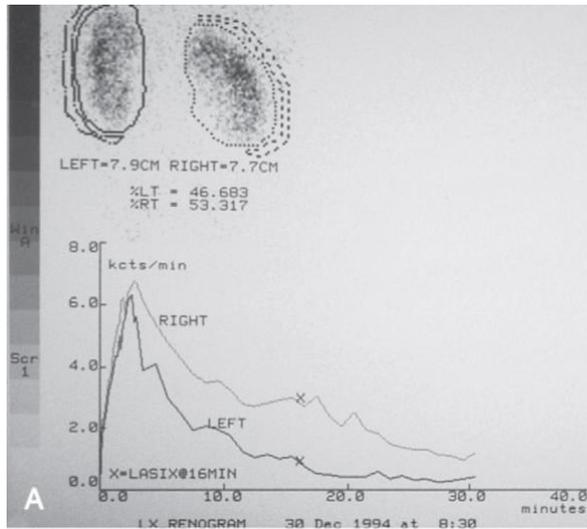
- * Most infants are asymptomatic, and most children are discovered because of their symptoms.
- * palpable mass
- * Occasionally, there are still infants who present with failure to thrive, feeding difficulties, sepsis secondary to urinary tract infection, or pain or hematuria related to nephrolithiasis. Urinary tract infection is the presenting sign in 30% of affected children beyond the neonatal period.
- * In the older child, episodic flank or upper abdominal pain, sometimes associated with nausea and vomiting due to intermittent UPJ obstruction, is a prominent symptom .
cyclic vomiting alone is caused by intermittent UPJ obstruction.
- * Hematuria
- * Hypertension

Diagnosis:

U/S

IVP

RENOGRAM



TREATMENT:

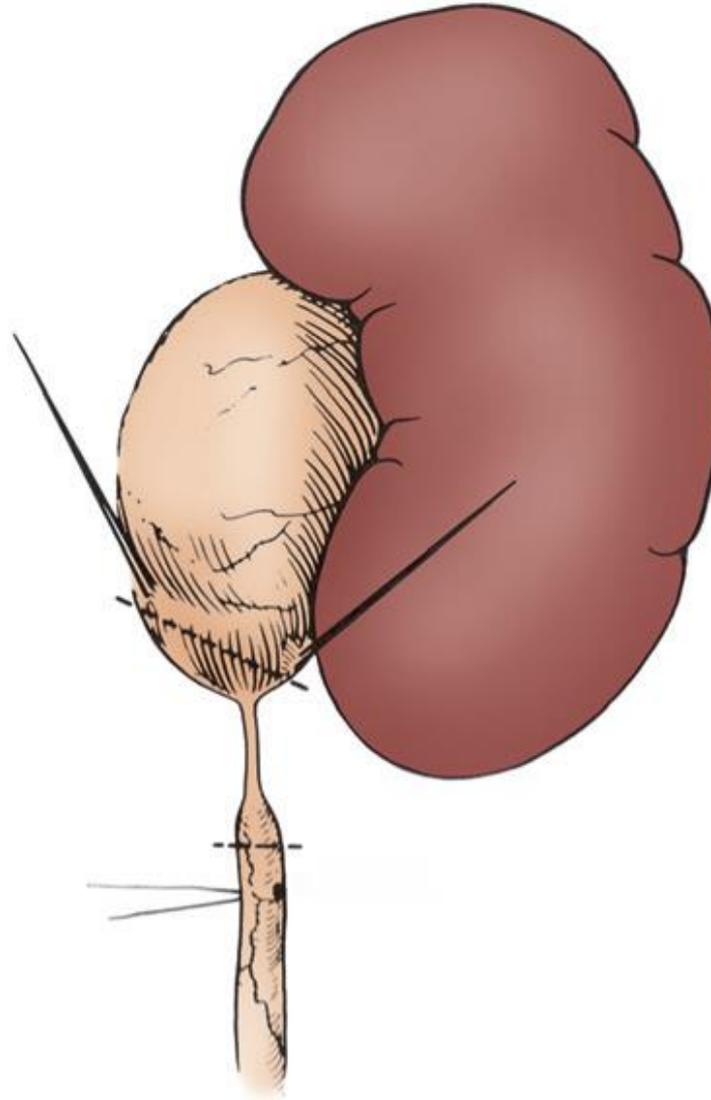
open surgical techniques yielding way to endoscopic, laparoscopic, and robotic-assisted approaches.

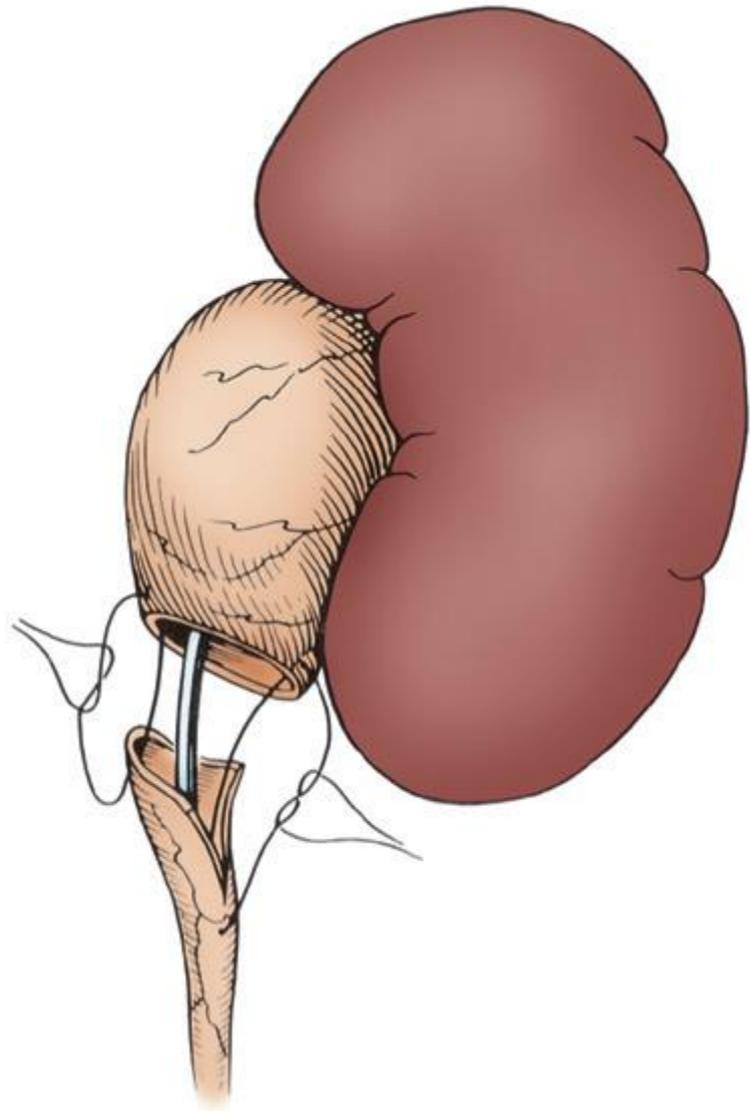
The open techniques that have had the greatest applicability can be classified

Pyeloplasty:

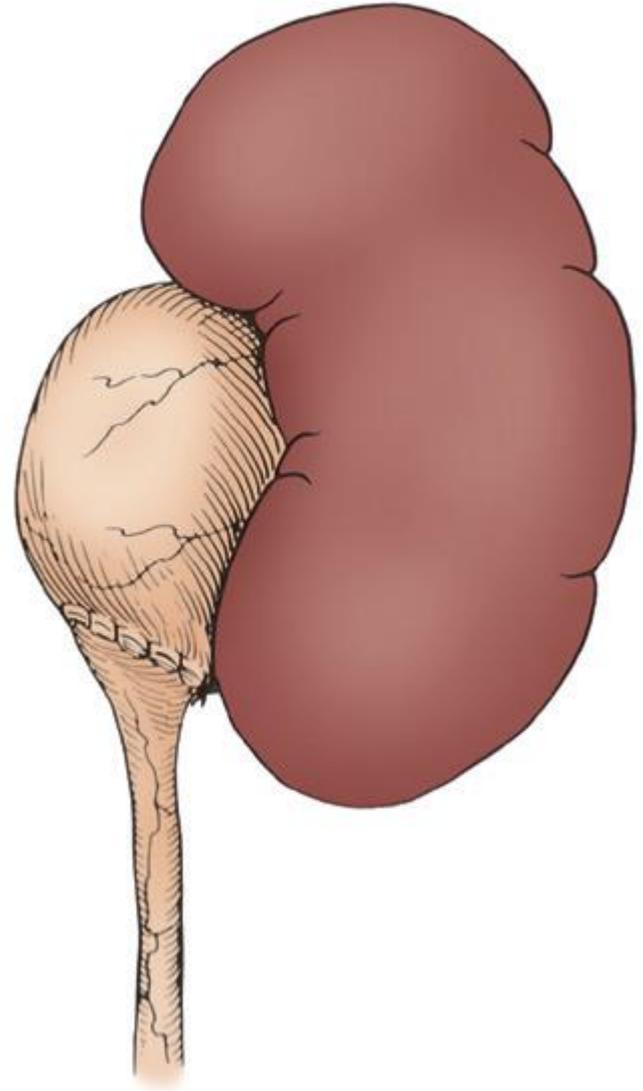
Dismembered

Nondismembered





Anderson-Hynes dismembered pyeloplasty.



MEGAURETERS

Megaloureter is a term introduced to describe a dilated ureter.

megaureter may be:

obstructed

refluxing

both refluxing and obstructed,

unobstructed and not refluxing

either from a primary (idiopathic cause intrinsic to the ureter or secondary to specific pathophysiologic processes, such as outlet obstruction, neurogenic dysfunction, polyuria, or infection).

Treatment ;

CAUSE

PRESENTATION

RENAL FUNCTION

1 - NON SURGICAL

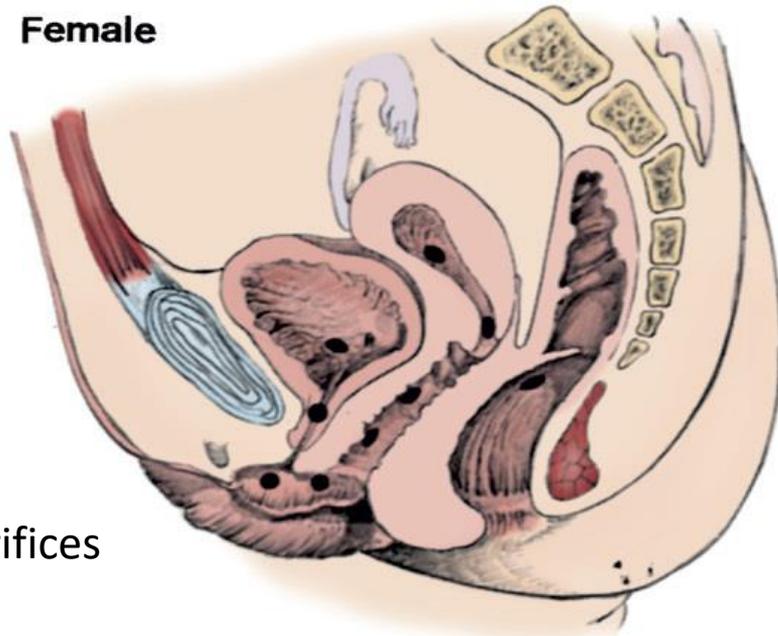
2- SURGICAL

Ureteral Anomalies

Ectopic Ureter

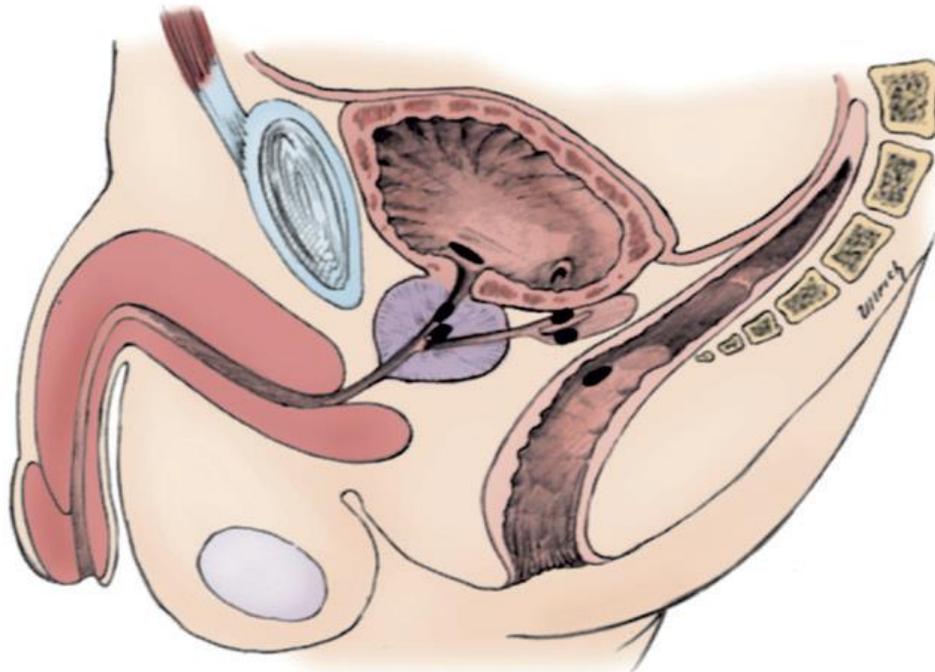
- * An ectopic ureter is any ureter, single or duplex, that does not enter the trigonal area of the bladder.
- * In a duplex system the ectopic ureter is inevitably the upper pole ureter due to its budding from the mesonephric duct later (more cephalad) than the lower pole ureteral bud.
- * In females the ectopic ureter may enter anywhere from the bladder neck to the perineum and into the vagina, uterus, and even rectum. One of the classic symptoms is continuous wetting.
- * In males the ectopic ureter always enters the urogenital system above the external sphincter or pelvic floor, and usually into the wolffian structures including vas deferens, seminal vesicles, or ejaculatory duct.

Female



Sites of ectopic ureteral orifices
in the male and female.

Male





Perineal ectopic ureteral orifice (*bottom arrow*)
cannulated with an angiocatheter, situated between the urethral
orifice (*top arrow*) and the vagina, just to the left of midline.

Ureterocele

Ureteroceles is a cystic dilation of the distal aspect of the ureter that is located either within the bladder or spanning the bladder neck and urethra.

The majority of ureteroceles and ectopic ureters are detected through prenatal ultrasound (US) imaging, even if the specific diagnosis is not made.

The ectopic ureter can appear identical to a ureterocele with a dilated upper pole, tortuous ureter, but no intravesical component.

Clinical Presentation

*Incidental

*Infection

Ectopic ureters will frequently present with a less acute pattern evidenced by ongoing low-grade fever with periodic spikes. In some cases, urine cultures will be negative because the infected ectopic system is not draining into the bladder. Parents may describe a purulent discharge from the perineum.

*Incontinence

Urinary incontinence may be due to an ectopic ureter in a girl but not in a boy. Untreated ureteroceleles are rarely associated with incontinence. The toilet-trained girl with verified continuous urinary leakage must be evaluated for an ectopic ureter.

Pain

Prolapse



prolapsed ureterocele presented as an interlabial mass in a 3-week-old girl.

Dx-

Anatomical and Functional assessment: :

1- physical Ex

2-U/S

3-IVP

4-MRI

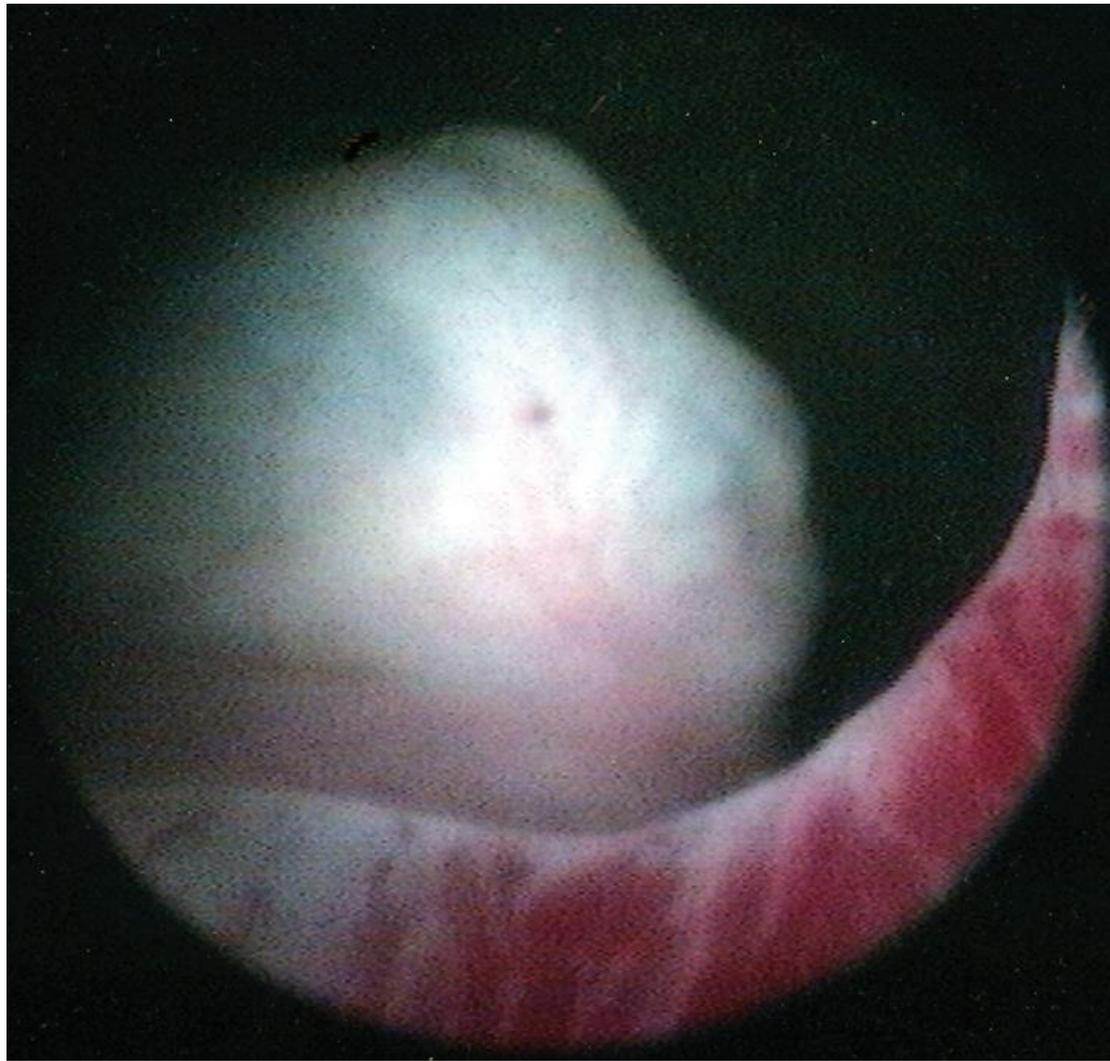
5-Renal function

6-Reogram--Nuclear image--DMSA)

7-Bladder function--us ,urodynamic

8-The voiding cystourethrogram (VCUG) --reflux, BN OBST.

9-Cystoscopy



Endoscopic image of an intravesical ureterocele just inside the bladder neck.

TREATMENT:

The goals of therapy are preservation of renal function; elimination of infection, obstruction, and reflux; and maintenance of urinary continence.

- * **Ureterocele: incision--adult**
Ureteric reimplantation-- children
- * **Ectopic ureter: reimplantation**
Heminephrectomy + ureterectomy

OTHER URETERAL ANOMALIES

Anomalies of Number

- * Bifid Ureters

- * Triplication

- * Quadruple Ureters

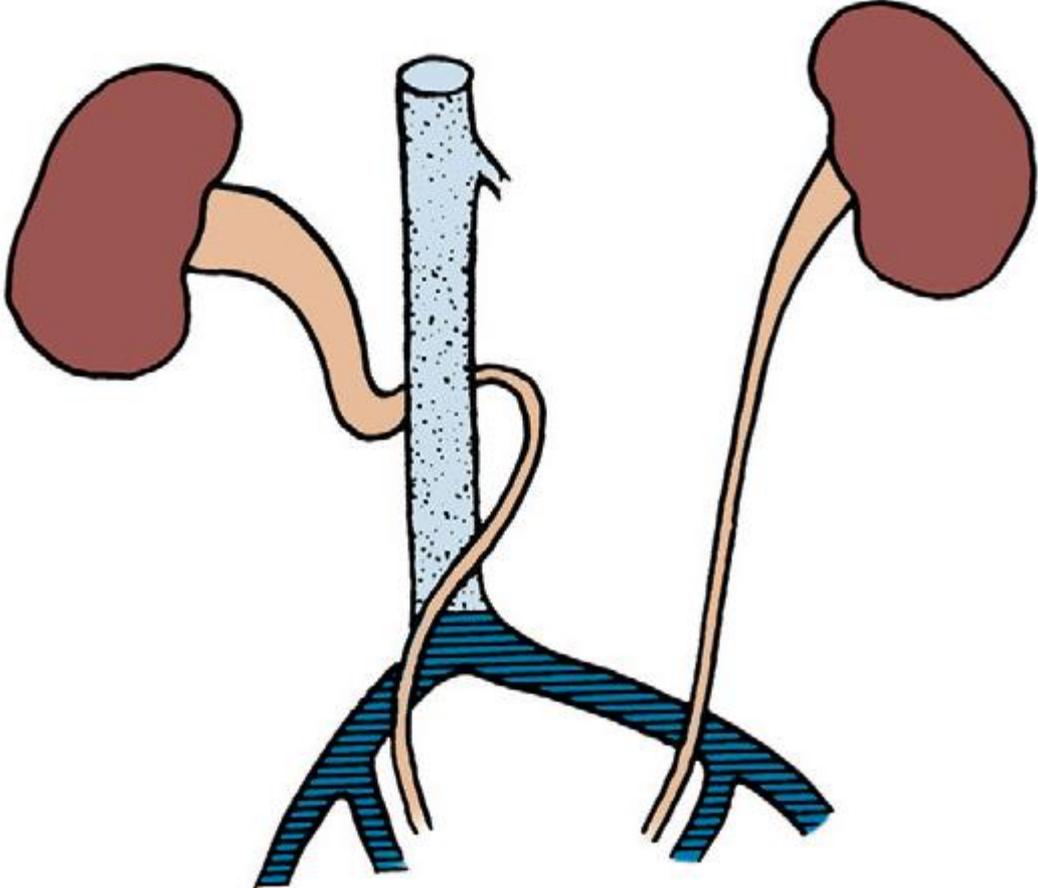
- * **Fibroepithelial Polyps**: of the ureter may present clinically with flank pain, hematuria, or by incidental detection of hydronephrosis.

The most common site of attachment is at the UPJ, although polyps may originate from any part of the ureter.

ANOMALIES OF POSITION

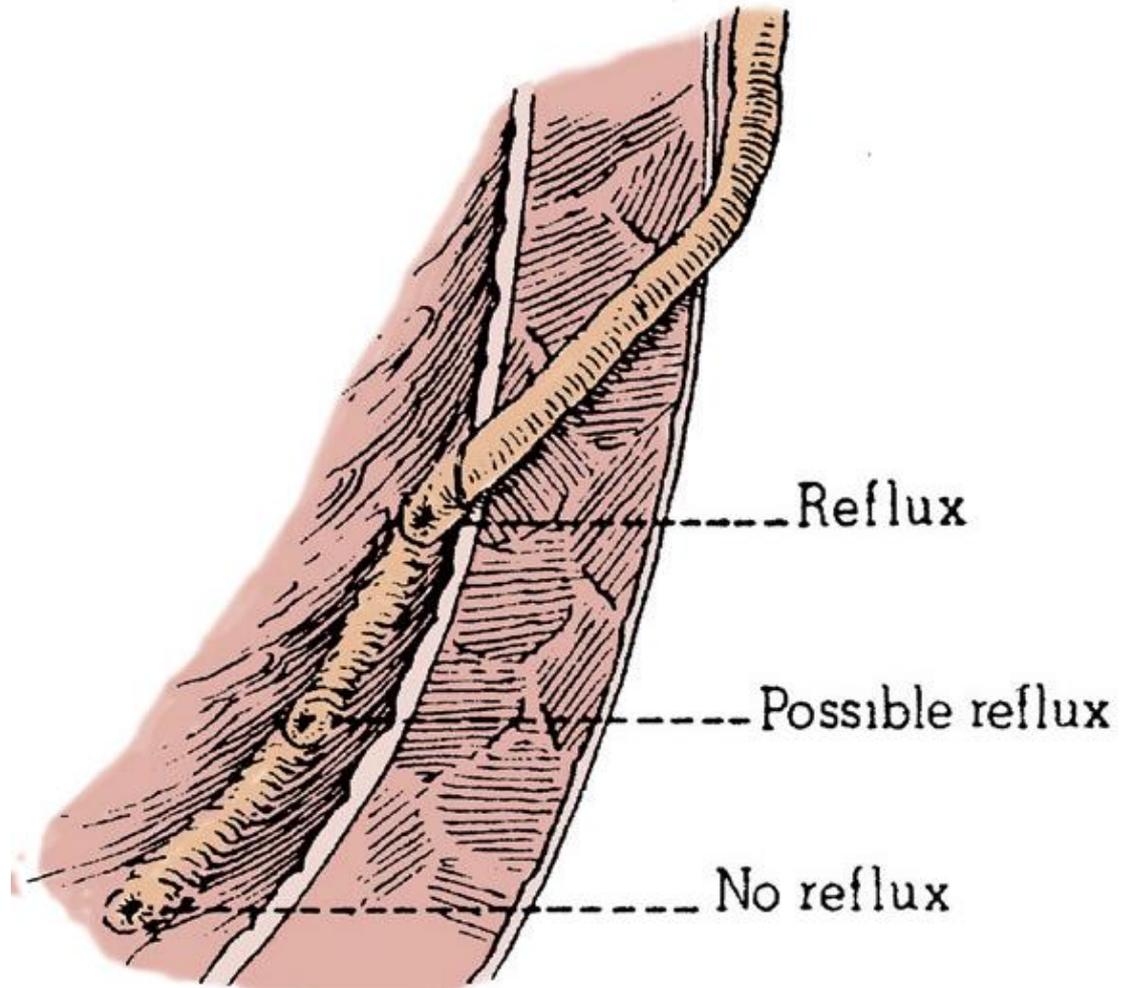
Preureteral Vena Cava:(Retro-caval Ureter)

This disorder involves the right ureter, which typically deviates medially behind (dorsal to) the inferior vena cava, winding about and crossing in front of it from a medial to a lateral direction, to resume a normal course, distally, to the bladder. The renal pelvis and upper ureter are typically elongated and dilated in a J or fishhook shape before passing behind the vena cava.



Vesicoureteral Reflux

VUR: represents the retrograde flow of urine from the bladder to the upper urinary tract. VUR is a common clinical entity. Its clinical challenges arise from the fact that it is usually asymptomatic. When it is not, however, it is responsible for pyelonephritic scarring and can be associated with congenital renal dysmorphism.



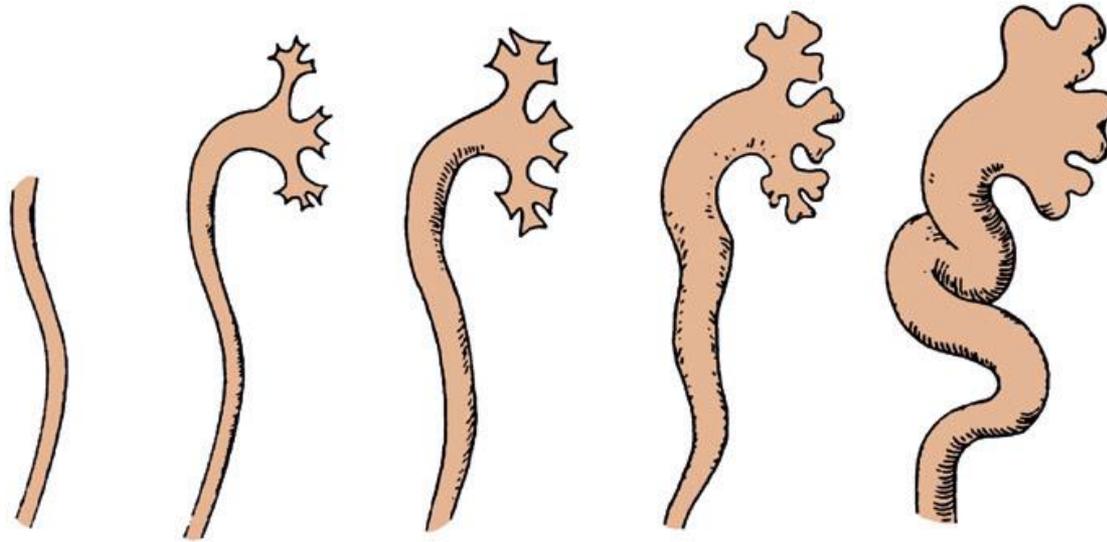
*** primary: if the main reason for it is a fundamental deficiency in the function of the UVJ antireflux mechanism while remaining factors (bladder and ureter) remain normal or relatively noncontributory.**

*** Secondary reflux, then, implies reflux caused by overwhelming the normal function of the UVJ. Bladder dysfunction of a congenital, acquired, or behavioral nature is often the root cause of secondary reflux.**

Obstruction ; PUV

Neurogenic bladder

Grading of Reflux:



International Classification of Vesicoureteral Reflux

GRADE DESCRIPTION

- 1- Into a nondilated ureter
- 2- Into the pelvis and calyces without dilatation
- 3- Mild to moderate dilatation of the ureter, renal pelvis, and calyces with minimal blunting of the fornices
- 4- Moderate ureteral tortuosity and dilatation of the pelvis and calyces
- 5- Gross dilatation of the ureter, pelvis, and calyces; loss of papillary impressions; and ureteral tortuosity

Clinical presentation:
UTI
Asyptomatic
Renal failure



Dx:

U S

VOIDING CYSTOURETHROGRAPHY

IVP

NUCLEAR RENOGRAM

GUE

RENAL FUNCTION TESTS

URINE & BLOOD CULTURE

Principles of Management

the essential tenants of reflux management as follows:

1. Spontaneous resolution of reflux is very common.
2. High-grade reflux is less likely to resolve spontaneously.
3. Sterile reflux is benign.
4. Extended use of prophylactic antibiotics is benign.
5. Success of (open) surgical correction is very high.

TREATMENT:

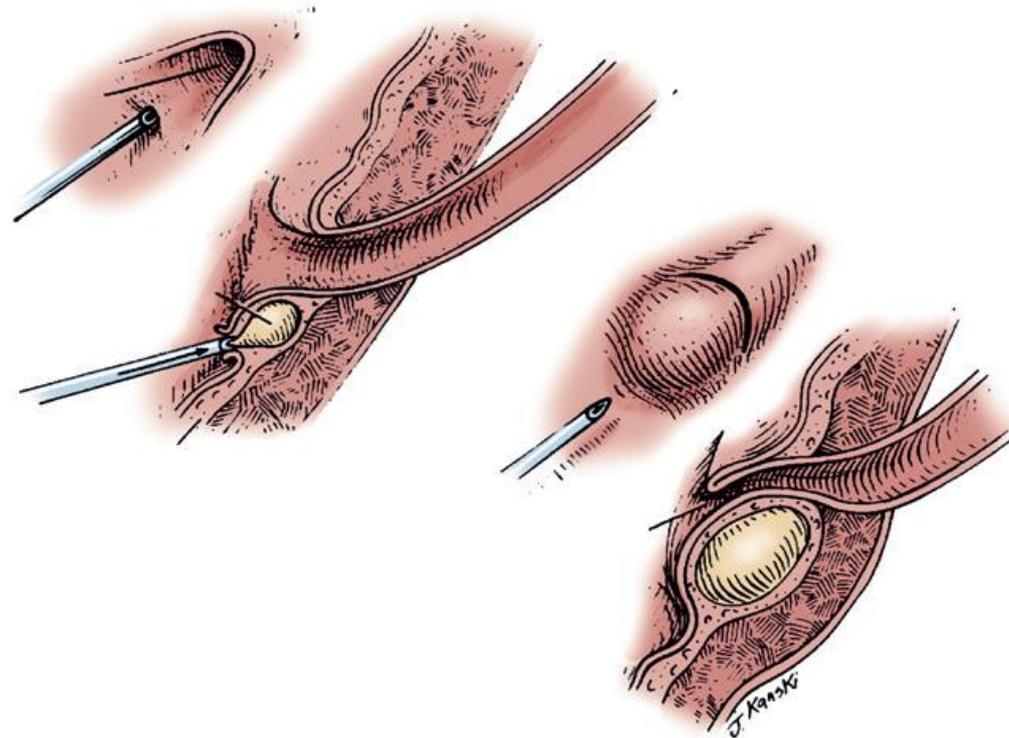
1 - NON SURGICAL

The classic approach has been to offer daily low-dose prophylactic antibiotic suppression of infections as the first line of treatment under the principle that every case of reflux should be offered time to resolve spontaneously, despite grade.

2 - ENDOSCOPIC INJECTION

Polytetrafluoroethylene Paste (Teflon Paste)

Principle of endoscopic treatment of reflux. A bulking agent is injected beneath the ureteral orifice with a needle. The buttress that is provided helps coapt the distal end of the ureter.



3 - URETERIC REIMPLANTATION