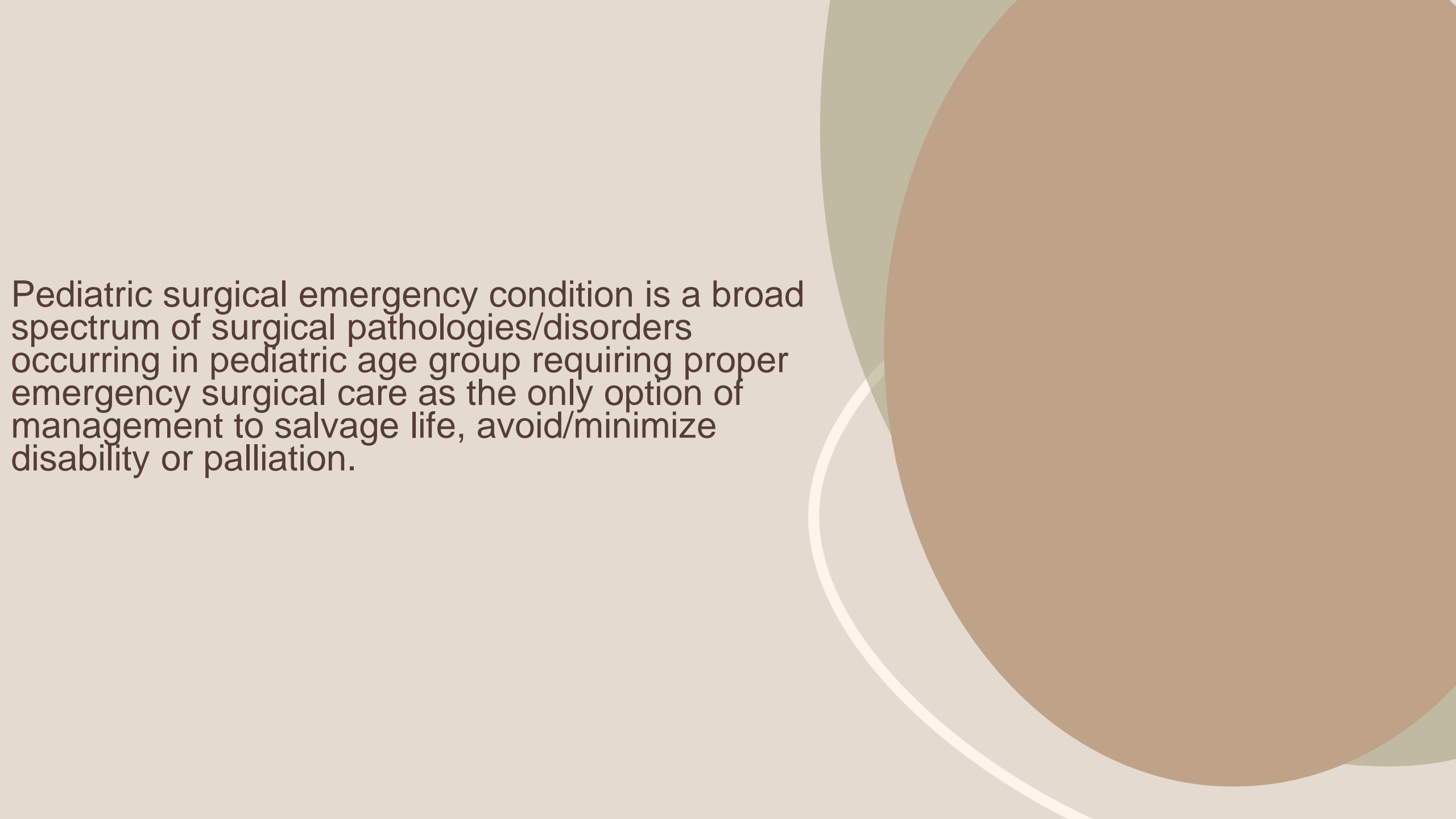


A large, dark grey circular graphic on the left side of the slide. Inside the circle, there is a stylized, light grey leaf-like graphic with several pointed, overlapping shapes. The text 'PEDIATRIC SURGICAL EMERGENCIES' is written in a white, serif font across the middle of the circle.

PEDIATRIC SURGICAL
EMERGENCIES

**Rama Awad
Rama Adnan
Abdallah Ghwiry**



Pediatric surgical emergency condition is a broad spectrum of surgical pathologies/disorders occurring in pediatric age group requiring proper emergency surgical care as the only option of management to salvage life, avoid/minimize disability or palliation.

A stylized, dark grey leaf graphic with several pointed, overlapping leaflets, positioned in the upper left quadrant of the slide. The background is split into a dark grey circular area on the left and a light beige area on the right.

Acute scrotum

ACUTELY PAINFUL

+/- SWELLING

+/- RED SCROTUM

Causes

- Testicular Torsion
- Tortion of appendage (commonest for prepubertal boys)
- Epididymo-orchitis.
- Torsion of Appendages
- Other conditions e.g. Incarcerated hernia



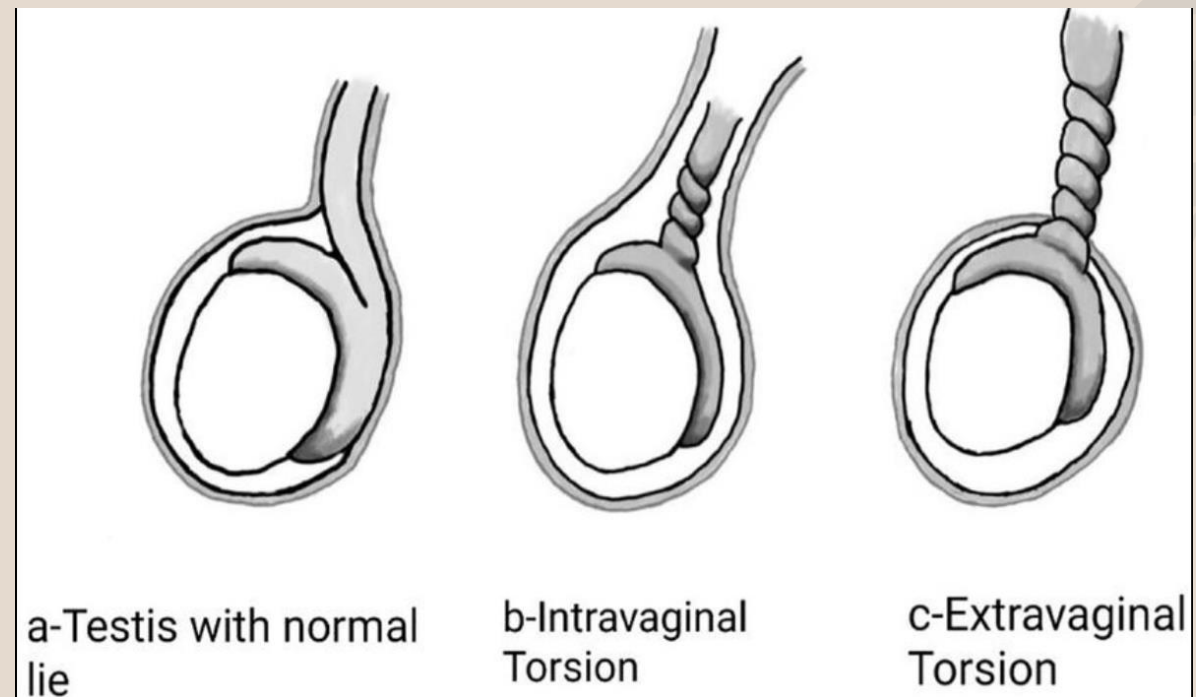
Testicular torsion

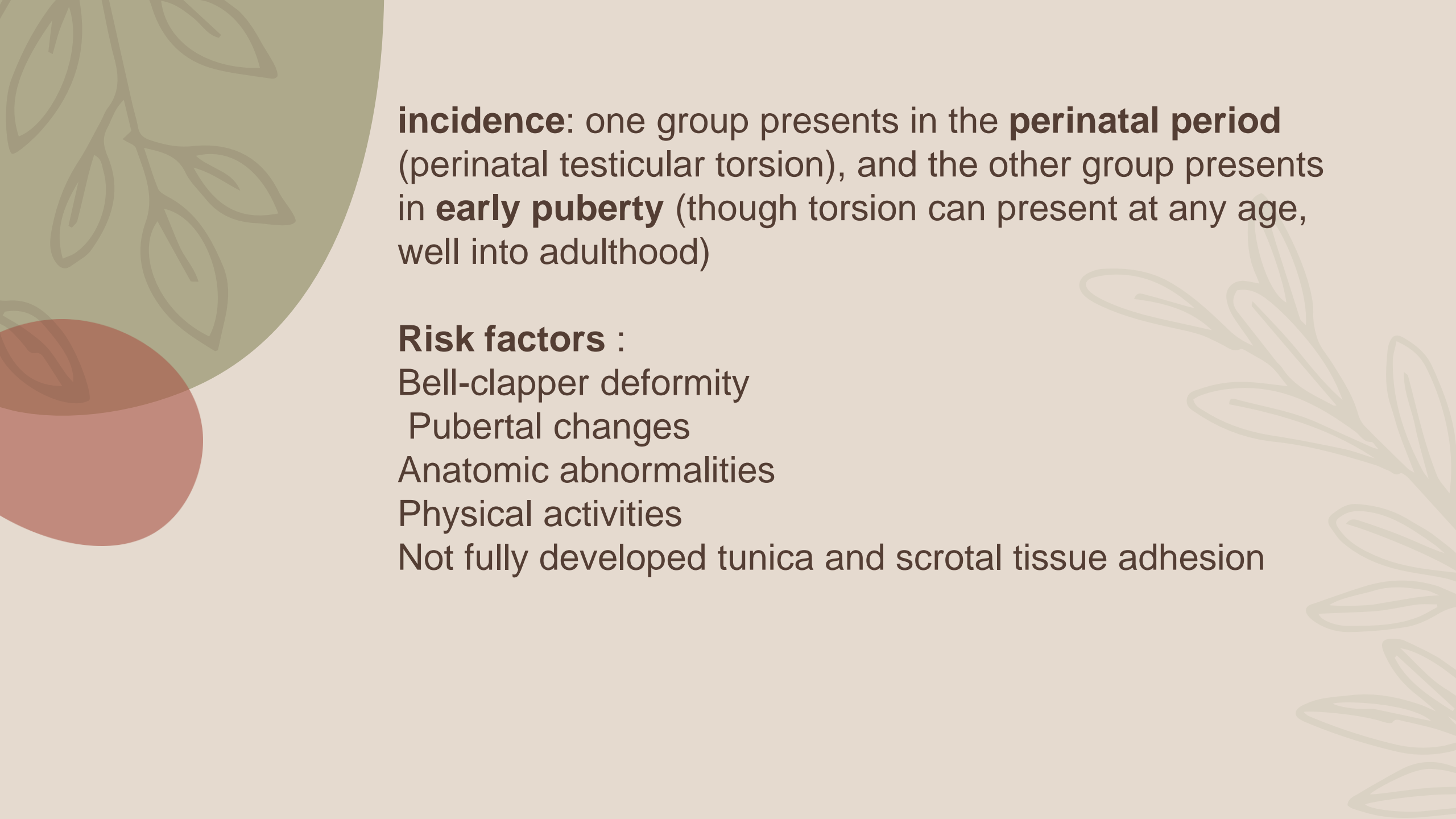
PEDIATRIC TESTICULAR TORSION IS AN ACUTE VASCULAR EVENT IN WHICH THE SPERMATIC CORD BECOMES TWISTED ON ITS AXIS, SO THAT THE BLOOD FLOW TO OR FROM THE TESTICLE BECOMES INTERRUPTED. THIS RESULTS IN ISCHEMIC INJURY AND INFARCTION

Testicular torsion can take place either inside the tunica vaginalis (intravaginal) or outside it (extravaginal).

1. Intravaginal testicular torsion (see the image below) is far more common and represents almost all torsion events in older boys

2. Extravaginal testicular torsion is commonly seen in perinatal cases. Hence, the diagnosis is often made late, long after the torsion event has taken place.





incidence: one group presents in the **perinatal period** (perinatal testicular torsion), and the other group presents in **early puberty** (though torsion can present at any age, well into adulthood)

Risk factors :

Bell-clapper deformity

Pubertal changes

Anatomic abnormalities

Physical activities

Not fully developed tunica and scrotal tissue adhesion

Symptoms

acute onset of diffuse testicular pain ,Nausea, vomiting

Signs

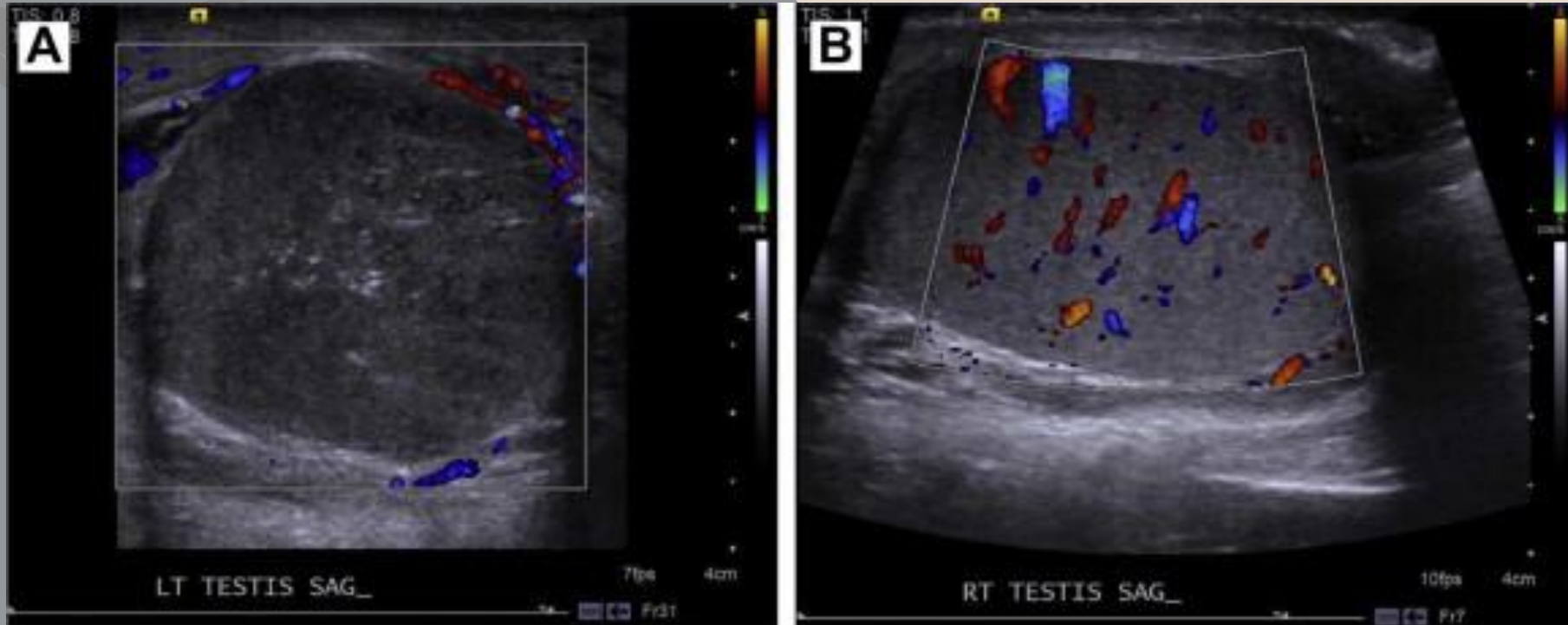
- Swollen, red hemiscrotum , affected testis have a horizontal lie, lies higher than contralateral testis.
- absent or decreased cremasteric reflex.
- Negative Prehn's sign: no pain relief with the affected testicle.
- Fever and urinary symptoms are presence is more indicative of epididymitis))

Diagnostic imaging

- Unnecessary if clinical findings are strongly suggestive, surgical detorsion should not be delayed
- Color Doppler ultrasound : absence of blood flow in the twisted testicle (no central testicular blood flow but excessive peripheral)
- Radionuclide Scan

Lab result

Can help exclude alternative diagnosis (e.g orchiepidiymitis)



- **TESTICULAR TORSION OF THE LEFT SIDE. (A) COLOR DOPPLER ULTRASOUND OF THE LEFT TESTIS SHOWS HETEROGENEOUS ECHOGENICITY AND NO DETECTABLE BLOOD FLOW IN THE LEFT TESTIS, SUGGESTING LEFT TESTICULAR TORSION. (B) COLOR DOPPLER ULTRASOUND OF THE NORMAL RIGHT TESTIS SHOWS HOMOGENEOUS ECHOGENICITY AND DETECTABLE BLOOD FLOW IN THE RIGHT TESTIS**

- **MANAGEMENT**

- **TIMING IS CRITICAL 4 - 6 HOURS**
- **EXPLORATION IF ANY DOUBT .**
- **UNTWIST AND ASSES VIABILITY**
- **FIX OTHER SIDE (ORCHIOPEXY FOR CONTRALATERAL TESTIS)**
- **IF MORE THAN 12 HOURS, IT IS LIKELY TO BE NON-VIABLE AND MAY NEED ORCHIECTOMY . (NON – SALVAGEABLE)**

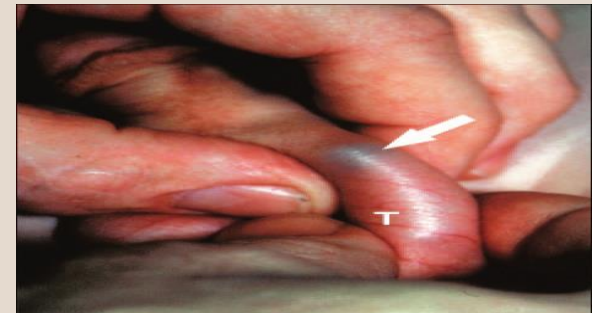
4-6 hours of symptom onset, salvage rates may approach 90%; with delayed intervention, however, these rates drop dramatically—to 50% at 12 hours after symptom onset and to almost 10% after 24 hours. In contrast, perinatal testicular torsion almost always results in loss of the involved testis (salvage rate, < 5%)

Prognosis:

Torsion of the appendage of the testis

occurs in children aged 7-14 years. Poses no threat to health

- The pain is located in the superior pole of the testicle. focal point of pain on the testicle is uncommon in complete testicular torsion.
- Systemic symptoms are absent.
- Nausea and vomiting
- Blue dot sign
- Vertical orientation of the testes is preserved
- cremasteric reflex is usually intact





Doppler ultrasound:

normal blood flow to the testis

Management

treated conservatively; NSAIDs and ice are the mainstays of therapy

operative if torsion cannot be excluded



Epididymo-orchitis

**INFLAMMATION OF
EPIDIDYMIS & TESTIS DUE
TO INFECTION OR
TRAUMA**

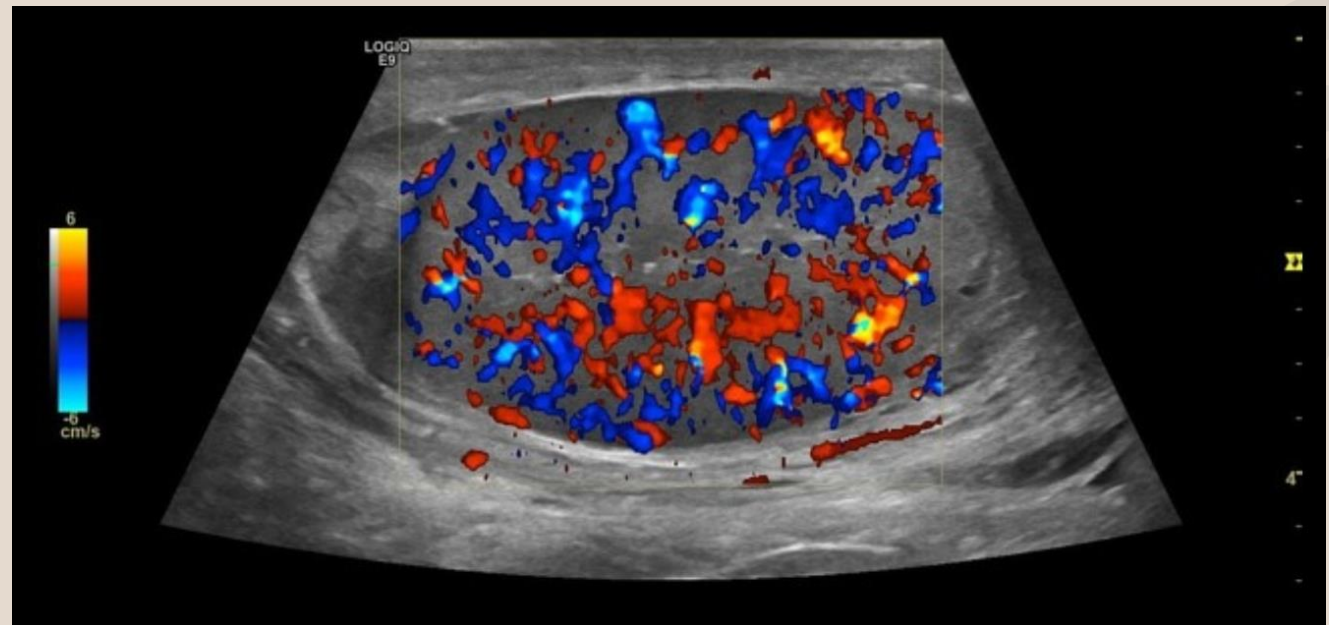
**(CHLAMYDIA
TRACHOMATITIS AND
NEISSERIA GONORRHOEA
)**

**14 AND 35 YEARS OF AGE
ARE MOST OFTEN
AFFECTED**

- 1. Gradual onset of pain in hemiscrotum**
- 2. Commonly associated with fever and UTI (urinary symptoms)**
- 3. Pain relief by elevation of hemiscrotum Prehn's sign The cremasteric reflex remains normal**
- 4. Doppler Scan:**

Management:

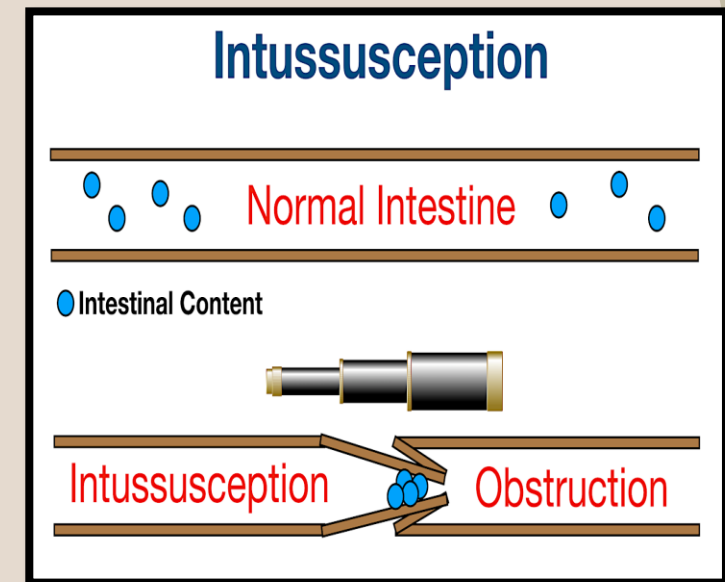
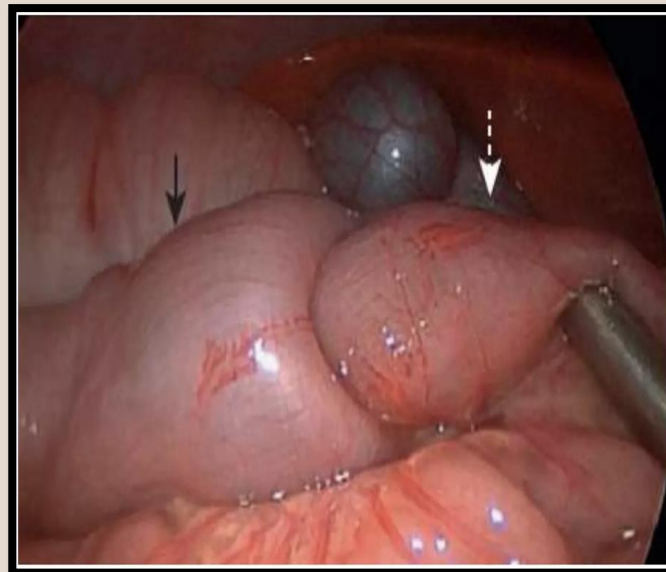
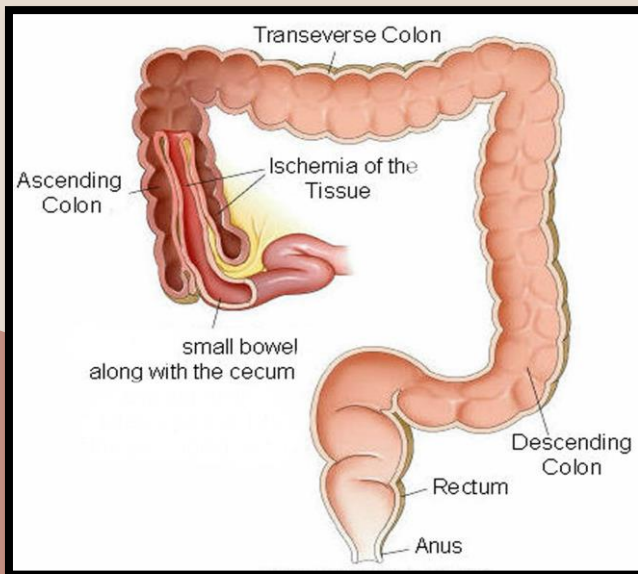
treated conservatively with antibiotics and anti-inflammatory drugs





Intussusception

- **Telescoping of bowel**
 - It refers to the condition whereby a proximal segment of intestine becomes drawn into the lumen of the adjacent distal bowel.
- **Most common cause of small bowel obstruction in toddlers**
- **Most common site (ileo-cecal)**



**Without
leading point**

Hypertrophied
peyer patches

**With a
leading
point**

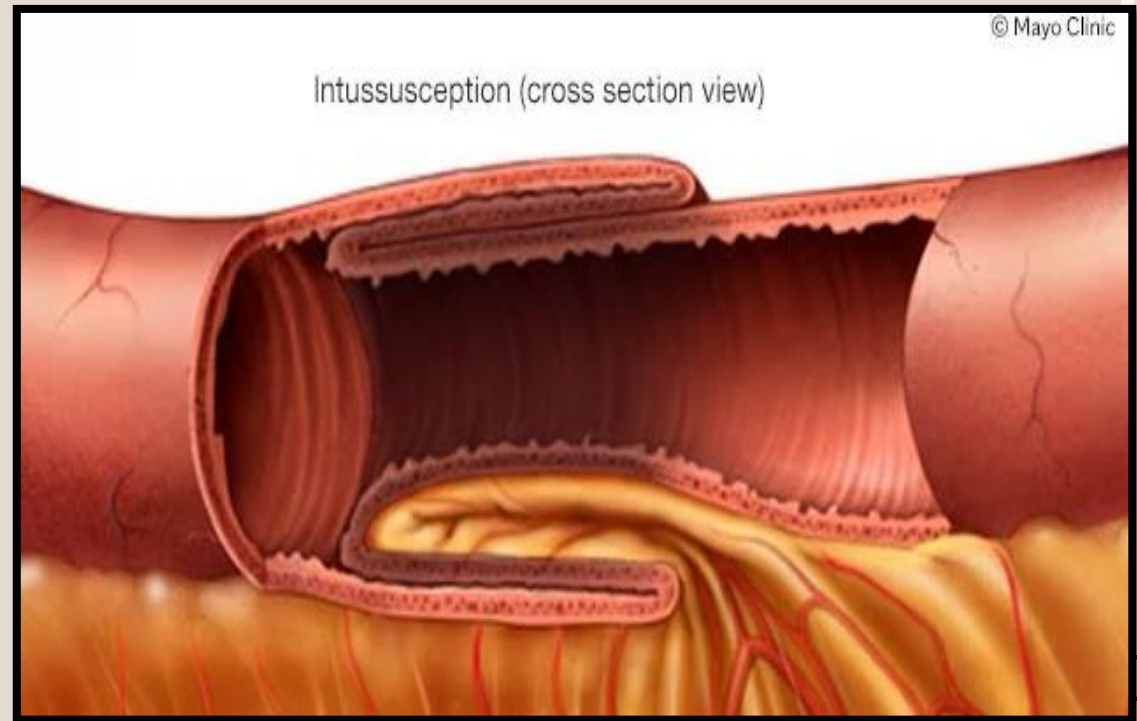
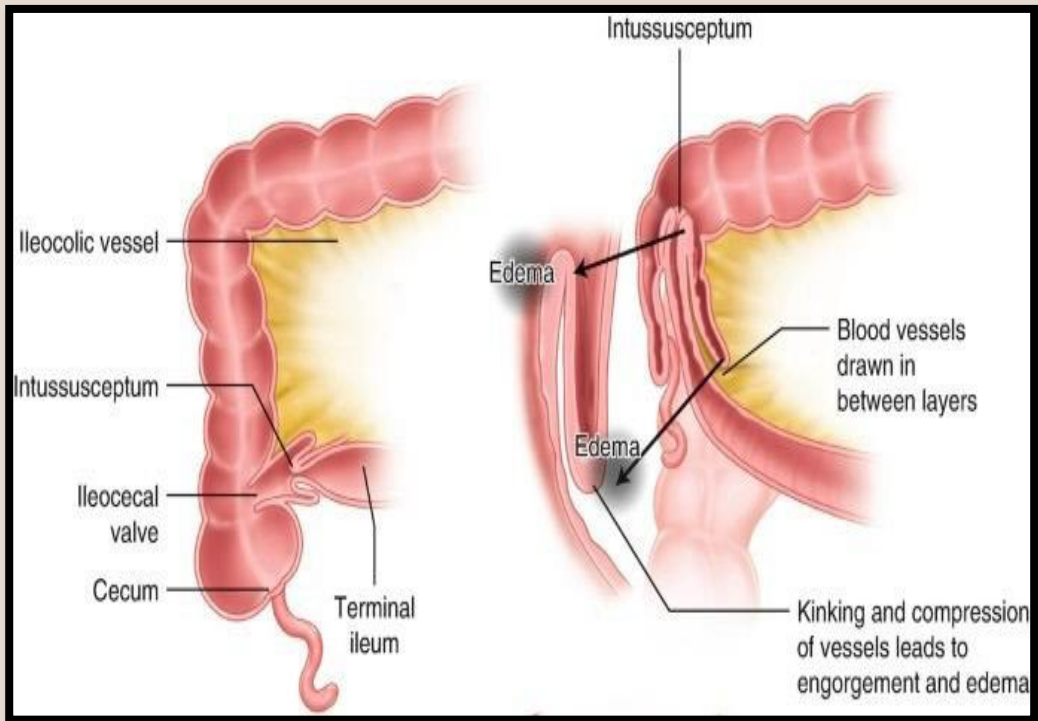
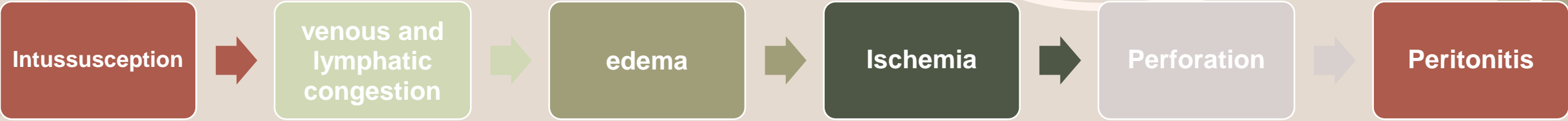
**Meckel
diverticulum**

Tumor

Polyp

Hematoma

***Pathogen
esis***



Presentation

Sudden acute abdominal pain (colicky in nature)

Vomiting

Blood in stool (redcurrent jelly stool)

Palpable abdominal mass

Hx of URTI

Diagnostic

```
graph TD; A[Diagnostic] --> B[Plain xray]; A --> C[Ultrasound]; A --> D[Barium enema]; B --> E[To exclude intestinal obstruction]; C --> F[Target sign]; D --> G[Diagnostic and therapeutic];
```

Plain xray

To exclude
intestinal
obstruction

Ultrasound

Target sign

Barium
enema

Diagnostic
and
therapeutic



Target sign



Contrast enema for diagnosis and treatment

Management

Pressure reduction

Surgical reduction

Barium

Water

Air

Manual reduction of Intussusception

Look for leading point

Resection if unable to reduce the Intussusception



MANAGEMENT



THERAPEUTIC
ENEMA



Indication for surgery

Peritonitis

Sepsis

Failure of the conservative treatment

Recurrence

When there is leading point

Necrotizing Enterocolitis



Disorder involving inflammation and ischemic necrosis of intestinal walls. (progressive disease)



NEC may involve single or multiple segments of the intestine, most commonly the terminal ileum, followed by the colon

Necrotizing enterocolitis (NEC) is the most frequent and lethal gastrointestinal disorder affecting the intestine of the stressed, preterm neonate.

Multiple risk factors have been associated with development of NEC .

- VLBW Infants
- Enteral Feeding
- Bacterial overgrowth
- Prematurity
- Hyperosmolarity of solution

bell's criteria for necrotizing enterocolitis

Stage	Classification	Clinical Signs	Radiologic Signs
I	Suspected NEC	Abdominal distention Bloody stools Emesis/gastric residuals Apnea/lethargy	Ileus/dilation
II	Proven NEC	As in stage I, plus: Abdominal tenderness ± Metabolic acidosis Thrombocytopenia	Pneumatosis intestinalis and/or portal venous gas
III	Advanced NEC	As in stage II, plus: Hypotension Significant acidosis Thrombocytopenia/disseminated intravascular coagulation Neutropenia	As in stage II, with pneumoperitoneum

Modified from Walsh MC, Kliegman RM: Necrotizing enterocolitis: treatment based on staging criteria, *Pediatr Clin North Am* 33:179, 1986.

Clinical findings



- Dull, dusky-colored, distended abdomen
- Symptoms of sepsis (temp instability, poor perfusion, lethargy)
- Large, bilious residuals
- Bloody stool
- Hypoactive/absent bowel sounds
- Abdominal tenderness

Initial work up

Labs: Findings associated with NEC

CBC – Thrombocytopenia – Neutropenia
($<1500/\mu\text{L}$) –poor prognosis

DIC panel (PT/INR, PTT, Fibrinogen, D- dimer)

Elevated PT/INR, PTT, D-dimer

Decreased Fibrinogen

BMP (may have values similar to those found
in sepsis)

– Hyponatremia (<130)



Work up

- Abdominal radiography
- The mainstay of diagnostic imaging
- An AP and a left lateral decubitus view are essential for initial evaluation
- Should be performed serially at 6-hour or greater intervals, depending on presentation acuity and clinical course, to assess disease progression
- If the infant does not tolerate



Management

- Medical management (10-14 days)
- Make NPO, start on IVF (consider TPN).
- Insertion of nasogastric tube to suction for decompression
- Empiric antibiotics – Ampicillin, gentamicin – Clindamycin and/or flagyl are often added for severe cases
- Cardiovascular/pulmonary support as needed
- Pediatric surgery consultation

Management

- Surgical management
 - Absolute indication for surgery
 - Pneumoperitoneum
 - Relative indication for surgery
 - failure to improve
 - progressive thrombocytopenia
 - Portal vein gas
 - Severe peritonitis
 - Surgical intervention
 - Peritoneal drainage

Prognosis

With aggressive treatment and earlier diagnosis, 70-80% of infants survive.

Infants requiring surgical intervention have a higher mortality rate

About half of survivors have no long-term sequelae.

Long term sequelae:

Stunted growth

Short gut syndrome / intestinal adhesions (in patients requiring extensive resection).

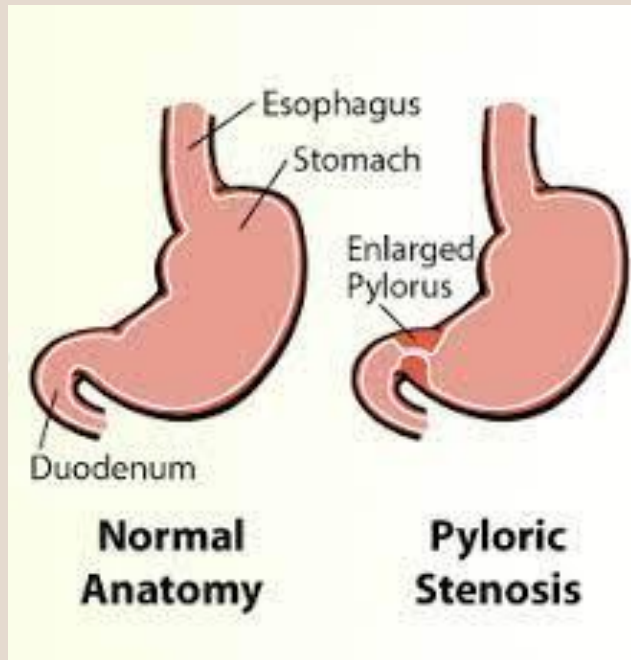


CONGENITAL HYPERTROPHIC PYLORIC STENOSIS (CHPS)

Pyloric Stenosis involves narrowing and obstruction of the pyloric channel because of hypertrophy of the circular muscle of the pylorus.

- It is the most common pediatric surgical disorder of infancy that necessitates surgery for associated emesis.
- Gastric outlet obstruction results in emesis, which is characteristically nonbilious and projectile.

Protracted emesis, as well as failure of the stomach to empty into the duodenum, results in progressive dehydration, electrolyte abnormalities, acid-base disorders, weight loss, and, potentially, shock



- . Incidence:
- . 8:1000
- . M/F ratio=4:1
- . More in first born babies
- . More in infants born to a mother who had suffered from CHPS



presentation

- Symptoms...
- . Projectile vomiting is typically nonbilious but may have brown discoloration or a coffee-ground appearance due to associated gastritis, particularly if emesis has persisted for several days
- . The vomiting occurs within 30-60 minutes after feeding
- . The infant remains hungry and usually attempts to feed immediately after vomiting
- Classically the symptoms between 3-12 weeks after birth

Signs...

.Signs of dehydration which may be severe and life threatening.

.Visible peristalsis in the upper abdomen can usually be seen after the baby is given a test feed followed by projectile vomiting



Diagnosis



. Laboratory Studies:



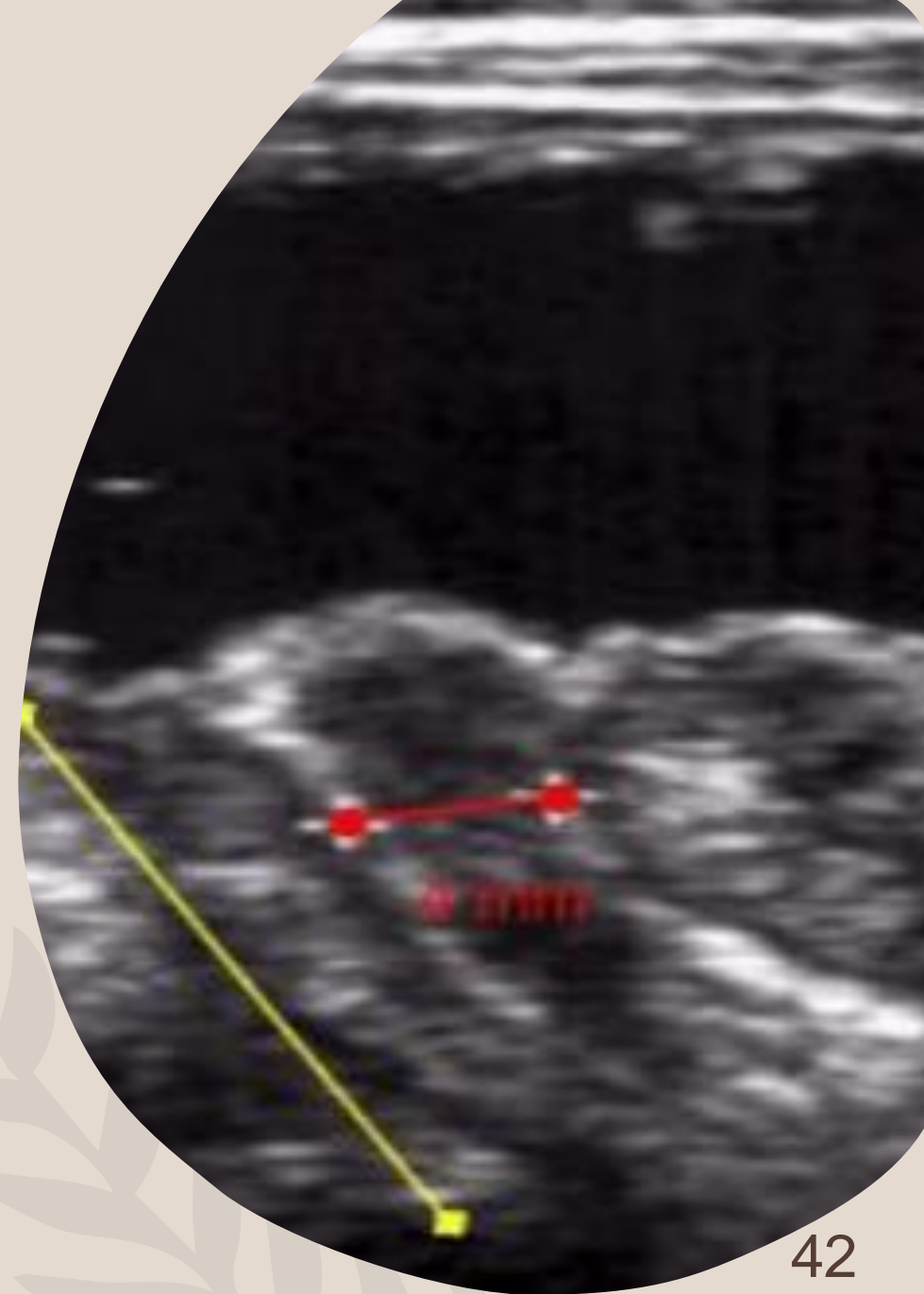
• An electrolyte panel is essential for estimating the state of dehydration and acidosis/alkalosis in patients with pyloric stenosis. Hypochloremic hypokalemic metabolic alkalosis is the characteristic biochemical disturbance observed in pyloric stenosis.

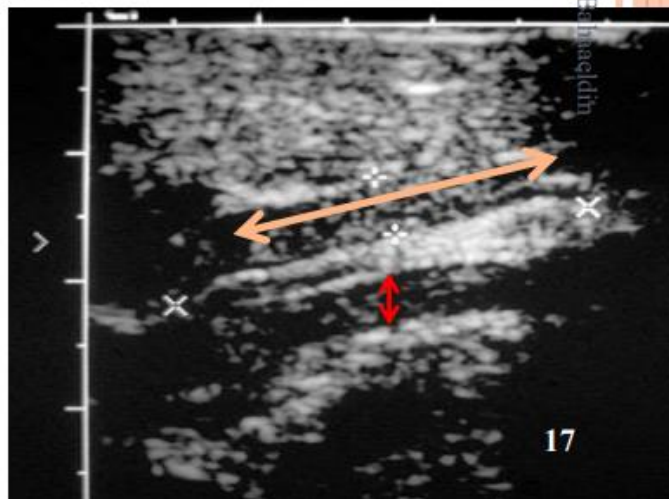


Radiography: • Upper GI (UGI) contrast studies have largely been supplanted by Ultrasonography as the study of choice for confirming pyloric stenosis.

Ultrasonography:

- . pyloric channel length (normal 11 mm, pyloric stenosis > 15-18 mm)
- . pyloric muscle length (normal 13-17 mm, pyloric stenosis > 19-21 mm)
- . pyloric muscular wall thickness (normal < 2 mm, pyloric stenosis > 3-5 mm).
- . pyloric diameter (normal < 10-15 mm, pyloric stenosis > 10-15 mm)





Treatment

- Once the diagnosis of pyloric stenosis has been confirmed, adequate ongoing preoperative fluid resuscitation must be maintained by establishing adequate urine output (1 mL/kg/hr) and correcting acid-base disorders and electrolyte abnormalities.
- Pyloromyotomy may be performed either as an open procedure, via a right-upper-quadrant (RUQ) horizontal incision or an umbilical incision (Tan-Bianchi operation), or as laparoscopic procedure.



thank you

