

APPROACH TO ABDOMINAL MASS IN PEDIATRICS

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IN THIS SEMINAR WE WILL DISCUSS >

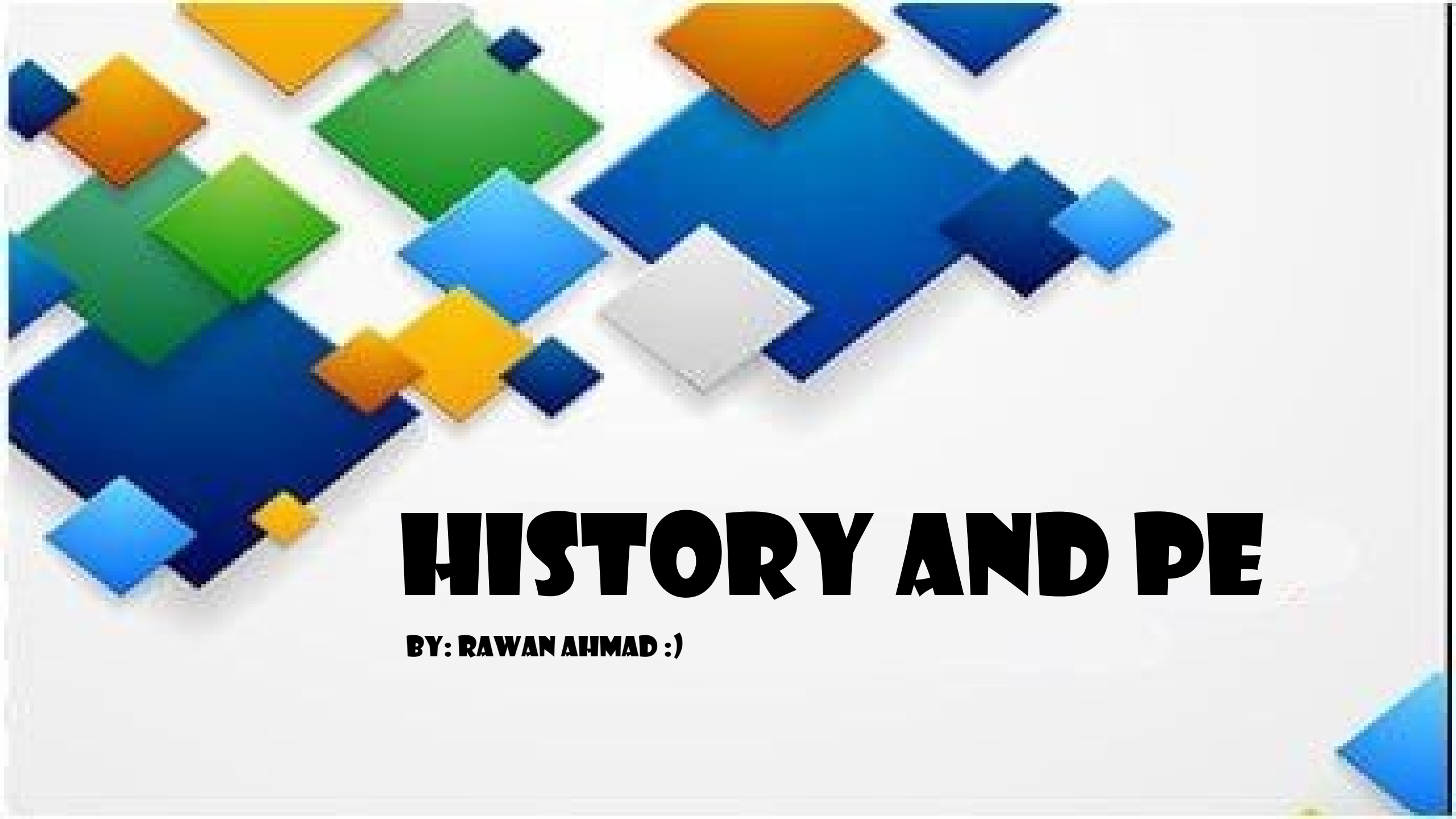
- **HISTORY AND PE**
- **GASTROINTESTINAL DZ**
- **RENAL DZ**
- **LIVER & BILARY DZ**
- **ENDOCRINAL DISORDERS**
- **HEMATO DZ**



INTRODUCTORY>

- ✓ Abdominal masses are common in infants and children
- ✓ Abdominal masses are usually an accidental finding in routine clinical examination and imaging
- ✓ Most masses are benign; like hepatosplenomegaly and require medical treatment.
- ✓ Some rare causes are neoplasms which may need surgical intervention with or without chemotherapy or other treatment modalities.
- ✓ The following points need to be considered when assessing a child with an abdominal mass:
 1. Age of the patient and the most likely pathological process arising in that organ at that age
 2. Length of history and type of symptoms, which may also implicate a particular pathological process (e.g, tenderness of the mass suggests infection or bleeding)
 3. Site of the mass and its precise characteristics, which will suggest the probable organ of origin





HISTORY AND PE

BY: RAWAN AHMAD :)

*** Taking a pediatric history and performing an abdominal examination require a sensitive and methodical approach, as children may not communicate clearly or tolerate examination as well as adults. Here is a guide:**

1) Introduction and Environment >

- Introduce yourself to both the child and caregiver.
- Ensure a friendly environment to make the child comfortable.
- Speak to the child at their level if possible and use simple language.

2) Chief Complaint >

Ask the caregiver (OR child if old enough) about the main issue.

Examples: abdominal pain, vomiting, diarrhea, constipation or bloating.



3) History of Presenting Illness (HPI) >

- **Onset:** When did the symptoms start?
- **Duration:** How long have the symptoms been present?
- **Character:** Ask about the nature of the pain (sharp, dull, colicky, etc.).
- **Location:** Where is the pain? (Ask the child to point.)
- **Aggravating/Relieving Factors:** Does anything make it better or worse?
- **Associated Symptoms:** Nausea, vomiting, fever, diarrhea, changes in stool, etc

4) Past Medical History >

- Previous similar episodes.
- History of gastrointestinal issues or surgery.
- Birth history: Prematurity, birth complications.
- Vaccination status and developmental milestones.

5) Family History >

Ask about family history of gastrointestinal problems (e.g., celiac disease, inflammatory bowel disease).

6) Dietary History >

What the child typically eats.

Any recent changes in diet or feeding difficulties (especially in infants).

7) Medications >

Any current medications, recent antibiotics, or over-the-counter treatments.

8) Allergies >

Ask about known food or drug allergies.

9) Social History >

Living conditions, school, any stressors (emotional stress can manifest as abdominal symptoms in children).

* Don't forget to summarise the highlights with the caregiver.

We will focus on the ABDOMINAL EXAMINATION >

- General Inspection:

- Start by observing the child's demeanor: Are they active or lethargic?
- Observe nutrition status: Is the child well-nourished or thin?
- Look for signs like abdominal distension, visible peristalsis, or scars from previous surgeries.
- Inspect for umbilical hernia or abdominal wall defects.

- Positioning:

Lay the child flat on an examination table or bed, Depending on the child's age and cooperation, have the caregiver help keep the child calm and still.



- Palpation (starting with light palpation) >

- Use a gentle approach. Begin by palpating the non-painful areas first.
- Watch the child's face for discomfort.
- Assess for tenderness, guarding, or rigidity.
- Feel for any masses, enlarged organs (e.g., liver, spleen), or rebound tenderness (suggestive of peritonitis).

- Deep Palpation >

- Carefully palpate deeper if tolerated.
- Check for organomegaly:
 - Liver: Palpate the liver edge under the right costal margin.
 - Spleen: Palpate under the left costal margin.
- Feel for masses in all quadrants.

- Percussion >

- Gently percuss the abdomen, listening for areas of dullness (suggestive of fluid or mass) or tympany (air-filled bowel).
- Check for shifting dullness if there's suspicion of ascites.

- Auscultation:

- Use a stethoscope to listen to bowel sounds.
 - Hyperactive bowel sounds: Suggestive of gastroenteritis or obstruction.
 - Absent or hypoactive sounds: May suggest ileus or severe abdominal pathology.

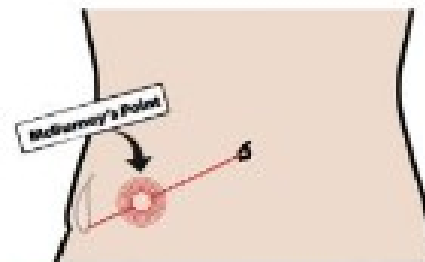
- Special Tests:

- Rebound tenderness: Gently press on the abdomen and quickly release; if this causes pain, it may indicate peritonitis.
- Murphy's sign: Palpate under the right costal margin while the child breathes in; pain suggests gallbladder inflammation.
- McBurney's point tenderness: Suggests appendicitis if present.

- Patient is asked to inhale while the examiner hooks his fingers under the liver boarder and presses in.
- The **inhalation causes the gallbladder** to descend, producing pain if it is inflamed.



McBurney's Sign



A positive McBurney's sign is when significant pain is elicited by palpating this area in the RLQ.

This could mean appendicitis.

REBOUND TENDERNESS



Rebound tenderness is when there is brief worsening of pain after releasing pressure while palpating

*** Additional Tips >**

- **Distraction techniques:** Use toys or talking to distract younger children.
- **Parental involvement:** Have a parent nearby for reassurance, or even assist by holding the child's hand.
- **Always make the exam as quick and non-threatening as possible.**



General observation

- Weight, length and head circumference
- Maturity
- Muscle tone
- Reflexes: Moro, grasp, suck and rooting
- Is this a healthy baby who is feeding well?

Face—dysmorphic features?

- Low set or simple ears?
- Inner epicanthic folds
- Mongolian or anti-Mongolian slant of eyes?
- Symmetry of face and mouth
- Accessory auricles or pre-auricular pits?
- Micrognathia?

Heart

- Cyanosis?
- Heart failure (tachypnoea, hepatomegaly)?
- Heart murmur?
- Femoral pulses (coarctation)
- Apex beat (dextrocardia)

Back and spine

- Spina bifida or posterior encephalocele?
- Midline naevus, lipoma?
 - deep sacral pit?

Hips

- Barlow and Ortolani tests for developmental dysplasia of the hips (DDH)
- Ask about risk factors (breech, family history of DDH)

Genitalia and anus

- Hypospadias?
- Cryptorchidism (undescended testes)?
- Ambiguous genitalia?
- Imperforate anus?

Skin

- Pallor?
- Jaundice?
- Cyanosis?
- Rashes?
- Birthmarks?

Head

- Anterior fontanelle
- Skull shape and size
- Scalp - swellings or birthmarks?

Eyes

- Red reflex for cataracts
- Sclera for jaundice
- Coloboma (defect in the pupil)?

Mouth

- Cleft lip/palate?
- Central cyanosis?
- Neonatal teeth?

Chest

- Respiratory rate
- Respiratory distress?
- Symmetry of chest movement?

Abdomen

- Abdominal distension or bile-stained vomiting?
- Palpable kidneys?
- Hepatosplenomegaly?
- Anterior abdominal wall defects?
- Umbilical cord vessels

Limbs

- Talipes equinovarus (club foot)?
- Polydactyly (extra digits or toes)?
- Syndactyly (fused digits or toes)?
- Single palmar crease and 'sandal gap' between toes (Down syndrome)?
- Contractures?
- Absent radii (VACTERL association)?





GASTROINTESTINAL DZ

BY: ABDULLAH JIHAD & ABDULLAH ATTIYEH

* Intussusception >

- Epidemiology >

Sex: ♂ > ♀ (3:2)

Age:

- Peak incidence: 3–12-month-old infants
- Otherwise commonly occurs in children 3 months to 5 years of age
- Uncommon in adults

- Etiology >

Mostly idiopathic; ~ 75% of cases have no identifiable lead point

Pathological lead points: Defined as intraperitoneal anomalies or abnormalities that obstruct or tether the bowel and act as lead points in the process of intussusception

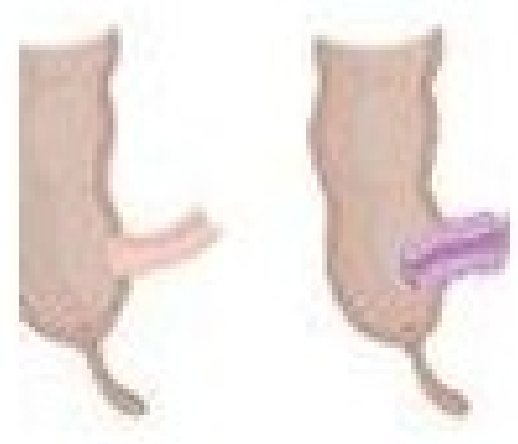
- **Meckel diverticulum** (most common in children)
- Intestinal polyps or other benign tumors (most common in adults and 2nd most common in general)
- Enlarged Peyer patches: individuals with a history of a recent viral infection or immunization (e.g., rotavirus or adenovirus)

- Pathophysiology >

- Imbalance in the bowel wall (idiopathic or via a pathological lead point) → invagination or “**telescoping**” of a portion of intestinal bowel (intussusceptum) into the distal adjacent bowel loop (intussusciens) → impaired lymphatic drainage and increasing pressure in intussusceptum bowel wall → venous impairment → mesenteric vessels congestion → **ischemia** of intussusceptum bowel wall → sloughing of bowel mucosa (most sensitive to bowel ischemia since it is the furthest from the arterial supply) → transmural **necrosis** and perforation with prolonged ischemia
- The dysfunctional passage leads to mechanical bowel obstruction → vomiting

- Classification >

- Ileocecal invagination (most common; accounts for 85–90% of cases)
- Ileoileal invagination
- Ileocolic invagination
- Colosigmoidal invagination
- Appendicocecal invagination (very rare)



- Clinical features >

- Acute **cyclical** colicky abdominal pain (sudden screaming or crying spells), often with legs drawn up, with asymptomatic intervals: Acute attacks occur approx., every 15–30 min.
 - Vomiting (initially no bilious) & “Currant jelly” stool
 - Abdominal tenderness, palpable **sausage-shaped mass** in the RUQ , and an “emptiness” or retraction in the RLQ (**Dance sign**) during palpation
 - High-pitched bowel sounds on auscultation
- “Currant jelly” stool**

- Less than 15% of patients with intussusception present with the classic triad of abdominal pain, a palpable sausage shaped abdominal mass, and blood per rectum.

- Diagnosis >

Approach

- If clinical suspicion is high : perform an enema.
- If the diagnosis is unclear at presentation or pathological lead points are suspected : perform an ultrasound or abdominal x-ray to confirm the diagnosis.

- Procedures > Abdominal ultrasound (best initial test): often sufficient to confirm diagnosis

- Target sign (transverse view): The invaginated portion of bowel appears as rings on a target in transverse view on ultrasound.
- Pseudokidney sign (longitudinal view)
- Contrast or pneumatic, enema using ultrasound or fluoroscopy (best confirmatory test)
- Pneumatic insufflation (air enema): air is injected into the intestines to create pressure

Target sign



Pseudo-kidney



- Treatment >

- **Initial steps:** nasogastric decompression and fluid resuscitation
- **Nonsurgical management** (performed under continuous ultrasound or fluoroscopic guidance):
 - **Air enema:** treatment of choice
 - **Hydrostatic reduction**
- **Surgical reduction**

- Indications >

- **When a pathological lead point is suspected**
- **Suspected gangrenous or perforated bowel**

- Complications >

- **Small bowel obstruction**
- **Bowel gangrene, perforation, and peritonitis**

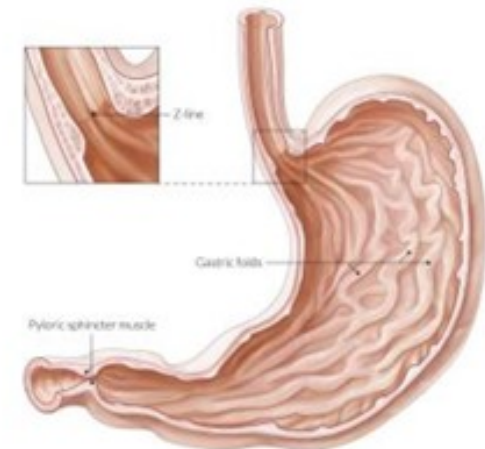
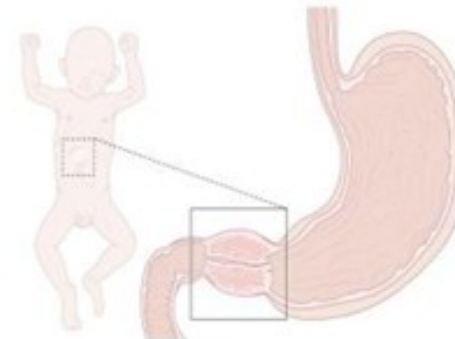
* Hypertrophic pyloric stenosis >

- Etiology >

- **Environmental factors**
 - Exposure to nicotine during pregnancy
 - Bottle feeding
- **Macrolide antibiotics:** Erythromycin and azithromycin

- Clinical features >

- Symptoms usually develop between the 2nd and 7th week of age
- Frequent regurgitation progressing to **projectile, non-bilious vomiting**
- An enlarged, thickened, **olive-shaped**, non-tender pylorus (diameter of 1–2 cm) should be palpable in the epigastrium
- A **peristaltic wave**



- Diagnosis >

Initial imaging: abdominal ultrasound shows an elongated and thickened pylorus

Alternative imaging

Barium studies

String sign: elongated, thickened pylorus

Laboratory tests

Hypochloremic, hypokalemic metabolic alkalosis, a classic result, is now uncommon because infants are typically diagnosed and treated early.

- Treatment >

Treatment of choice: pyloromyotomy (a longitudinal muscle-splitting incision of the hypertrophic sphincter)



* Hirschsprung disease >

- It is a birth defect in which some nerve cells are missing in the large intestine, so a child's intestine can't move stool and becomes blocked
- Epidemiology About 1 in 5,000 newborns has Hirschsprung disease
- More likely to affect:
 - Boys, is about 3 to 4 times more common in boys than in girls 1:4
 - children who have a sibling or parent with Hirschsprung disease.

- Types of >

- **short-segment Hirschsprung disease, nerve cells are missing from the rectum and sometimes the sigmoid colon.**
- **long-segment Hirschsprung disease, nerve cells are missing from the rectum and a longer part of the colon than in short-segment Hirschsprung disease, but nerve cells are present in at least part of the colon.**
- **total colonic Hirschsprung disease, nerve cells are missing from the rectum and the entire colon, but are present in the end of the small intestine.**
- **small intestinal Hirschsprung disease, nerve cells are missing from the rectum, colon, and the end of the small intestine, but are present in the rest of the small intestine.**
- **total intestinal Hirschsprung disease, in which nerve cells are missing from the rectum, colon, and all, or nearly all, of the small intestine.**

- Symptoms in new infants >

- Not having a first bowel movement within 48 hours after birth
- Green or brown vomit
- Swollen abdomen, or belly
- Problems feeding
- Explosive stools or diarrhea after a doctor inserts a finger into the newborn's rectum

- Symptoms in Older infants and children >

- Chronic constipation that doesn't get better after treatment with oral laxatives—laxatives that are taken by mouth
- Swollen abdomen
- Malnutrition or failure to thrive, meaning that an infant or child weighs less or is gaining less weight than expected for his or her age
- Symptoms of hirschsprung-associated enterocolitis, such as diarrhea

- Complications > common complication of hirschsprung disease is hirschsprung-associated enterocolitis, a condition in which the intestines become inflamed. This complication may occur before or after a child has surgery to treat hirschsprung disease

- Symptoms of hirschsprung-associated enterocolitis may include:

- Swelling of the abdomen
- Fever
- Diarrhea & vomiting
- Lack of energy
- Rectal bleeding
- Shock
- Soiling
- Megacolon
- Malnutrition & perforation

- Physical exam > During a physical exam, a doctor typically

- reviews the child's height and weight
- examines the child's abdomen—or belly—for swelling
- performs a digital rectal exam—having no stool in the rectum or having explosive stool after a rectal exam may be signs of Hirschsprung disease

- Imaging tests >

- lower GI series, or contrast enema
- Anorectal manometry
- Rectal biopsy
- Pull-through procedure; during a pull-through procedure, a surgeon removes the part of the large intestine that is missing nerve cells. The surgeon then connects the healthy part of the large intestine to the anus.

- Ostomy surgery >

Doctors may recommend that children have ostomy surgery before having a pull-through procedure, if complications arise.

During ostomy surgery, surgeons create a stoma on a child's abdomen and connect the stoma to the large or small intestine. After ostomy surgery, waste will leave the child's body through the stoma

* Mesenteric and omentum cysts >

- Etiology >

As proposed by Gross, mesenteric and omental cysts are thought to represent benign proliferations of ectopic lymphatics that lack communication with the normal lymphatic system

- Epidemiology > Approximately one third of mesenteric cysts occur in children younger than 15 years. The mean age of children affected is 4.9 years. Mesenteric cysts are 4.5 times more common than omental cysts.

- Pathophysiology >

Mesenteric and omental cysts can be either simple or multiple and either unilocular or multilocular, and they may contain hemorrhagic, serous, chylous, or infected fluid.

The fluid is serous in ileal and colonic cysts and chylous in jejunal cysts.

The cysts can range in size from a few millimeters to 40 cm in diameter



- Symptoms and signs >

- Soft, mobile abdominal mass abdominal pain
- Obstructive symptoms
- Nausea-Vomiting-Abdominal distention

- Complications > Various complications have been associated with mesenteric and omental cysts, including the following:

- Intestinal obstruction (most common)
- Volvulus
- Hemorrhage into the cyst
- Infection
- Rupture
- Cystic torsion
- Obstruction of the urinary and biliary tract

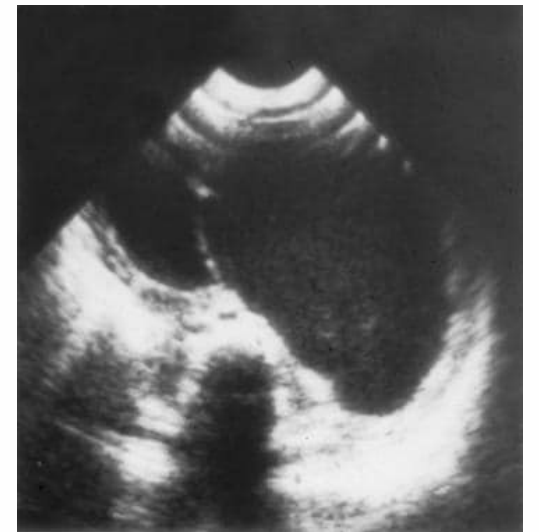
- Imaging Studies >

1-Radiography

2-Ultrasonography

- The imaging modality of choice is abdominal ultrasonography US reveals fluid-filled cystic structures, commonly with thin internal septa and sometimes with internal echoes from debris, hemorrhage, or infection. However, these can be confused with large ovarian cysts in the fetus and newborn.

- Surgical Therapy > The goal of surgical therapy for mesenteric and omental cysts is complete excision of the mass. Omental cysts can be removed without endangering the adjacent bowel.





RENAL DZ

BY MAYA MAHER & ABDURRAHMAN ALAWNEH

Nephroblastoma (Wilms' tumour)

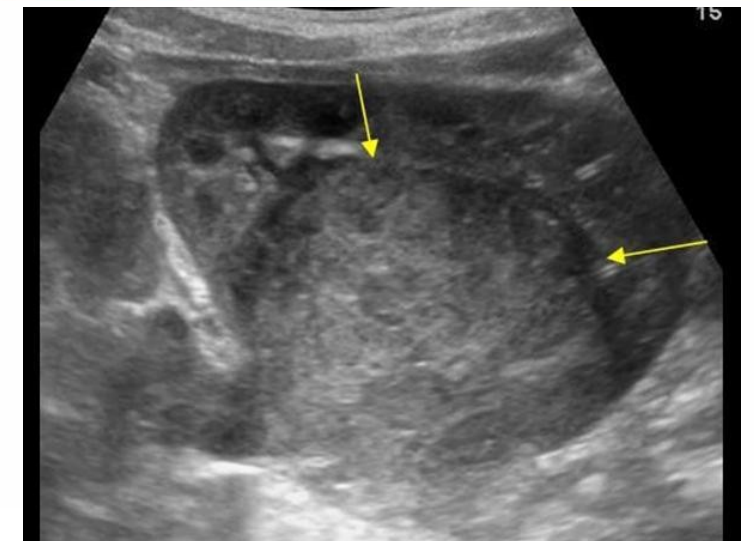
is the most common pediatric renal cancer

* Pathology >

It is a rare and extremely anaplastic tumour, which usually arises in children under the age of 5 years, although it occasionally affects older children and adolescents. It probably originates from embryonic mesodermal tissue. Bilateral tumours are present in 5–10% of cases, and there is an association with congenital anomalies (aniridia, hemihypertrophy, macroglossia) in a few patients.

* Etiology >

The cause of Wilms tumor is not precisely known, but it is believed to be due to genetic alterations that deal with the normal embryological development of the genitourinary tract.



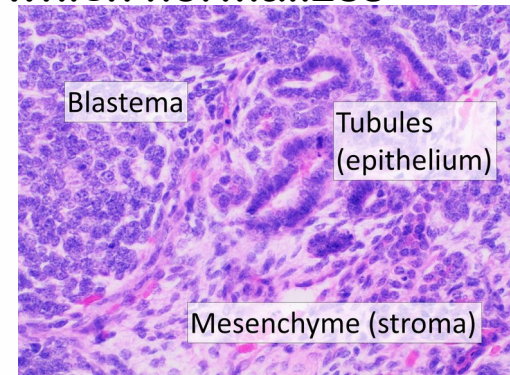
* **Histology**>

- Macroscopically, the tumours are large and may be difficult to distinguish from neuroblastoma, they are pale on cut section and contain areas of hemorrhage.
- Microscopically, there is a mixture of mesenchymal and epithelial components, with spindle cells, epithelial tubules and smooth or striated muscle. the regional lymph nodes are soon invaded, and spread occurs by the bloodstream to the lungs and liver.

* **History and physical**> Wilms tumor usually presents as an asymptomatic abdominal mass in the majority of children. The child's caregiver may have discovered the mass while bathing the infant. Other features include:

- Abdominal pain
- Gross hematuria
- Urinary tract infections
- Varicocele
- Hypertension or hypotension (Up to 1/3 of Wilms patients will demonstrate hypertension which normalizes after nephrectomy)
- Fever
- Anemia

- If the patient has lung metastases, dyspnea or tachypnea may occur.
- Abdominal pain is the most common initial presenting symptom (30% to 40%), followed by
- hypertension (25%) and hematuria (12% to 25%).



*** Investigation >**

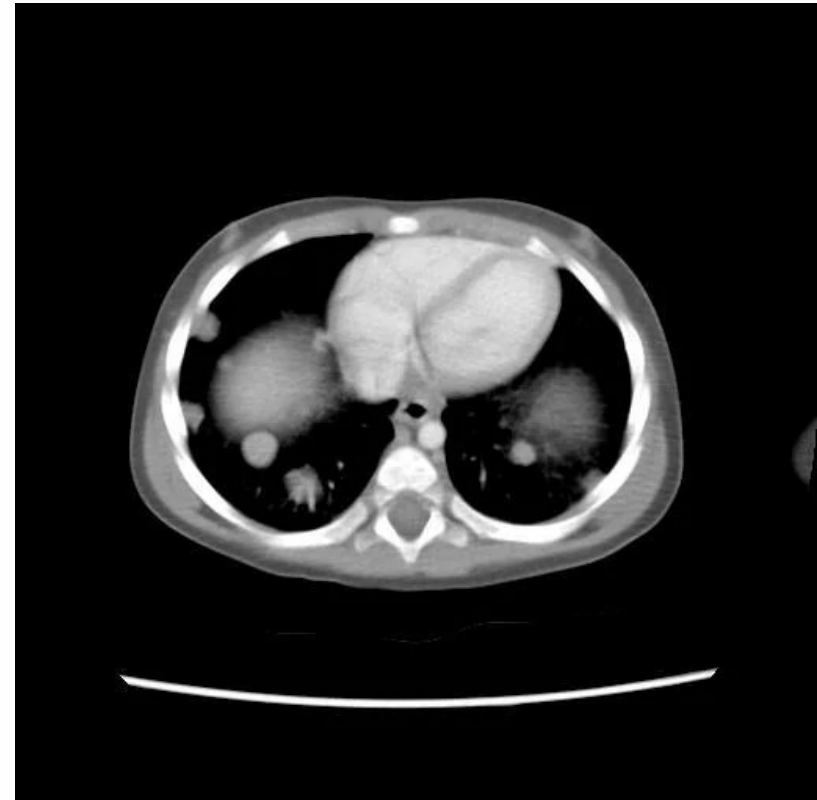
The usual labs are not specific for Wilms tumor but need to be ordered to look for other pathologies.

Routine blood work includes:

- Complete blood count to look for anemia
 - Chemistry profile
 - Renal function
 - Urinalysis
 - Coagulation studies
 - Cytogenetics studies to look for 1p and 16q deletion.
 - Imaging studies utilized include the following:
 - Renal ultrasonography (often the initial study) but is operator dependent
 - Chest x-ray to look for lung metastases
 - Abdominal and chest CT with sedation
 - Abdominal MRI is an optional study.
-
- **Metastasis:** The most common site of metastases is the lungs, so chest imaging is recommended.
 - Abdominal CT and MRI appear to be about equal in diagnosing Wilms, so either can be used.
 - Metastases to bones are uncommon but ominous and typically develop later as a relapse or recurrence

* **Treatment**>

- When possible, nephrectomy is performed. In early disease, with no residual tumour following surgery, chemotherapy alone will give prolonged survival. For more extensive disease, radiotherapy is given.
- When the tumour is unresectable, chemotherapy is given and nephrectomy performed once the tumour re-gresses. With such therapy, 90% of children with the condition survive 5 years.



Hydronephrosis

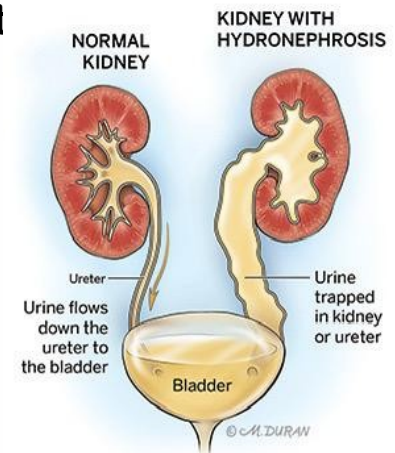
- is a condition that occurs when a kidney swells and can't get rid of pee (urine) like it should. This swelling typically happens when urine cannot drain out from the kidney to the bladder due to a blockage or obstruction. Hydronephrosis can occur in one or both kidneys. Over time, kidney function can decrease, leading to possible kidney damage.

- ***Signs and symptoms*** > Often, hydronephrosis does not cause any symptoms. Although sometimes there may be signs, which can include:

- Pain in the lower back, side, or belly
- Needing to pee a lot or having a hard time peeing
- Seeing blood in your pee
- Nausea
- Fever

- ***Causes*** > Hydronephrosis is usually caused by another underlying illness or risk factor, but are not

- Kidney stones
- Congenital blockages (a defect that is present at birth)
- Blood clots
- Scarring of tissue (from injury or previous surgery)
- Tumors or certain kinds of cancer (examples include bladder, cervical, colon, or prostate)
- Enlarged prostate (noncancerous)
- Pregnancy
- Urinary tract infection (or other diseases that cause inflammation of the urinary tract)



- **Complications** >

- In cases of severe blockage due to hydronephrosis, extra urine may need to be removed using either a catheter to drain urine from the bladder or a special tube called a nephrostomy that drains urine from the kidney. The key to treatment is to get it addressed as soon as possible in order to avoid any permanent damage to the kidneys.
- Severe hydronephrosis can damage the kidneys and lead to kidney failure. If kidney failure occurs, treatment will be needed with either dialysis or a kidney transplant. When treated quickly, most people recover from hydronephrosis.



- **Diagnosis** > Hydronephrosis is diagnosed by:

- Talking to the patient and doing a physical check-up
- Having blood and urine tests
- Using machines (like ultrasound, CT scans, MRI, or even a special telescope called a cystoscope) to take pictures of the kidneys and bladder to locate the blockage

- **Treatment** >

When treating hydronephrosis, doctors try to stop the kidney from swelling further. In order to do this, they may:

- Prescribe medicines to ease pain and/or fight off infection
- Recommend a surgical procedure to remove the blockage

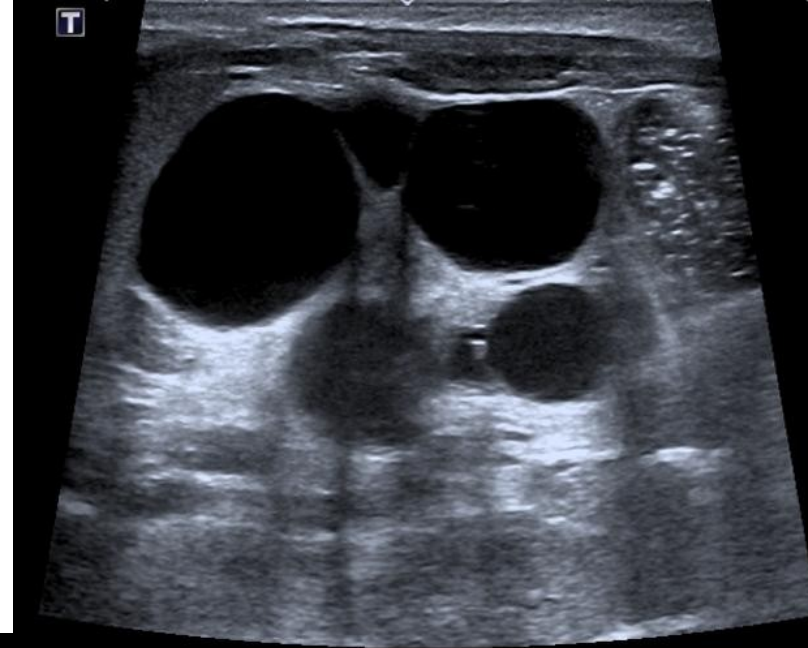
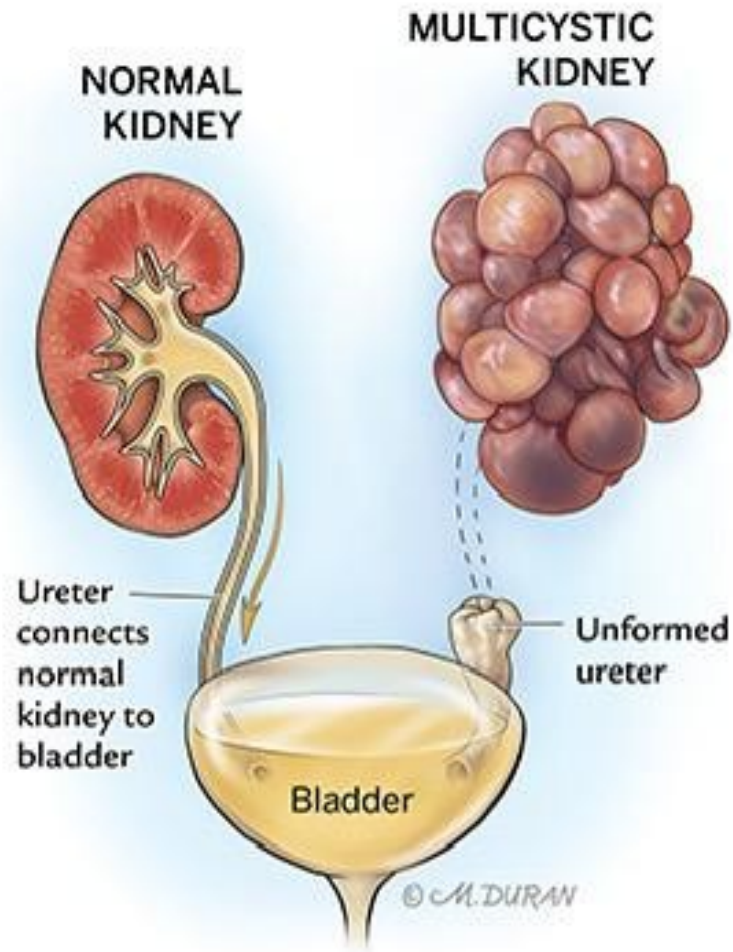
MCDK

- May also be called *multicystic renal dysplasia*.

- What is multicystic dysplastic kidney? Multicystic dysplastic kidney (MCDK) is a condition in which one or both of a baby's kidneys do not develop normally while the baby is growing in the womb. Fluid-filled sacs, called cysts, replace normal kidney tissue and prevent the affected kidney from working.

- When only one kidney is affected, the unaffected kidney usually grows larger to compensate for the nonworking kidney, and it does the work of both kidneys. The nonworking kidney usually shrinks and disappears over time.
- The remaining, working kidney is called a solitary or single-functioning kidney.
- A health care professional may need to evaluate the unaffected kidney to make sure it is working properly.

Multicystic Dysplastic Kidney



- Babies born with MCDK in only one kidney can grow normally and may have few, if any, health problems.

-Babies born with MCDK in both kidneys may not survive long after birth. Babies who do survive often develop kidney failure and require kidney replacement therapy, dialysis or a kidney transplant.

- MCDK is different from polycystic kidney disease, which is a disorder that causes fluid-filled cysts to grow in the kidneys.

- How common is MCDK?

A small study estimated that between 1 in 1,000 babies and 1 in 4,300 babies are born with MCDK each year.¹ However, some babies with MCDK are never diagnosed with the condition, so researchers don't know exactly how many people have MCDK.

- Who is more likely to develop MCDK?

- MCDK is more likely to occur in babies or fetuses who have **parents with genetic traits** [NIH external link](#) **for the condition** **certain genetic syndromes that affect multiple parts of the body**

- MCDK is more common in boys than in girls.

- What are the complications of MCDK?

Some children with MCDK may develop high blood pressure [NIH external link](#), also called hypertension. Children with MCDK in one kidney may have other urinary tract problems that affect their working kidney. These problems may increase the child's risk of developing chronic kidney disease.

- What are the symptoms of MCDK?

Many babies born with MCDK in only one kidney have no signs of the condition. In some babies, the affected kidney may be bigger than normal at birth and may cause pain.

- What causes MCDK?

MCDK is a birth defect [NIH external link](#) that happens when the fetus is developing in the womb.

Researchers don't know exactly what causes MCDK, but it may be caused by gene mutations [NIH external link](#) that can pass from parent to child, although a genetic cause is usually not found genetic syndromes that affect more than one system in the body, such as the digestive system, nervous system, heart and blood vessels, muscles and bones, or other parts of the urinary tract

- How do health care professionals diagnose MCDK?

- Most often, MCDK is diagnosed before birth, during a prenatal ultrasound [NIH external link](#).
- Ultrasounds use sound waves to create a picture of how a baby is developing in the womb.
- The images can show problems with the fetus's kidneys and other parts of the urinary tract.
- Ultrasounds during pregnancy are part of regular prenatal testing [NIH external link](#).
- After the baby is born, a health care professional will perform an ultrasound on the baby to confirm the diagnosis.

- how do health care professionals treat MCDK?

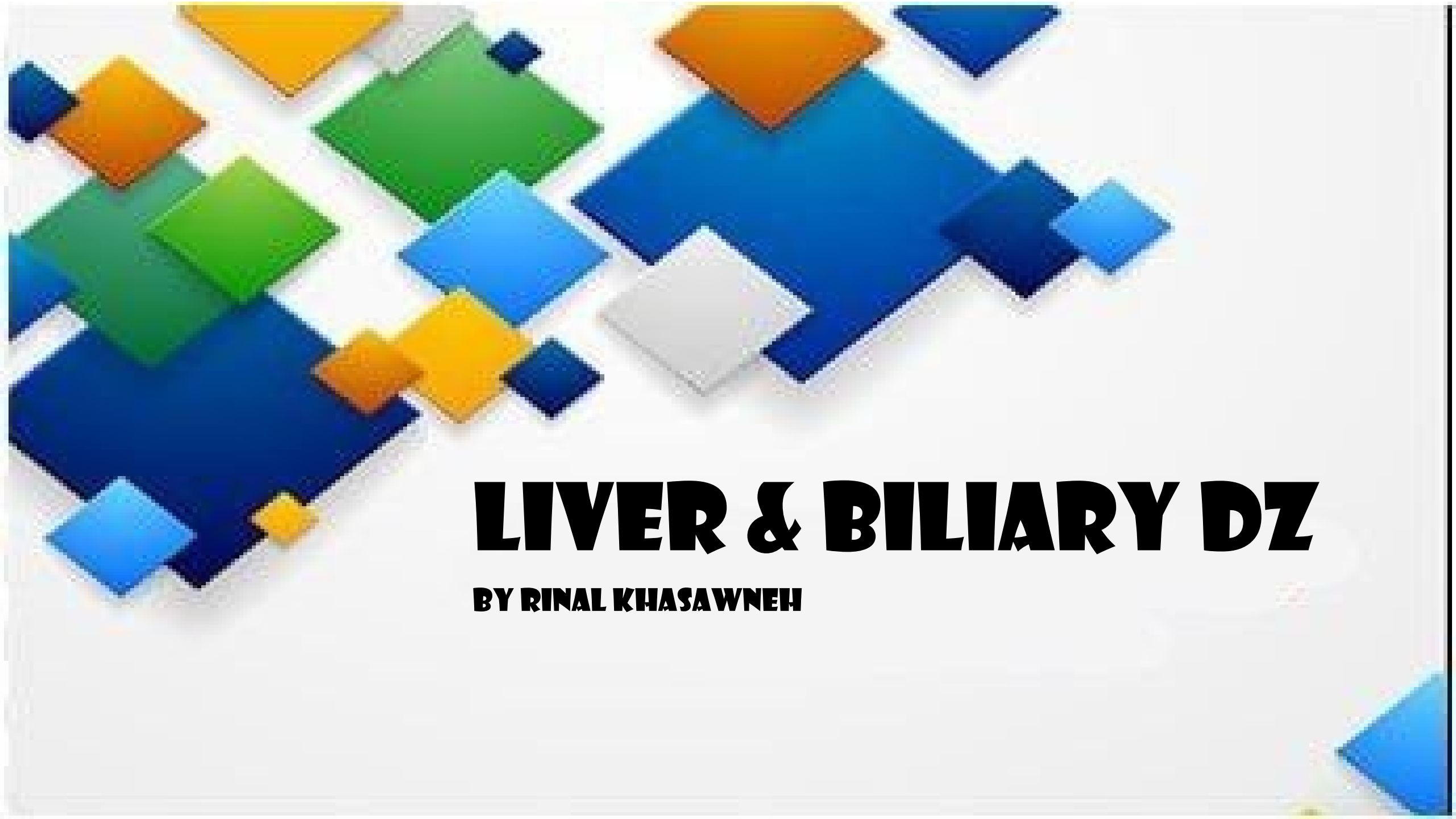
Health care professionals may not need to treat MCDK if the baby has no signs of the condition and only one kidney is affected and the other kidney is healthy. However, health care professionals will suggest regular checkups that include

- blood pressure tests [NIH external link](#)
- blood tests [NIH external link](#) to check how well the kidneys are working
- urine tests [NIH external link](#) to look for protein in the urine and check for kidney damage
- regular ultrasounds to monitor for disappearance of the affected kidney and to make sure the other kidney continues to grow and stay healthy

- **In rare cases**, if the affected kidney doesn't shrink over time, your child's health care professional may recommend surgery to remove the nonworking kidney if it is causing problems, such as high blood pressure or kidney infections.

- If both kidneys are affected or the healthy kidney becomes damaged, your child may need kidney replacement therapy, kidney transplant, hemodialysis, or peritoneal dialysis to stay healthy.

- If your child's health care professional suspects your child has kidney disease, you may be referred to a pediatric nephrologist, a doctor who specializes in treating kidney disease in children.



LIVER & BILIARY DZ

BY RINAL KHASAWNEH

HEPATOBIILIARY MASSES

*** HEPATOBLASTOMA >**

- Hepatoblastomas are the most common primary malignant liver tumor in pediatric patients, and most often occur within the first 2 years of life
- The tumor is more common in children with Beckwith-Wiedemann syndrome and familial adenomatous polyposis.
- Presentation :
 - Abdominal mass and pain
 - Weight loss or poor growth
 - Loss of appetite
 - Nausea and vomiting
 - Fever (less common)
 - Jaundice (if the tumor causes bile duct obstruction, although this is rare)

- Diagnosis >

- Imaging : CT scan
- MRI
- Laboratory Tests: alpha-fetoprotein (AFP); elevated serum AFP is a hallmark of hepatoblastoma. It is elevated in approximately 90% of cases and serves as a useful tumor marker for diagnosis and treatment response.
- Biopsy

- Management >

- Chemotherapy
- Radiotherapy
- Resection and transplantation

*** CHOLEDOCHAL CYST>**

- It is a cystic enlargement of the choledochal duct (common bile duct), Possible genetic influence, common with other anomalies (congenital hepatic fibrosis, intrahepatic biliary cysts, and polycystic kidney disease.)

- Presentation >

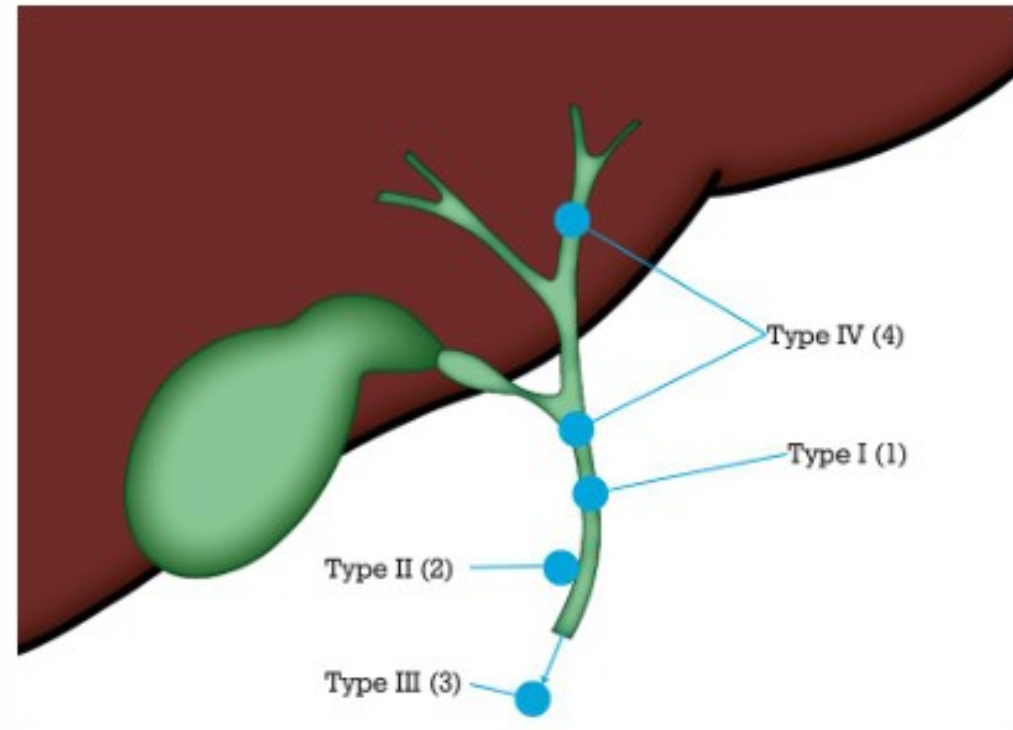
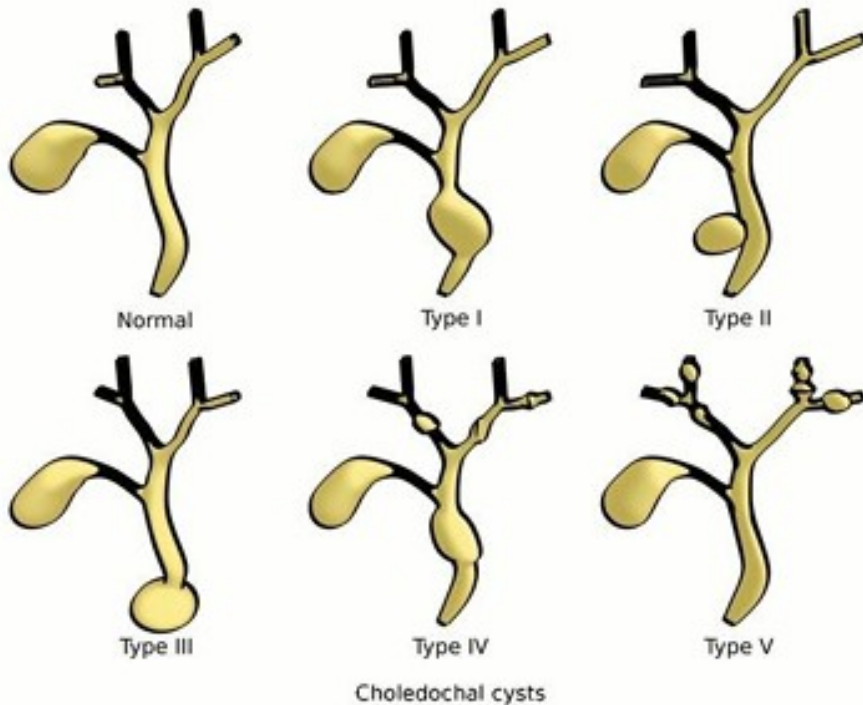
- Jaundice.
- RUQ mass.
- RUQ pain.
- Fever.
- May present with pancreatitis.

- CLASSIFICATION > 'TODANI CLASSIFICATION'

- Type I: Cystic dilatation of the CBD, most frequent type (90-95% of the cases).
- Type II: Diverticulum of the CBD, with normal size CBD.
- Type III: Choledochocele, a cystic dilatation of the distal intramural portion of the CBD, protruding into the 2nd part of the duodenum. (cyst located within the duodenal wall)
- Type IV: Cystic or fusiform dilatation of the CBD associated with cystic, fusiform, or saccular dilatation of extrahepatic bile ducts.
- Type V: Cystic, fusiform, or saccular dilatation of the intrahepatic bile ducts associated with a normal CBD; may be associated with hepatic fibrosis (referred to as Caroli disease)

- TREATMENT >

- Types I –IV :
 - Cystojejunostomy.
 - Total Excision and Cystojejunostomy.
 - Biliary reconstruction can be performed with a Roux-en-Y hepaticojejunostomy.
- Type V : Hepatic lobectomy





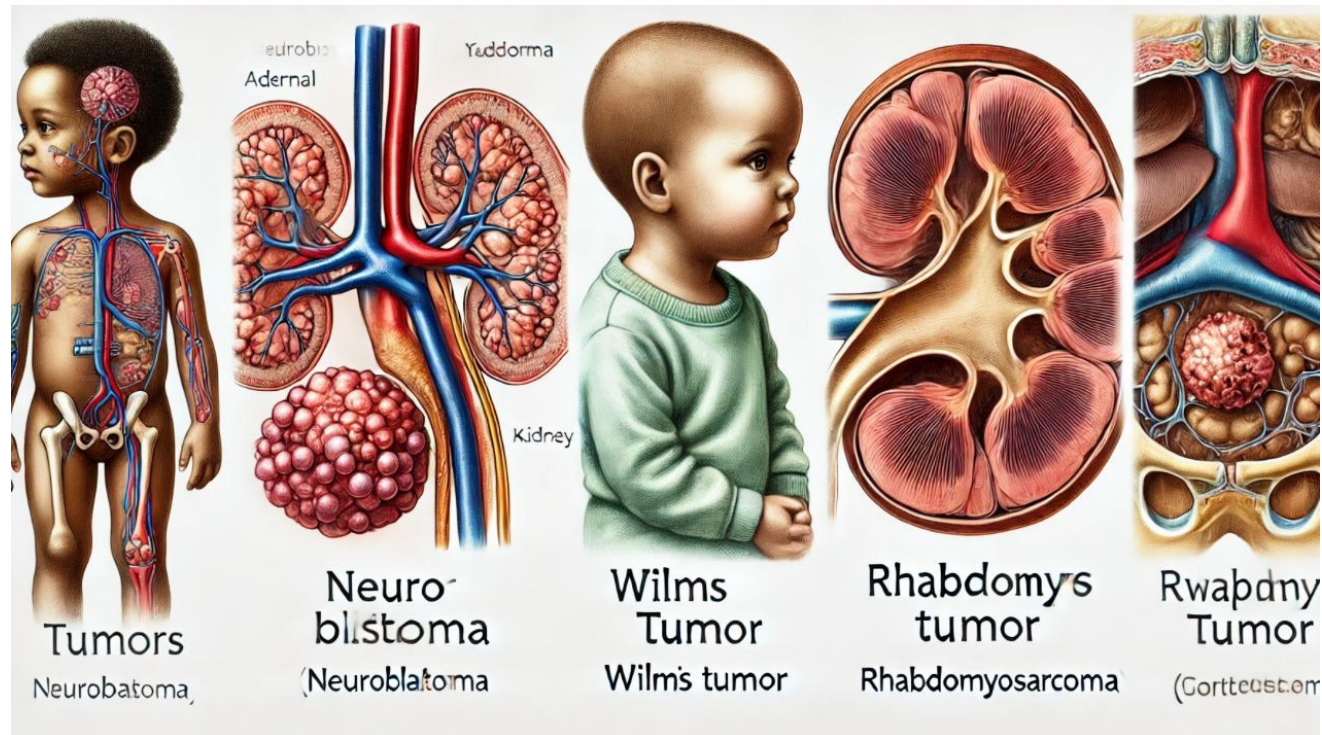
ENDOCRINAL DISORDERS

BY LAMEECE ALI

- A Focus will be on Neuroblastoma, Wilms Tumor and Rhabdomyosarcoma.

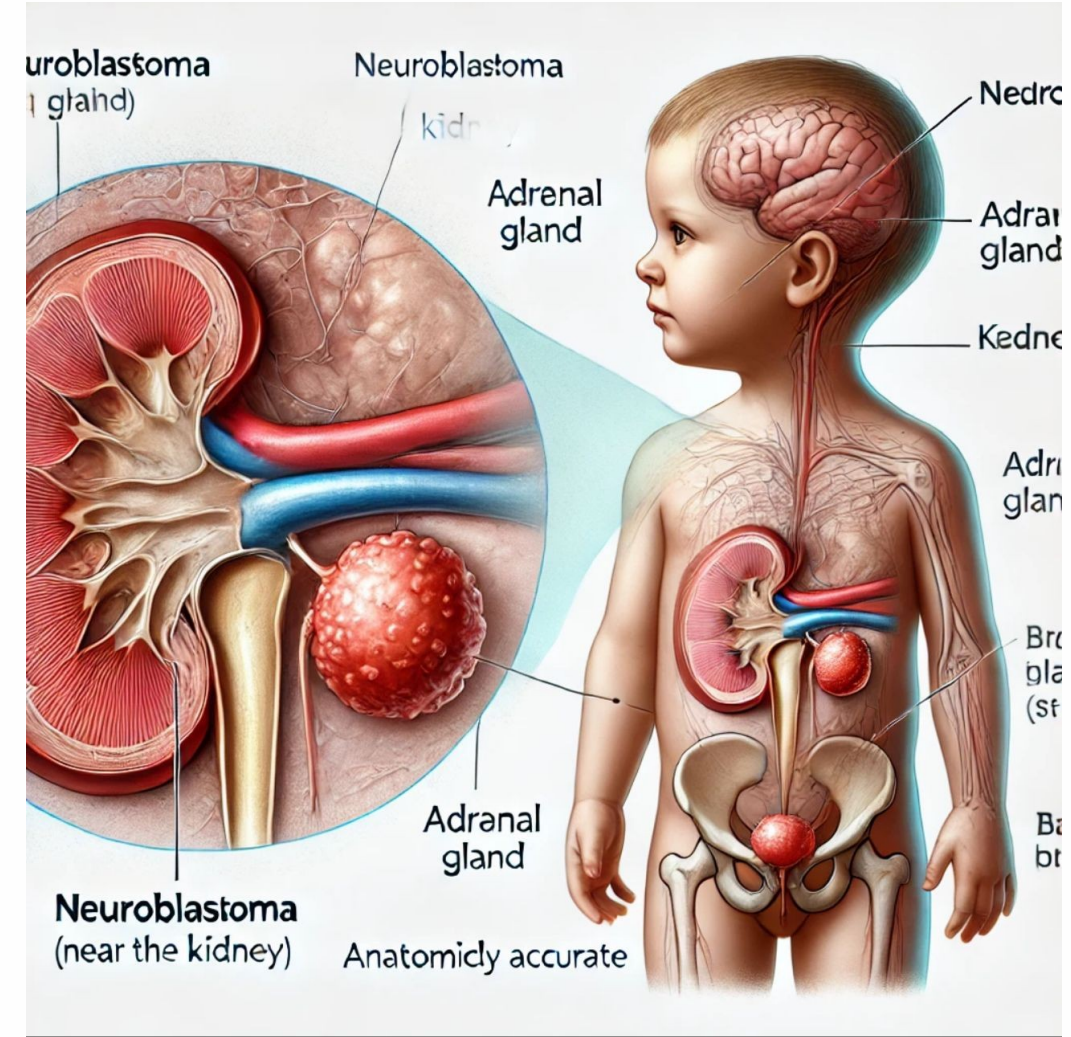
- Introduction >

- Abdominal masses in children can arise from a variety of causes, both benign and malignant.
- Common sources: tumors, endocrine disorders, infections, and congenital anomalies.
- Early identification and appropriate diagnostic workup are crucial for optimal outcomes.



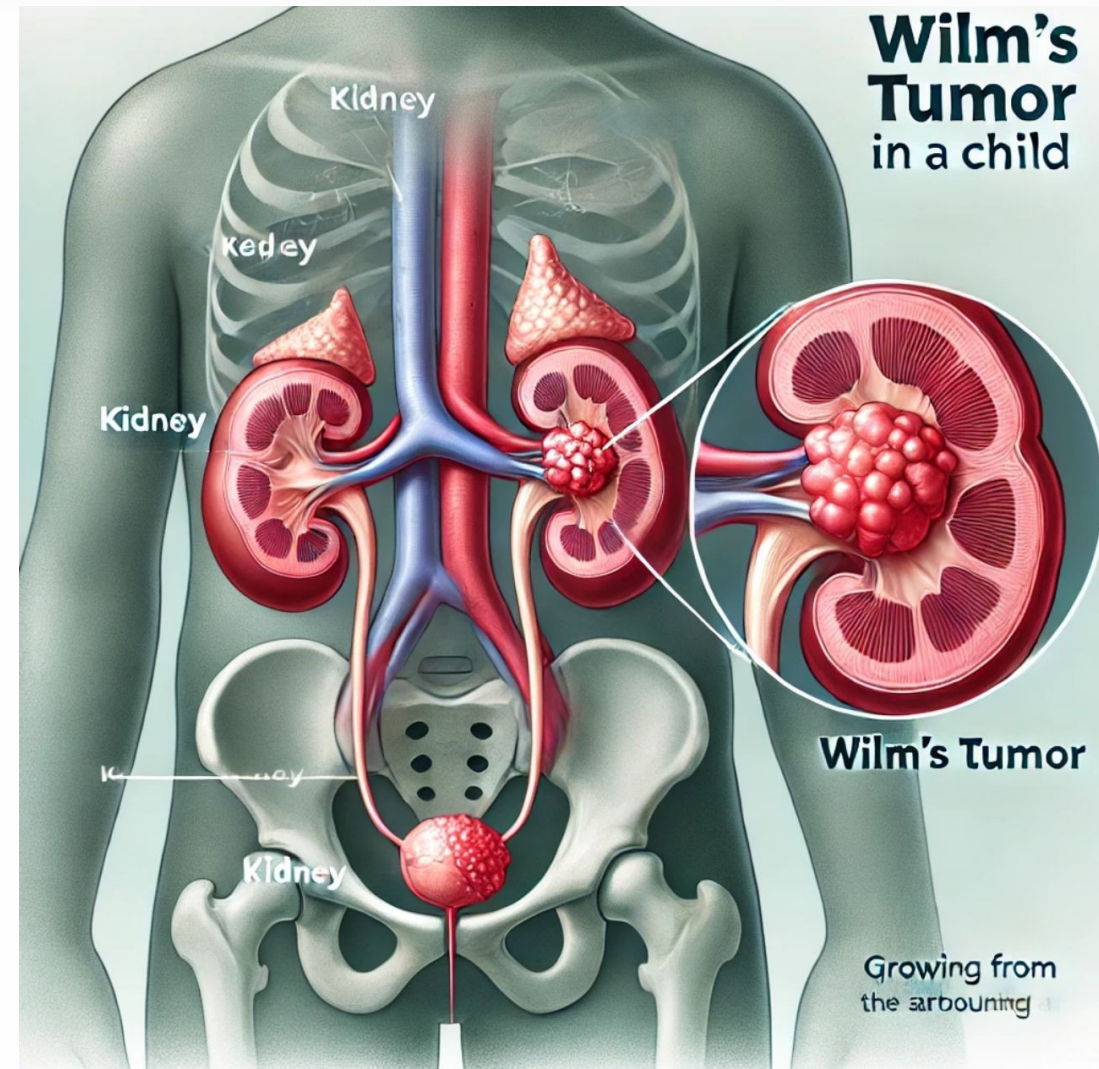
- Neuroblastoma is the most common pediatric solid tumor, and accounts for ~15% of childhood cancer-related mortality.

- signs and symptoms >
Abdominal mass: palpable, firm, irregular.
Weight loss, abdominal pain, hypertension



*** Wilms' tumour (nephroblastoma) >**

- Most common pediatric kidney tumor.
- Wilms tumor is a malignant renal tumour derived from embryonal cells; it typically affects children from 1 to 4 years of age.
- A mutation in the Wilm's tumour suppressor gene (WT1) is responsible for some cases.
- Signs And Symptoms >
Painless, palpable abdominal mass.
Hematuria, fever, hypertension.



* Rhabdomyosarcoma >

- Rhabdomyosarcomas (RMSs) are the most common soft tissue sarcomas in children/adolescents less than 18 years of age with an annual incidence of 1-2/million



- Types of Rhabdomyosarcoma >

- **Embryonal RMS:**
 - The most common subtype, typically occurs in children under 5.
 - Often found in the head and neck region, genitourinary tract, and retroperitoneum.
 - Has a generally better prognosis compared to other types.
- **Alveolar RMS:**
 - Tends to occur in older children and adolescents.
 - Commonly found in the extremities, chest wall, or abdomen.
 - More aggressive with a worse prognosis than embryonal RMS.
- **Pleomorphic RMS (rare in children):**
 - More common in adults.
 - Found in the extremities or trunk.

- Signs and symptoms of rhabdomyosarcoma >

- abdominal mass
- bladder or bowel obstruction
- pain & hematuria

- Investigations and Treatments for Pediatric Abdominal Tumors >

- imaging studies : CT , MRI & ultrasound
- biopsy : surgical and needle biopsy

- Tumor markers >

- Neuroblastoma: Catecholamines: Vanillylmandelic Acid (VMA) and Homovanillic Acid (HVA)
- Wilms Tumor (Nephroblastoma)
 - Alpha-Fetoprotein (AFP)
 - Beta-Human Chorionic Gonadotropin (β -hCG)
- Rhabdomyosarcoma
 - Myogenin and MyoD
 - Creatine Kinase (CK)



HEMATOLOGY

BY RAMA AMAWI

When approaching a pediatric patient with an abdominal mass that may be related to hematology, the goal is to systematically evaluate the child to determine the cause of the mass. The mass could be linked to hematologic malignancies, such as leukemia or lymphoma, or other conditions like splenomegaly.

1. History Taking > A thorough history helps narrow down the potential causes of the abdominal mass.

- Age: Certain hematological malignancies are more common in specific age groups (e.g., neuroblastoma in infants, lymphoma in older children).
- Onset: Was the mass noticed suddenly, or has it grown over time?
- Associated Symptoms: (Systemic symptoms)
 - Fever, night sweats, weight loss (suggesting malignancy).
 - Fatigue, pallor, and easy bruising/bleeding: These could suggest a blood disorder like leukemia.
 - Bone pain or limping: Can indicate bone marrow involvement, often seen in leukemia.
 - Jaundice or dark urine: May suggest hemolysis, which could be related to splenomegaly.
 - Recurrent infections: Could suggest an immune deficiency or bone marrow involvement.

2. Physical Examination >

- **General appearance:** Look for pallor (anemia), bruising (thrombocytopenia), or jaundice.
- **Abdominal examination:** Determine the size, location, and consistency of the mass
- **Splenomegaly (enlarged spleen):** Often found in hematologic conditions like leukemia, lymphoma, or hemolytic anemias
- **Hepatomegaly (enlarged liver):** Can be seen in lymphomas, leukemia, or metabolic diseases.
- **Palpation:** Is the mass tender? Is it mobile or fixed?
- **Lymphadenopathy:** Check for enlarged lymph nodes, particularly in the cervical, axillary, and inguinal regions, as lymphoma or leukemia may present with generalized lymphadenopathy.
- **Signs of bone marrow failure:** Petechiae, bruising, and pallor suggest hematologic involvement

3. Differential Diagnosis of Hematologic Abdominal Masses > Several hematological conditions can present with an abdominal mass:

- Leukemia (especially acute lymphoblastic leukemia - ALL):**

May present with hepatosplenomegaly due to infiltration of leukemic cells into the liver and spleen.

Associated symptoms: fever, bruising, fatigue, and bone pain

- Lymphoma (Hodgkin's and non-Hodgkin's lymphoma):**

Often presents with an abdominal mass, particularly in non-Hodgkin's lymphoma, where mesenteric lymphadenopathy or large tumor masses in the abdomen may occur.

Symptoms: Painless lymphadenopathy, fever, night sweats, and weight loss (B symptoms).

- Hemolytic Anemia (e.g., hereditary spherocytosis, sickle cell disease):**

Splenomegaly is often present due to excessive breakdown of red blood cells.

Associated symptoms: jaundice, anemia, and episodes of pain (in sickle cell disease).

4. Initial Investigations > The following tests help in diagnosing the cause of the abdominal mass:

- Complete blood count (CBC) with differential:**
 - **Leukemia:** May show pancytopenia, blast cells, or leukocytosis.
 - **Lymphoma:** Can be associated with anemia, lymphocytosis, or neutropenia.
 - **Hemolysis:** Signs like anemia and reticulocytosis suggest hemolysis

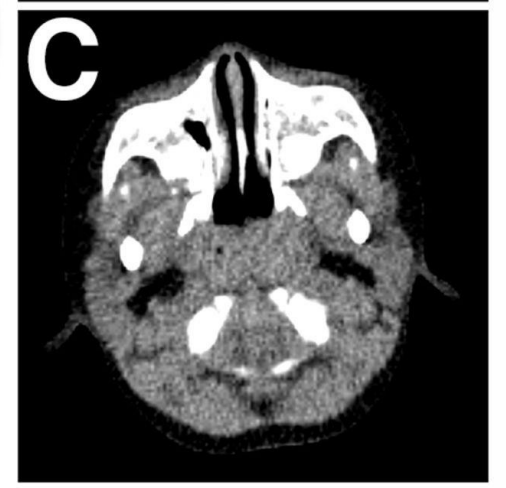
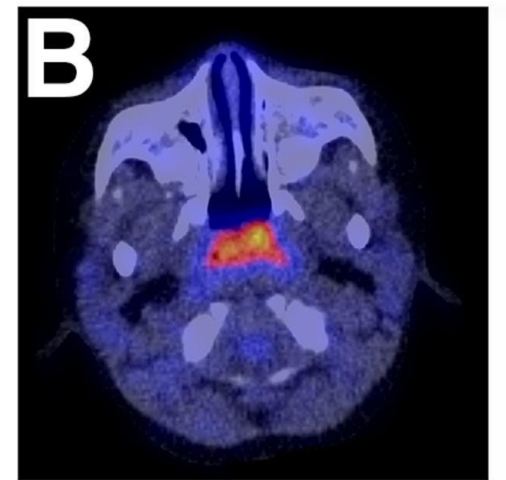
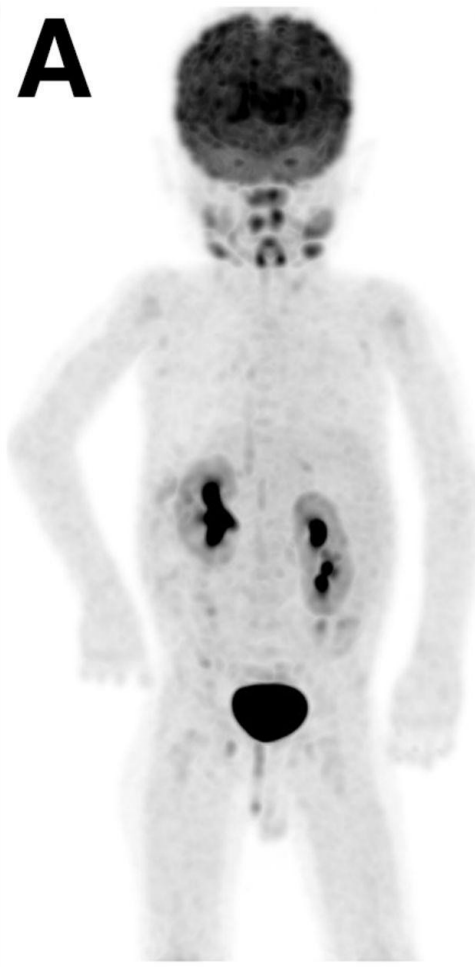
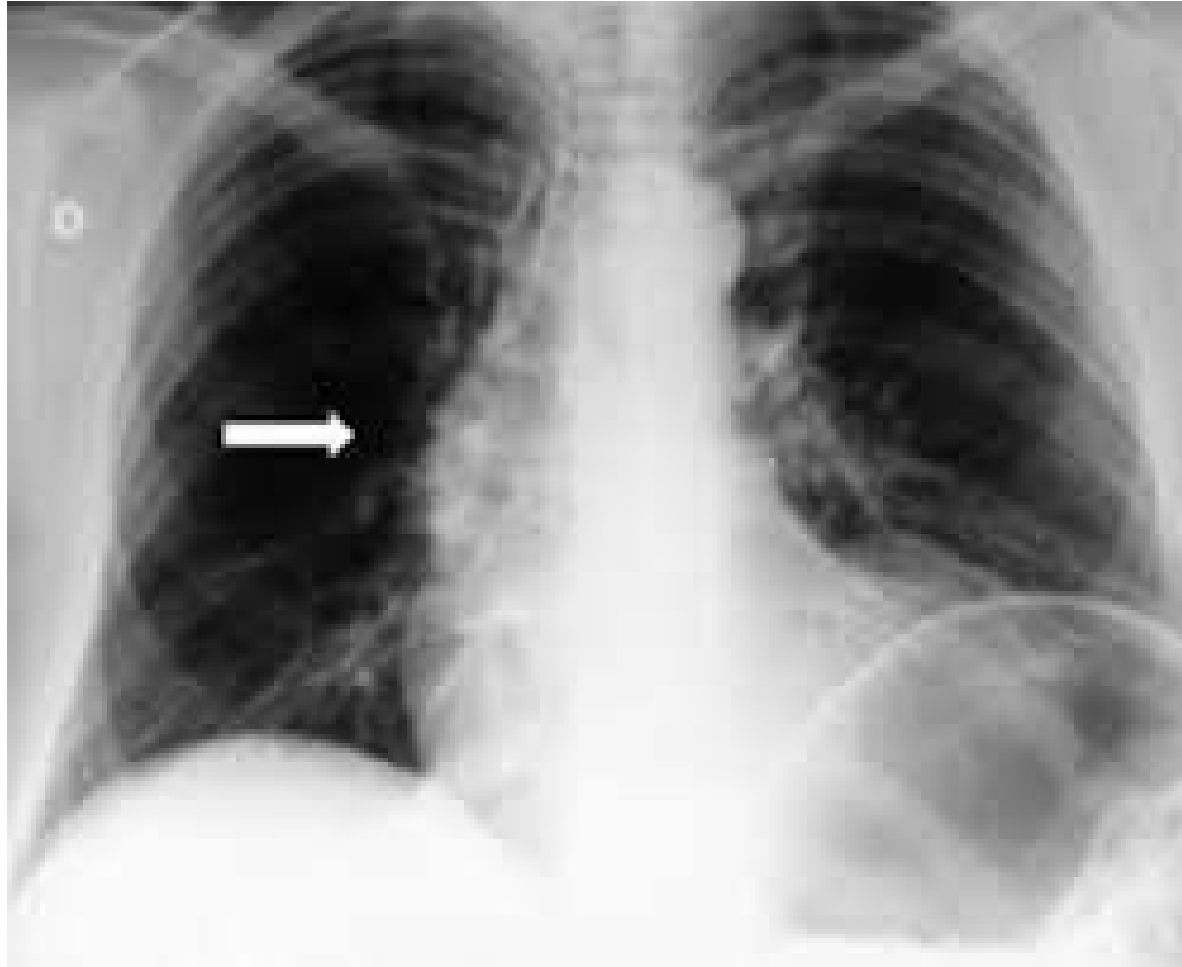
- Peripheral blood smear:** Helpful in identifying blast cells (in leukemia) or abnormal red blood cells (in hemolytic anemias).

- Liver function tests (LFTs) and lactate dehydrogenase (LDH):** Elevated LDH can indicate rapid cell turnover, common in malignancies.

- Coagulation profile: To assess for clotting issues, which may be present in some malignancies or liver involvement.
- Abdominal ultrasound or CT scan: Essential for evaluating the characteristics of the mass, its location, and whether it is associated with specific organs (e.g., liver, spleen, lymph nodes).
- Bone marrow aspiration/biopsy: Indicated if leukemia is suspected to confirm diagnosis by identifying malignant cells.
- Lymph node biopsy: If there is suspicion of lymphoma, a biopsy of the enlarged lymph node can confirm the diagnosis.

5. Further Diagnostic Imaging and Tests >

- Chest X-ray: To check for mediastinal masses (common in lymphoma).
- CT/MRI of the abdomen: To evaluate the size, extent, and nature of the abdominal mass.
- PET scan: Useful in staging lymphoma to see how far the disease has spread.



6. Management >

- **Leukemia:** Treatment typically involves chemotherapy, and depending on the type, bone marrow transplantation might be needed
- **Lymphoma:** Treatment can involve chemotherapy, radiation, or a combination. The exact protocol depends on the type and stage of the lymphoma.
- **Hemolytic anemias:** Management includes addressing the underlying cause (e.g., splenectomy in hereditary spherocytosis or hydroxyurea in sickle cell disease).

7. Summary Approach >

- History and physical exam focusing on systemic signs and symptoms.
- CBC, imaging (ultrasound/CT), and bone marrow biopsy to assess the cause of the mass.
- Tailored treatment based on the underlying condition (leukemia, lymphoma, etc.).

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Thank
You!

