Gastroenterology I.

Nabil El-Lababidi

Department of Paediatrics and Inherited Metabolic Disorders

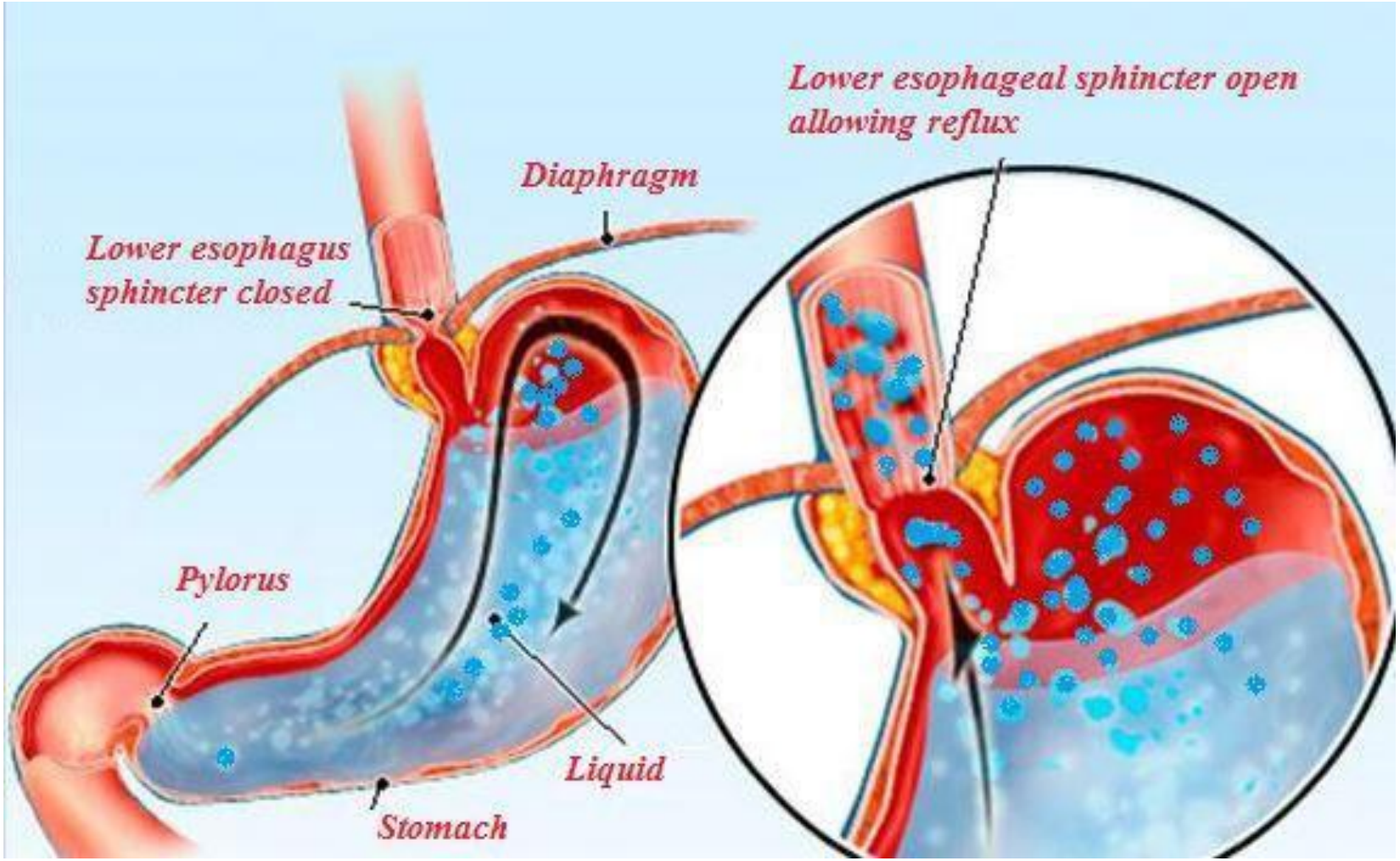
1. LF UK and VFN in Prague

Gastroesophageal reflux disease

Gastroesophageal reflux

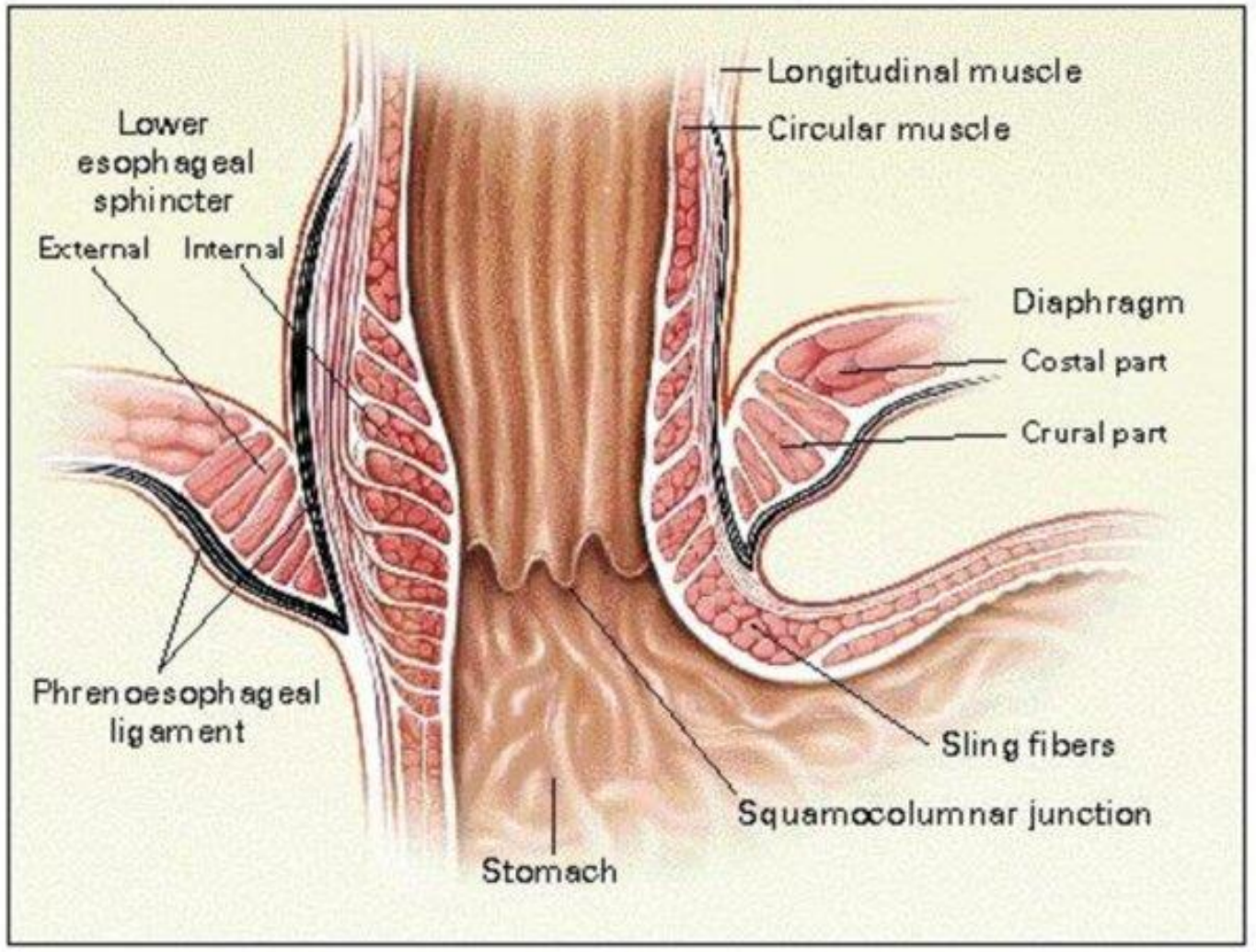
- Gastroesophageal reflux is the involuntary return of gastric content in the oesophagus with/out regurgitations and/or vomiting.
- Gastroesophageal reflux disease (GERD) is GER associated with clinical problems, damage to the tissue or both.
- Refractory GERD is the case, when reflux symptoms remain even after 8 weeks of therapy.

Anti-reflux mechanisms – Lower oesophageal sphincter



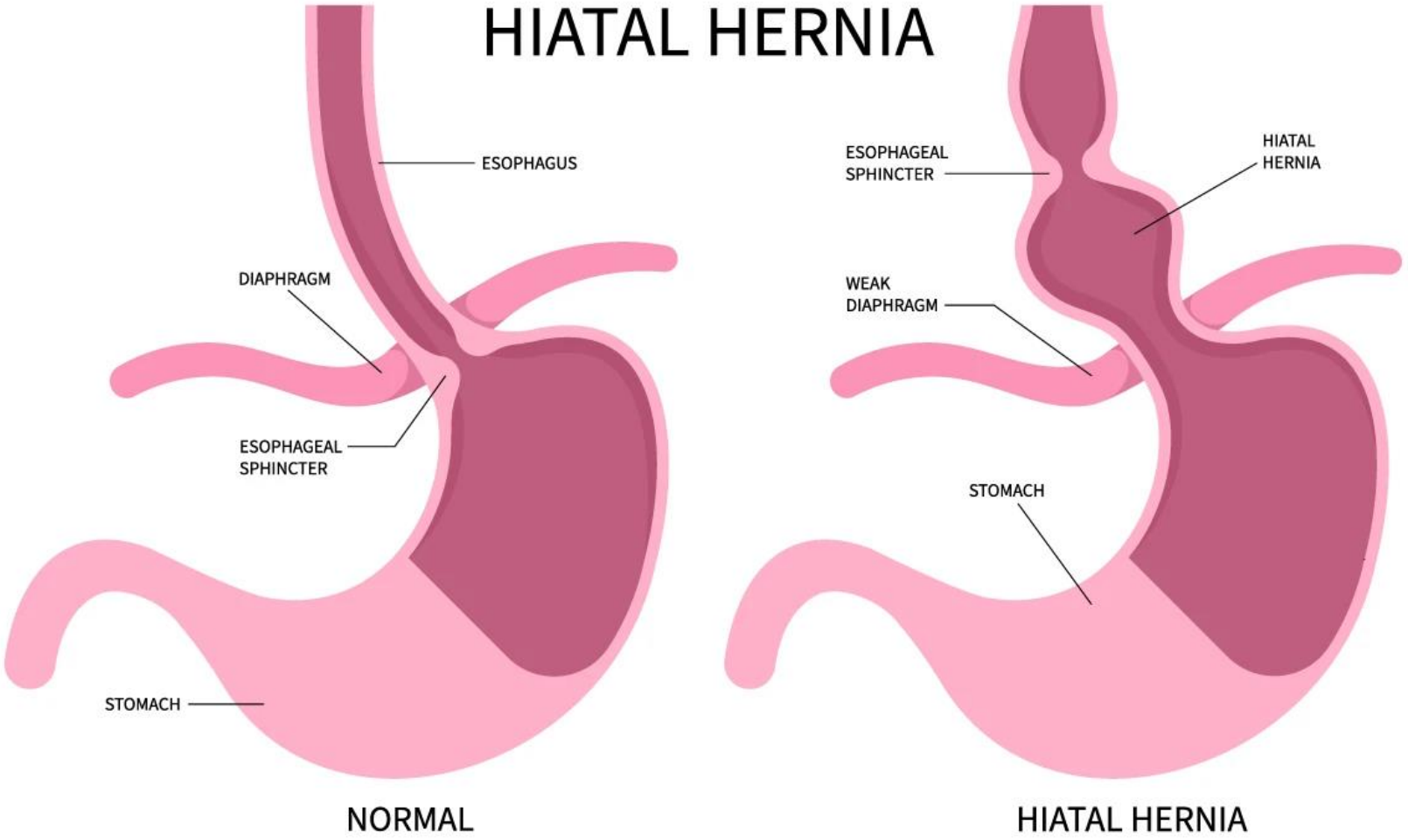
Sankar R. *J Dent Med Sci* 2016

Anti-reflux mechanisms – Diaphragm surrounding LES



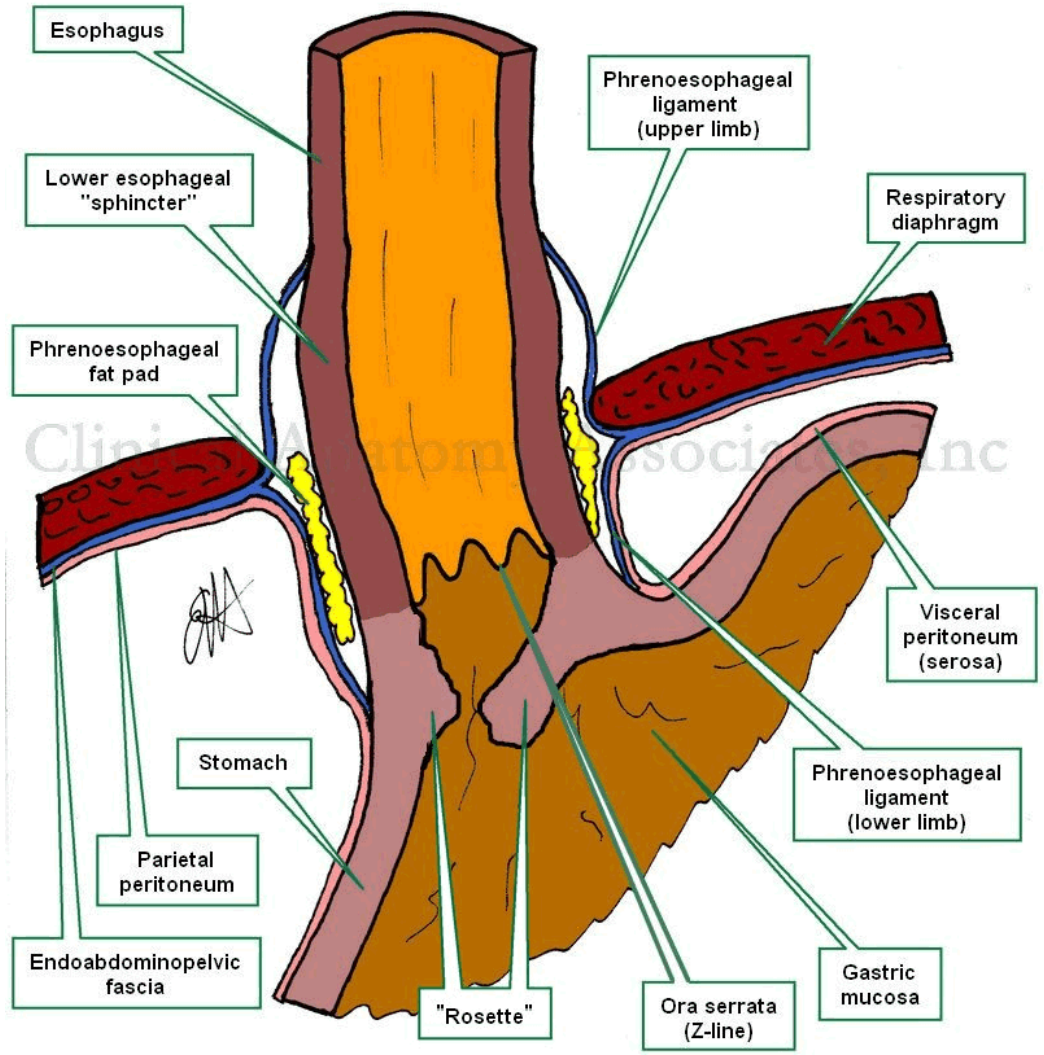
Mittal RK & Balaban DH. *N Engl J Med* 1997

Hiatal hernia



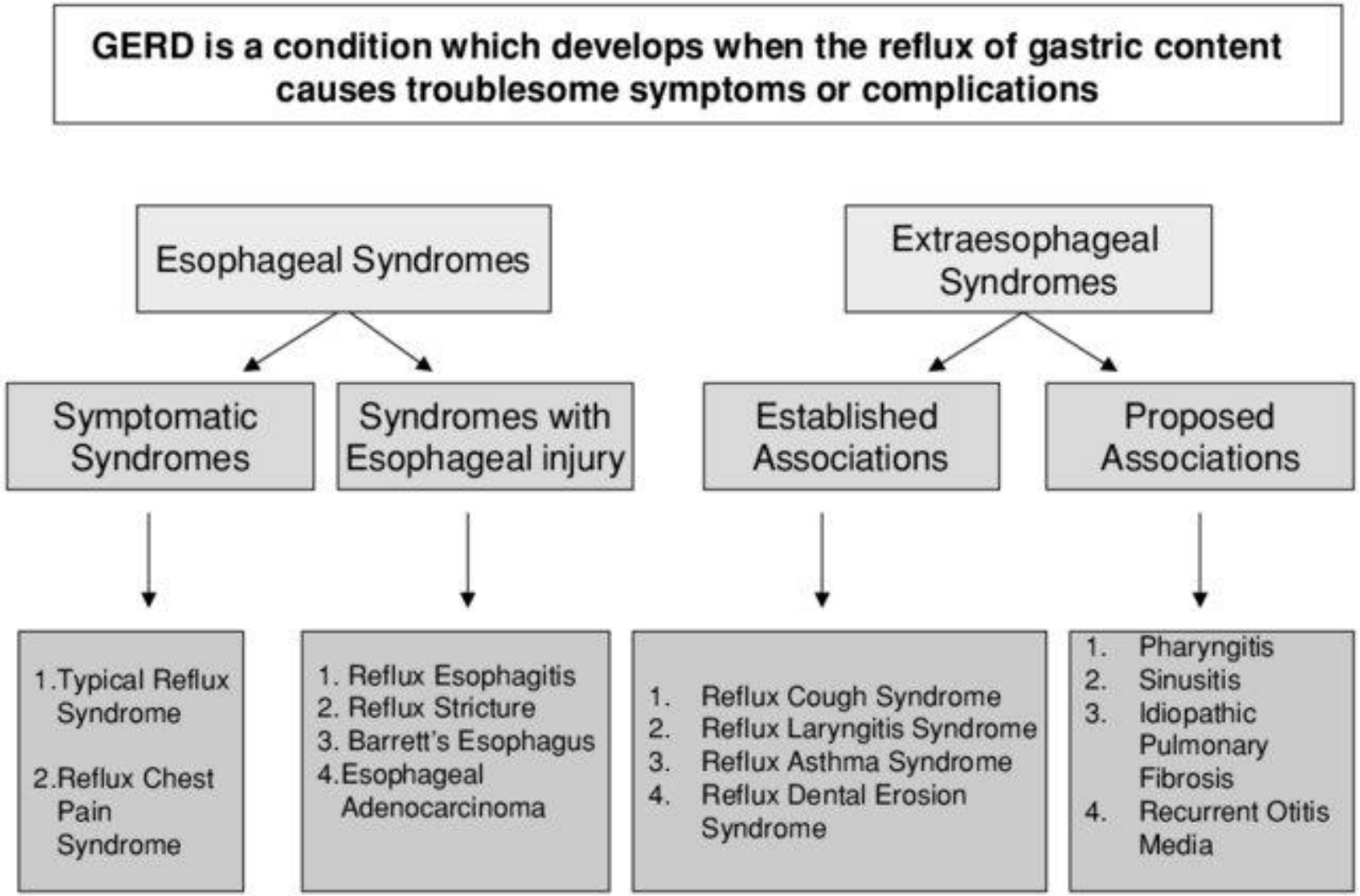
Hiatal Hernia Symptoms & Treatment | Aurora Health Care

Anti-reflux mechanisms – Angle of Hiss



Angle of His (clinicalanatomy.com)

Classification of GERD manifestations



Vakil N, et al. *Am J Gastroenterol* 2006

Oesophageal GERD symptoms

Regurgitations	Faltering growth and weight loss
Vomiting	Postprandial satiety
Pyrosis	Irritability
Retrosternal pain	Bloating
Dysphagia/odynophagia	Haematemesis
Food refusal	Haematochezia
Sandifer syndrome	Anaemia

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

Red flags in infants and toddlers

General:

- Weight loss
- Lethargy
- Fever
- Excessive irritability/pain
- Dysuria
- Onset of regurgitation/vomiting >6 months or increasing/persisting >12–18 months of age

Neurological:

- Bulging fontanel/rapidly increasing head circumference
- Seizures
- Macro/microcephaly

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

Red flags in infants and toddlers

Gastro-intestinal

- Persistent forceful vomiting
- Nocturnal vomiting
- Bilious vomiting
- Hematemesis
- Chronic diarrhea
- Rectal bleeding

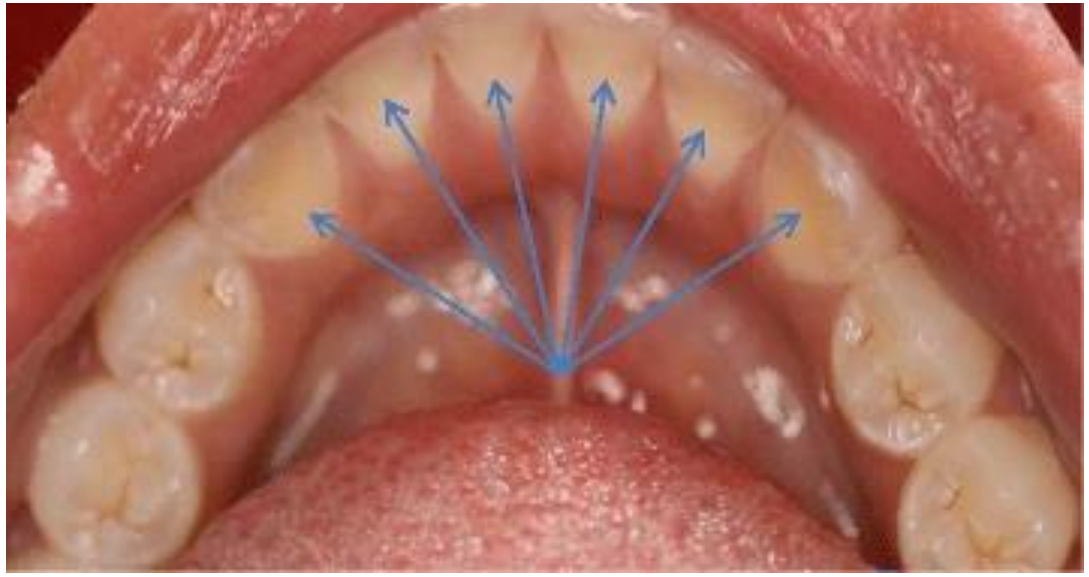
- Abdominal Distension

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

Extra-esophageal reflux disease (EER)

Aspiration pneumonia	Apnoea
Lung abscess	BRUE (brief, resolved, unexplained event)
Idiopathic lung fibrosis	SIDS (sudden infant death syndrome)

EER



Friesen LR et al. *BMC Oral Health* 2017

EER

Infants	Older children
Hoarseness	Throat paraesthesia
Stridor	Hoarseness
Eustachian tube insufficiency	Recurrent sinusitis
Recurrent middle ear infections	

GERD - diagnosis

- MII-pH-metry (Multichannel intraluminal impedance with pH-metry).
- pH-metry.

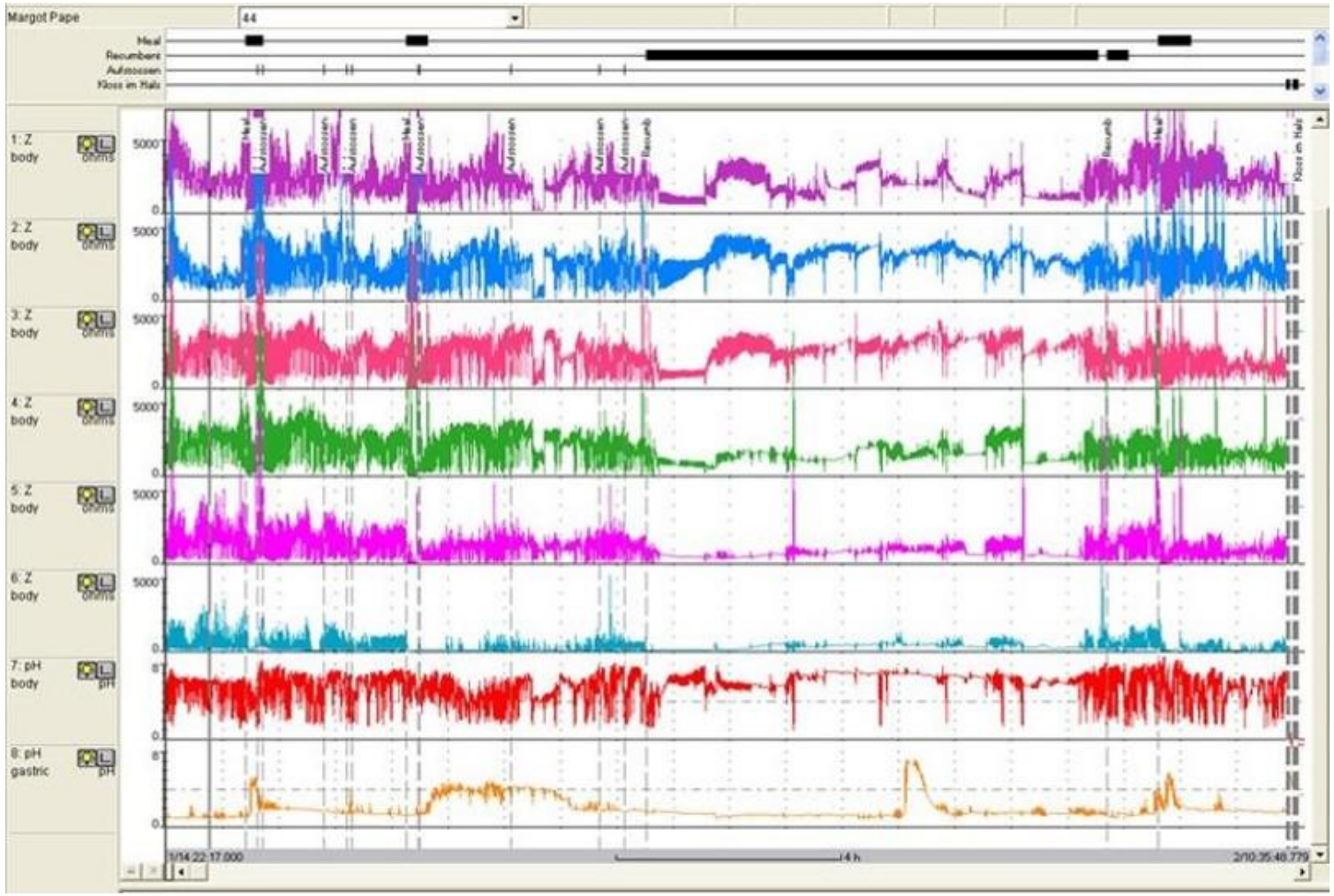
MII-pH-metry and pH-metry

Parameter	Acid GER	Non-acid GER	Gas reflux	Reflux height	Chemical clearance	Bolus clearance	Postprandial GER
pH-merty	+	-	-	1 or 2 levels	+	-	-
MII-pH-metry	+	+	+	6 levels	+	+	+

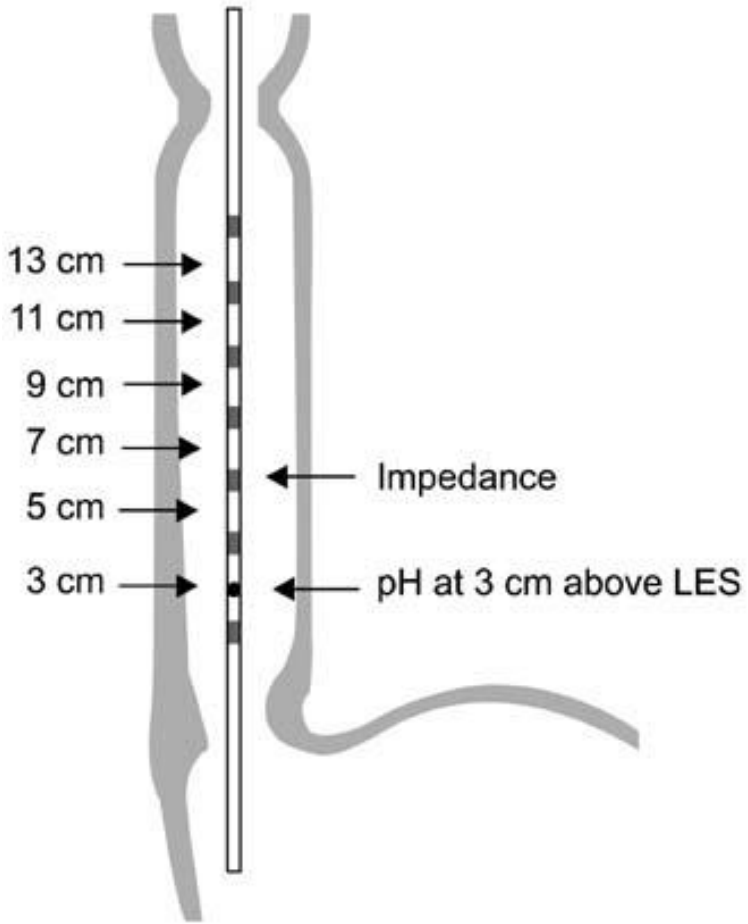
Wenzl TG, et al. *J Pediatr Gastroenterol Nutr* 2012

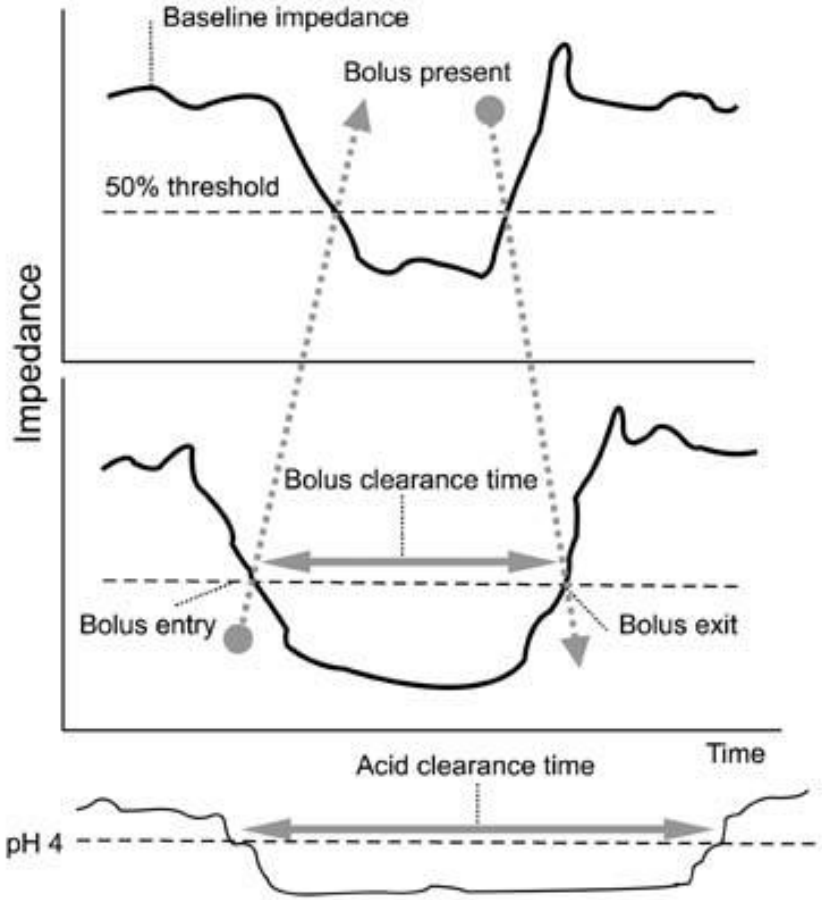
MII-pH-metry

MII-pH-metry


Margot Pape
44
Head
Recumbent
Aufrossen
Kloss im Hals
1: Z body
2: Z body
3: Z body
4: Z body
5: Z body
6: Z body
7: pH body
8: pH gastric
5000
0
8
4 h

MII-pH-metry

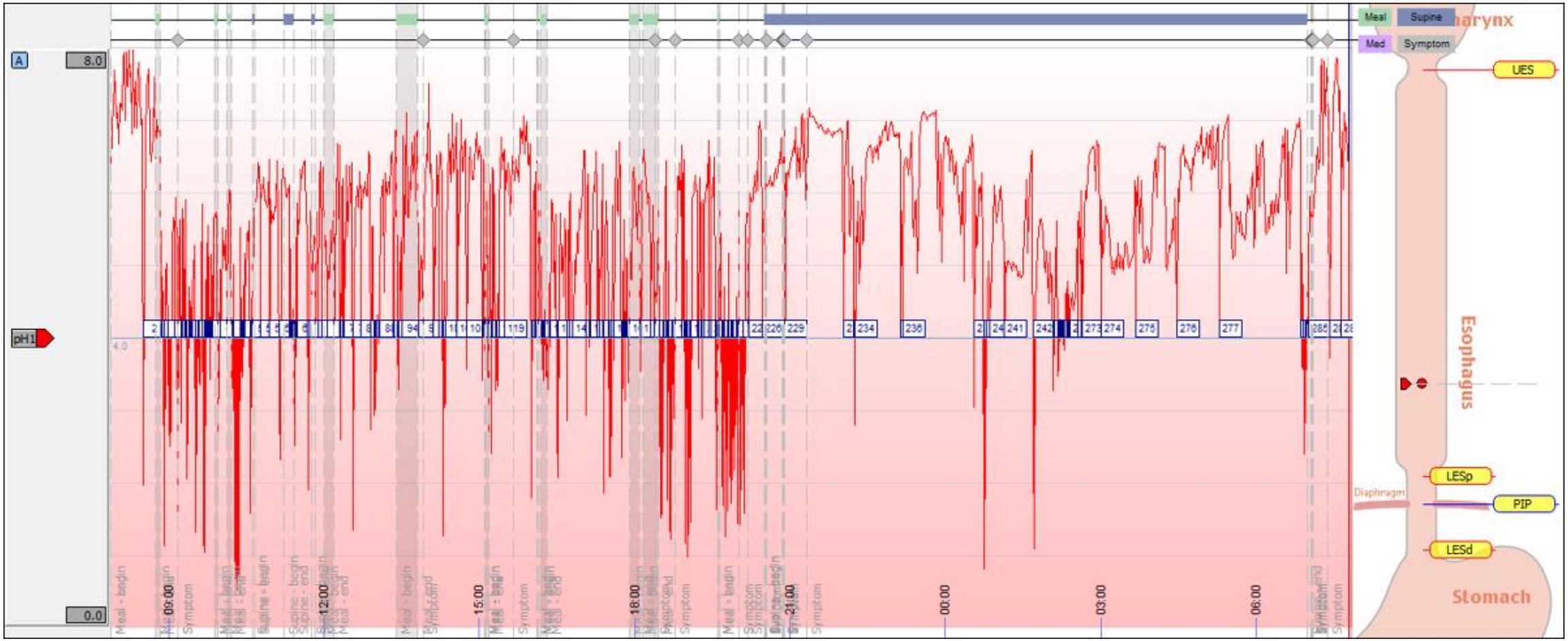




Shin MS. *J Pediatr Gastroenterol Hepatol Nutr* 2014

pH-metry

pH-metry


A
8.0
0.0
pH1
Meal
Supine
Med
Symptom
UES
Esophagus
LESp
Diaphragm
PIP
LESd
Stomach
09:00
12:00
15:00
18:00
21:00
00:00
03:00
06:00

GERD – examination methods

	GER	Esophagitis	Barrett oesophagus	Oesophageal stricture	Causal relationship
MII-pH-metry/pH-metry	+++	-	-	-	+++
Upper GI series	+	+	+	+++	-
Esophagogastroduodenoscopy	+	+++	+++	++	-
Scintigraphy of oesophagus	+	-	-	-	-
Oesophageal biopsies	-	+++	+++	-	-
Therapeutic test with PPIs	+	-	-	-	+

GERD differential diagnosis

Gastrointestinal obstruction

- Pyloric stenosis
- Malrotation with volvulus
- Intussusception
- Hirschsprung disease
- Antral/duodenal web
- Foreign body
- Incarcerated hernia
- Superior mesenteric artery (SMA) syndrome

Other gastrointestinal disorders

- Achalasia
- Gastroparesis
- Gastroenteritis
- Peptic ulcer
- Eosinophilic esophagitis
- Food allergy/intolerance
- Inflammatory bowel disease
- Pancreatitis
- Appendicitis

Neurologic

- Hydrocephalus
- Subdural hematoma
- Intracranial hemorrhage
- Intracranial mass

Infectious

- Sepsis/meningitis
- Urinary tract infection
- Upper/lower airway infection
- Otitis media
- Hepatitis

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

GERD differential diagnosis

Neurologic

- Hydrocephalus
- Subdural hematoma
- Intracranial hemorrhage
- Intracranial mass

Infectious

- Sepsis/meningitis
- Urinary tract infection
- Upper/lower airway infection
- Otitis media
- Hepatitis

Metabolic/endocrine

- Galactosemia
- Hereditary fructose intolerance
- Urea cycle defects
- Amino and organic acidemias
- Fatty acid oxidation disorders
- Metabolic acidosis
- Congenital adrenal hyperplasia/adrenal crisis

Others

- Pediatric condition falsification (PCF)/factitious disorder by proxy (FDP)
- Child neglect or abuse
- Self-induced vomiting
- Cyclic vomiting syndrome
- Rumination syndrome

Toxic

- Lead poisoning
- Other toxins

Renal

- Obstructive uropathy
- Renal insufficiency

Cardiac

- Heart failure
- Vascular ring

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

GERD treatment

- Non-pharmacological.
- Pharmacological.
- Surgical.

GERD Pharmacotherapy

Durg group	Effective substance	Recommend paediatric dose	Maximum adult dose	Side effects
Proton pump inhibitors (PPI)				Headaches. Increased risk of community acquired pneumonia, ciral gastroenteritis, candida infections. Acute interstitial nephritis. Necrotizing enterocolitis
	Omeprazole	<6 months: 0,7-1,2 mg/kg/den >6 months: 1-4 mg/kg/den	40 mg	
	Lansoprazole	For infants	30 mg	
	Esomeprazole	<20 kg:10 mg/den >20 kg: 20 mg/den	40 mg	
	Pantoprazole	1-2 mg/kg/den	40 mg	

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

GERD Pharmacotherapy

H2RA				Somnolence. Vertigo. Headaches. Abdominal pain. Diarrhoea.
	Ranitidine	5-10 mg/kg/den in 2-3 daily doses. Possible to give after 1 month of age.	300 mg	
	Cimetidine	30-40 mg/kg/den	800 mg	
	Nizatidine	10-20 mg/kg/den	300 mg	
	Famotidine	1 mg/kg/den in two daily doses. Possible to give after 1 year of age.	40 mg	
Prokinetics				
	Metoclopramide	0,4-0,9 mg/kg/den in 4 doses	60 mg	Lethargy or irritability. Gynecomastia. Galactorrhoea. Extrapyramidal symptoms. Tardive dyskinesis.
	Domperidone	0,8-0,9 mg/kg/den in 4 doses	30 mg	Extrapyramidal symptoms.
	Baclofen	0,5 mg/kg/den	80 mg	Somnolence. Confusion. Fatigue. Orthostatic hypotension.

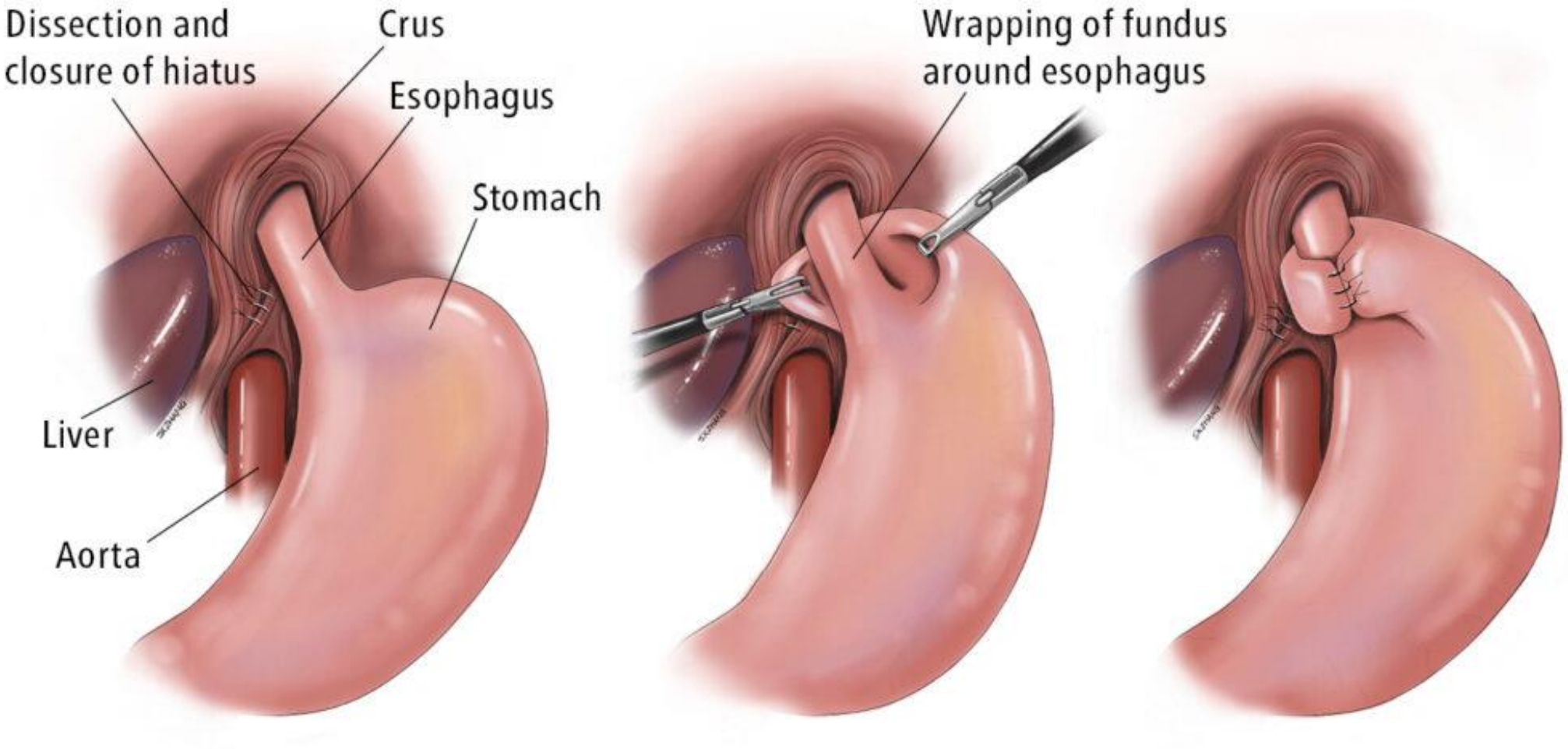
Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

GERD Pharmacotherapy

Antacids			Short term use seems to be safe. Long term use of antacids with aluminium increases its level in the infants‘ blood. Long term use of alginate containing calcium can lead to milk-alkali syndrome.
	Mg alginate with Simethicone	<5 kg: 2,5 ml 3 times daily. >5 kg: 5 ml 3 times daily.	
	Sodium alginate	225 mg sodium alginate and magnesium alginate 87,5 ml, total doses 0,65 g. <5,45 kg: 1 sachet daily. >5,45 kg: 2 sachets daily.	

Rosen R, et al. *J Pediatr Gastroenterol Nutr* 2018

GERD surgery



Nissen Fundoplication: A Minimally Invasive Surgery For GERD (patient9.com)

Disorders of gut-brain interaction (DGBI)

DGBI

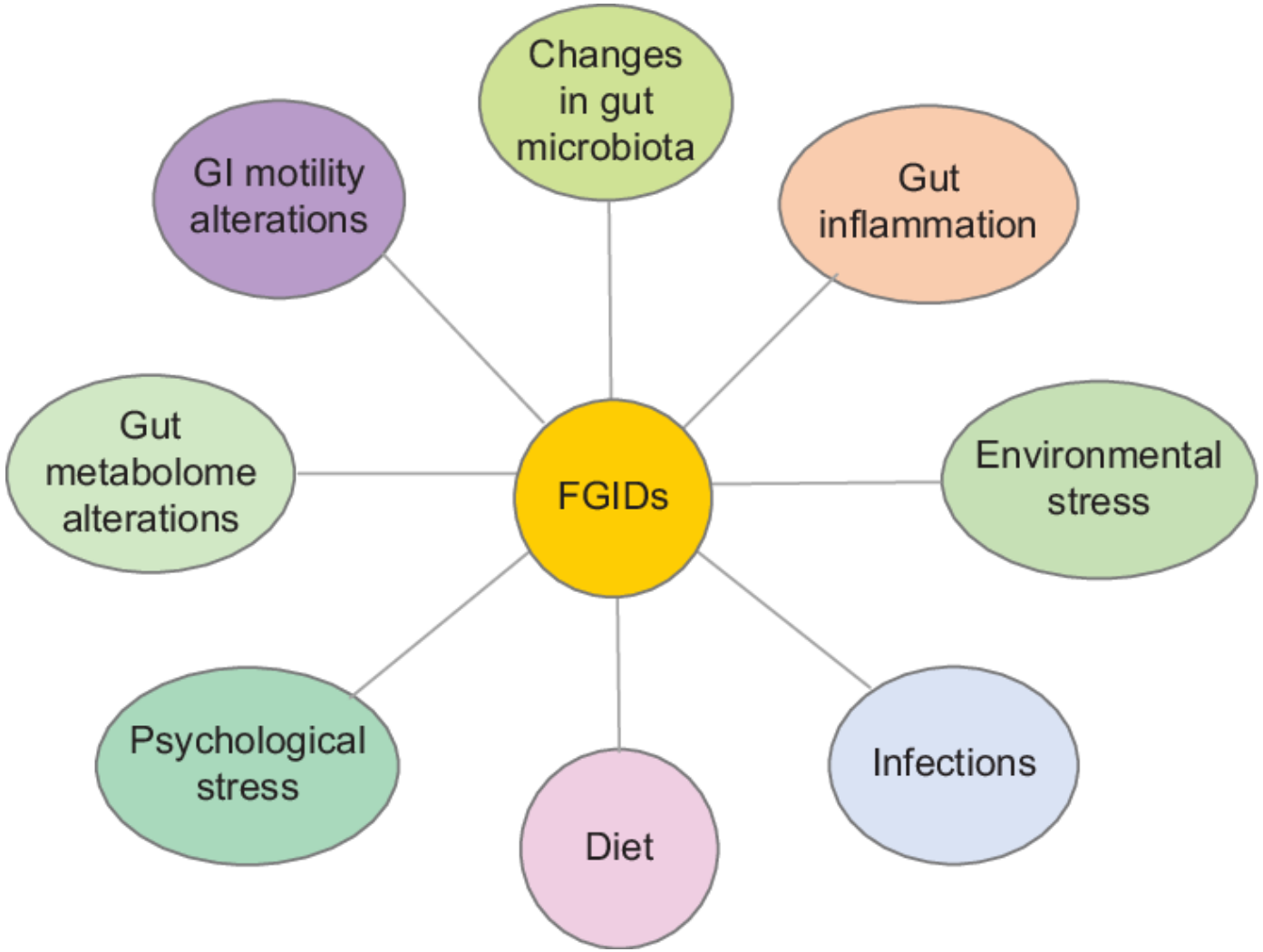
Previously called functional gastrointestinal disorders

DGBI are common, recurrent gastrointestinal symptoms in children, which cannot be explained by structural or biochemical changes or comorbidity with an organic disease.

DGBI epidemiology

- International prevalence 22 %.
- In children younger than 4 years 22,2 % (5,8-40 %).
- In children older than 4 years 21,8 % (19-40 %).
- Up to 8 % have > 1 DGBI.
- At 4-10 years up to 15 %.
- At age 10-18 years up to 22 %.

DGBI etiology



Manisalidis I. *Front Public Health* 2020

DGBI impact on the child

- DGBI has negative impact on a child‘s life:
  - School absences.
  - Negative effects on social life.
  - Negative impact on sleep hygiene and habits.
  - Psychosocial impacts, including anxiety, depressions and negative expectations from life..

Vernon-Roberts, et al. *Gastrointest Disord* 2023

DGBI impact on families

- Negative impact on parents‘ work attendance.
- Negative impact on family economy.
- Increased anxiety in siblings.

Brodwall A & Brekke M. *BMJ Open* 2021

DGBI prognosis

Risk of DGBI persistence into adulthood[1].

Up to 25 % of children diagnosed with functional abdominal pain develop irritable bowel syndrome in the future[2].

[1]Vernon-Roberts, et al. *Gastrointest Disord* 2023
[2]Jarrett M, et al. *J Spec Pediatr Nurs* 2003

DGBI in infancy

G. Functional gastrointestinal disorders: infants and toddlers	
	G1. Regurgitations in infants
	G2. Rumination
	G3. Cyclic vomiting syndrome
	G4. Infantile colics
	G5. Functional diarrhoea
	G6. Infantile dyschezia
	G7. Functional constipation

DGBI in children and adolescents

H1 Functional gastrointestinal disorders: children and adolescents		
	H1. Functional nausea and vomiting	
		H1a. Cyclic vomiting syndrome
		H1b. Functional nausea and functional vomiting
		H1c. Ruminations
		H1d. Aerophagia
	H2. Functional abdominal pain	
		H2a. Functional dyspepsia
		H2b. Irritable bowel syndrome
		H2c. Abdominal migraine
		H2d. Functional abdominal pain, not otherwise specified
	H3. Functional defecation disorders	
		H3a. Functional constipation
		H3b. Non-retentive faecal incontinence

Mos common DGBI

- Newborns and infants:
  - Regurgitation and rumination.
- At 13-48 months:
  - Functional constipation.
  - Cyclic vomiting syndrome.
- ≥4 years:
  - Functional constipation.
  - Functional dyspepsia.
  - Irritable bowel syndrome.

Vernon-Roberts, et al. *Gastrointest Disord* 2023

Infantile regurgitation

Regurgitation in newborns and infants is involuntary return of swallowed food or secretions into the oesophagus, oral cavity and/or nose.

Common in the first year of life.

Up to 26 % of infants.

Criteria

- Age 3 weeks to 12 months.
- Regurgitations at least twice daily for at least three weeks.
- Absence of nausea, haematemesis, aspiration, apniea, faltering growth, feeding disorders, swallowing disorders or abnormal posture.

Rumination in newborns and infants

Rumination is habitual regurgitation of gastric content into the oral cavity for self-stimulation.

Prevalence 1,9 %.

Diagnosis

- All criteria must be fulfilled for at least 2 months:
  - Repeated contractions of the abdominal wall, diaphragm and tongue.
  - Effortless regurgitation of gastric contents, which is followed with its expulsion of swallowing.
  - Three or more of the following:
    - Beginning of symptoms between 3. and 8. months.
    - Dose not respond to regime changes for GERD or regurgitations.
    - Not associated with stress.
    - Absent during sleep or interactions with another person or the environment.

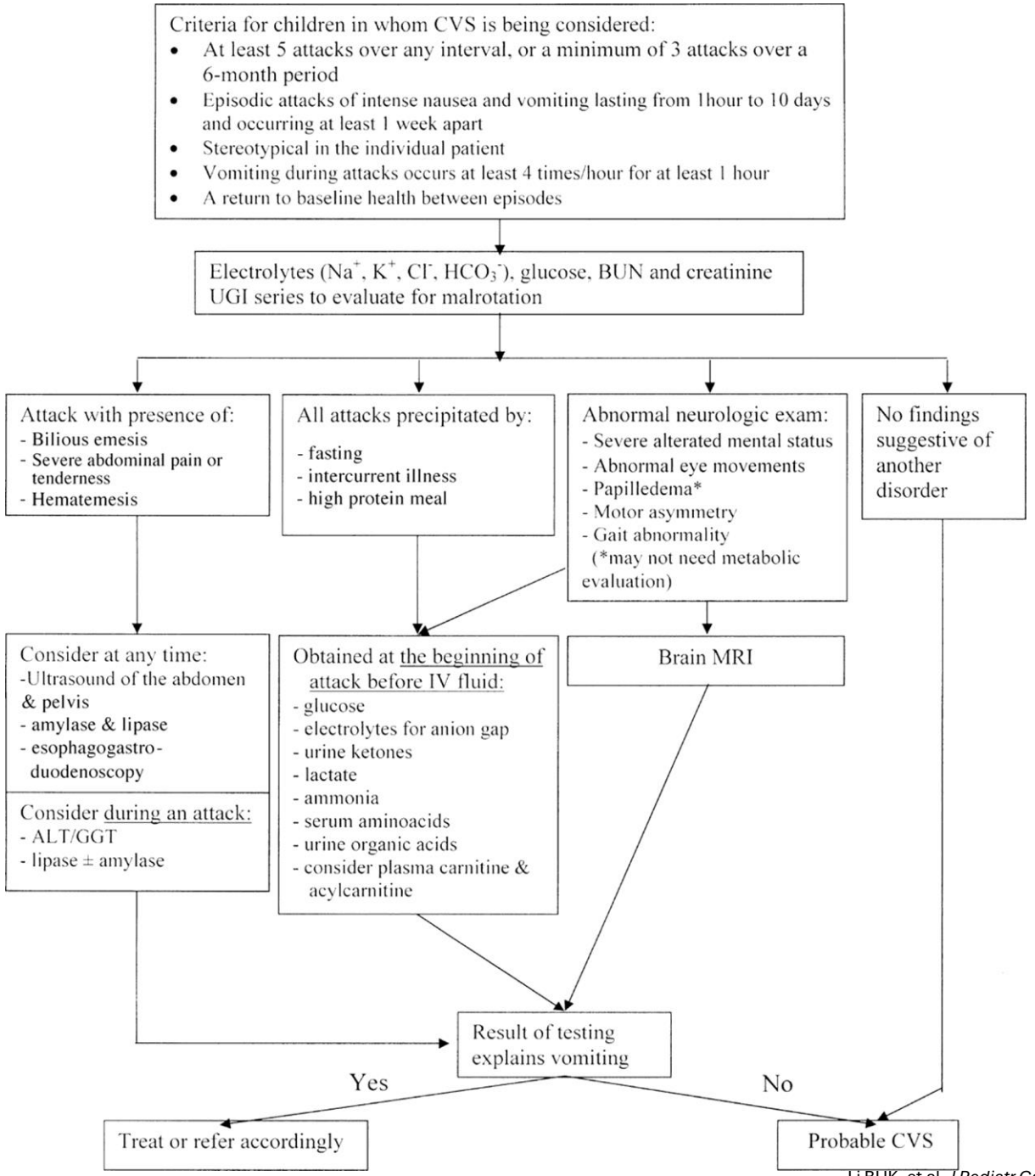
Cyclic vomiting syndrome (CVS)

- Stereotypical and recurrent episodes of vomiting, lasting hours to days with intervals of return to pre-attack condition of the child.
- Prevalence 0,1-2 %.
- Median age of onset 3,5-7 let.
- 46 % manifests before reaching the age of 3 years.
- More common in girls.
- Most common in Caucasians.

Diagnostic criteria

- Two or more episodes of intense, persisting nausea and vomiting, lasting for hours or days within 6 months.
- The episodes are identical in the same patient
- Individual episodes are separated by weeks to months with return of pre-attack health condition.
- No other disorders explaining the issue.

CVS diagnosis



Li BUK, et al. *J Pediatr Gastroenterol Nutr* 2008

CVS treatment

Lifestyle changes for 1-2 months or 1-2 attacks of CVS	
Education.	
Avoiding triggers:	
	„Vomiting diary“ with possible triggers.
	Avoidance of long time fasting.
	Realising the role of excitement as a trigger.
	Good sleeping hygiene.
	Avoidance of foods, that could trigger the attacks.
	Avoidance of exhaustion.
Sufficient carbohydrates intake in attacks triggered by fasting:	
	Fruit juices, or other sweet liquids.
	Snacks between main foods, prior to expected exhaustion or to bedtime.
Lifestyle changes similar to migraine headaches:	
	Regular aerobic exercise.
	Regular eating patterns.
	Limiting or avoidance of caffeine.

Li BUK, et al. *J Pediatr Gastroenterol Nutr* 2008

CVS Prophylaxis

≤5 years

Antihistamines: Cyproheptadine (medications of choice) and Pizotifen:

Cyproheptadine: 0,25-0,5 mg/kg/den in 2-3 doses.

B-blockers: Propranolol (second line):

Propranolol: 0,25-1,0 mg/kg/den, most commonly 10 mg 2-3x daily.

Follow-up of resting heart rate is mandatory.

Contraindications: asthma, diabetes, heart disease, depressions.

> 5 years

Tricyclic antidepressants: Amitriptyline (first line):

ECG monitoring evaluating QT_c prior to treatment start and after 10 days of reaching target dose

B-blockers: Propranolol (Second line).

Li BUK, et al. *J Pediatr Gastroenterol Nutr* 2008

Treatment of CVS attack

- Liquid, mineral and nutritional care.
- Antiemetics.
- Sedation.
- Analgesics.
- Anti-migraine medications.

Infantile colics

Benign condition associated with unexplained, excessive and inconsolable crying.

Up to 10-40 % of infants.

Up to 63 % of infants have another DGBI and 15 % have two other DGBI.

Most commonly bloating/excessive flatulation, regurgitation.

Criteria

Age of child at start and end of issues below 5 months.

Repeated, prolonged crying episodes, restlessness or irritability, starting and ending without a clear trigger, and which cannot be avoided by the caregiver.

No other explanation.

Functional diarrhoea

Daily, painless, repeated defecations of at least 3 large unformed stools for at least 4 weeks with beginning at infantile or preschool age.

Up to 2,4 % of children younger than 1 year and 6,4 % of toddlers.

Criteria

- Daily, painless repeated defecation of large, unformed stools, at least 4 daily.
- Persistence of problems for at least 4 months.
- Starting between 6. and 60. months of age.
- Faltering growth is absent with sufficient energy intake.

Infantile dyschaezia

Conditions of minutes lasting straining, shouting, crying, redness or violet colour in the face during each defecation attempt. Symptoms lasting for 10-20 minutes. Defecation is usually present many times daily. Problems occure during the first month of life and disappear within 3-4 weeks.

At one month of age affects 3,9 %.

At 3 months of age 0,9 %.

Up to 4,9 % is re-classified later as constipation.

Criteria

- Diagnosis must be established prior to reaching 9 months of age and fulfilling the following:
  1. At least 10 minutes of straining and crying prior to defecation of soft stools.
  2. Absence of other health issues.

Functional constipation

Constipation in infants and toddlers is less frequent and/or painful defecation. In older children it can be associated with faecal incontinence and withholding behaviour.

Prevalence at 1 year of age 2,9 %, at 2 years 10,1 %, and in older than 3 years 14 %.

Diagnostic criteria

At age 1 month to 4 years must fulfill at least 2 criteria for 1 month:	Two or less defecations weekly.
	History of stool withholding.
	History of painful defecation or hard stools.
	History of large stools.
	Stool mass during rectal examination.
In children without diapers two more criteria can be used:	At least one episode of weekly faecal incontinence after reaching a clean period.
	History of large stools blocking the drainage.

Diagnostic criteria

- In children older than 4 years, at least two symptoms at least once weekly for at least one month while not fulfilling irritable bowel syndrome criteria:
  - Two or less defecations weeks.
  - At least one episode of soiling weekly.
  - History of withholding behaviour.
  - History painful defecation or hard stools.
  - Large faecal mass during rectal examination.
  - History of large stools blocking the drainage.

Constipation red flags

Constipation starting extremely early in life (<1 mo)
Passage of meconium >48 h
Family history of HD
Ribbon stools
Blood in the stools in the absence of anal fissures
Failure to thrive
Fever
Bilious vomiting
Abnormal thyroid gland
Severe abdominal distension
Perianal fistula
Abnormal position of anus
Absent anal or cremasteric reflex
Decreased lower extremity strength/tone/reflex
Tuft of hair on spine
Sacral dimple
Gluteal cleft deviation
Extreme fear during anal inspection
Anal scars

HD = Hirschsprung disease.

Tabers MM, et al. *J Pediatr Gastroenterol Nutr* 2014

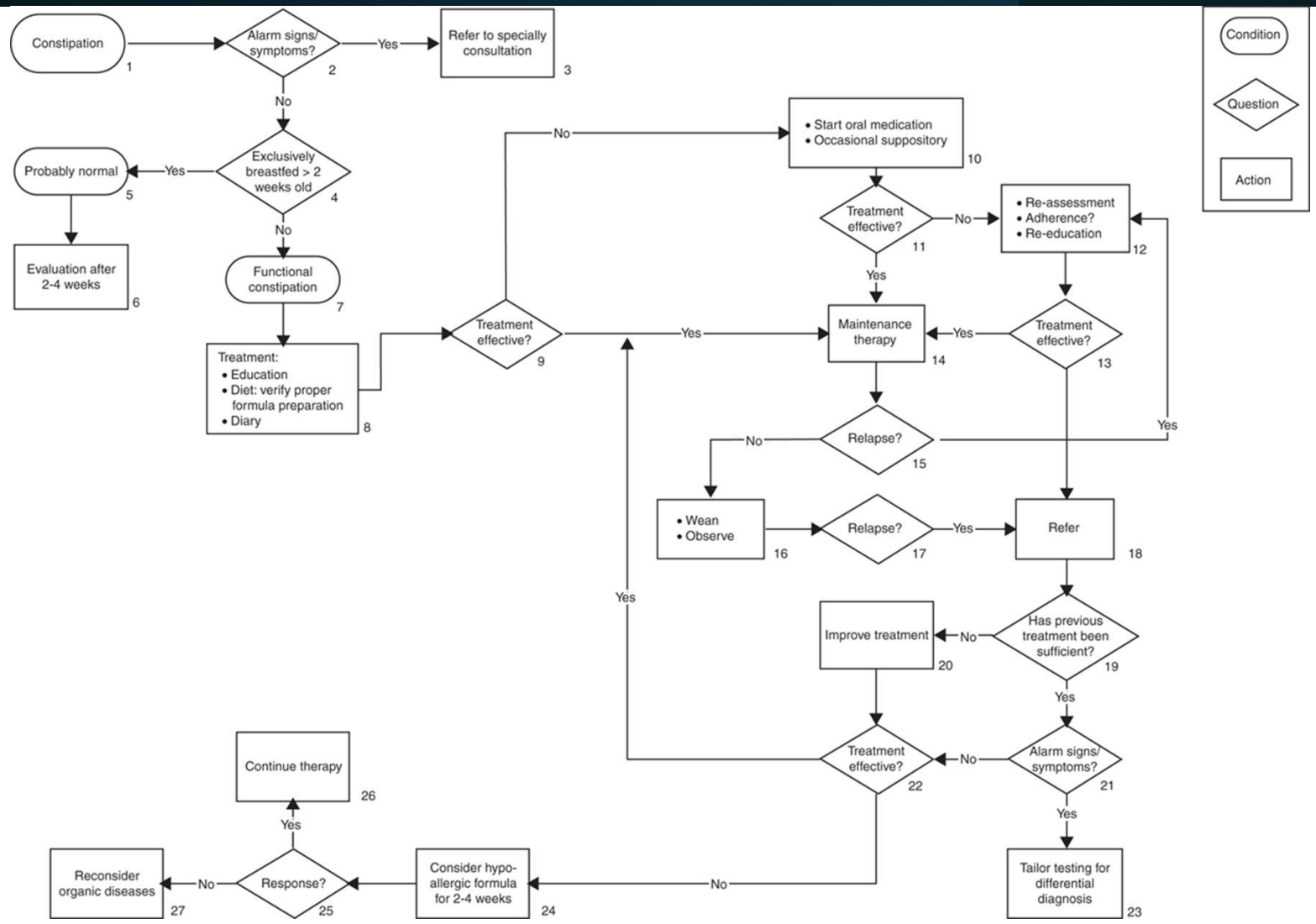
Constipation differential diagnosis

Celiac disease*
Hypothyroidism, hypercalcemia, hypokalemia*
Diabetes mellitus†
Dietary protein allergy*
Drugs, toxics
  Opiates, anticholinergics
  Antidepressants*
  Chemotherapy
  Heavy metal ingestion (lead)
Vitamin D intoxication*
Botulism
Cystic fibrosis*
HD*
Anal achalasia*
Colonic inertia†
Anatomic malformations
  Imperforate anus*
  Anal stenosis*
Pelvic mass (sacral teratoma)
Spinal cord anomalies, trauma, tethered cord*
Abnormal abdominal musculature (prune belly, gastroschisis, Down syndrome)*
Pseudoobstruction (visceral neuropathies, myopathies, mesenchymopathies)
Multiple endocrine neoplasia type 2B†

HD = Hirschsprung disease.
* More likely in the younger child.
† More likely in the older child.

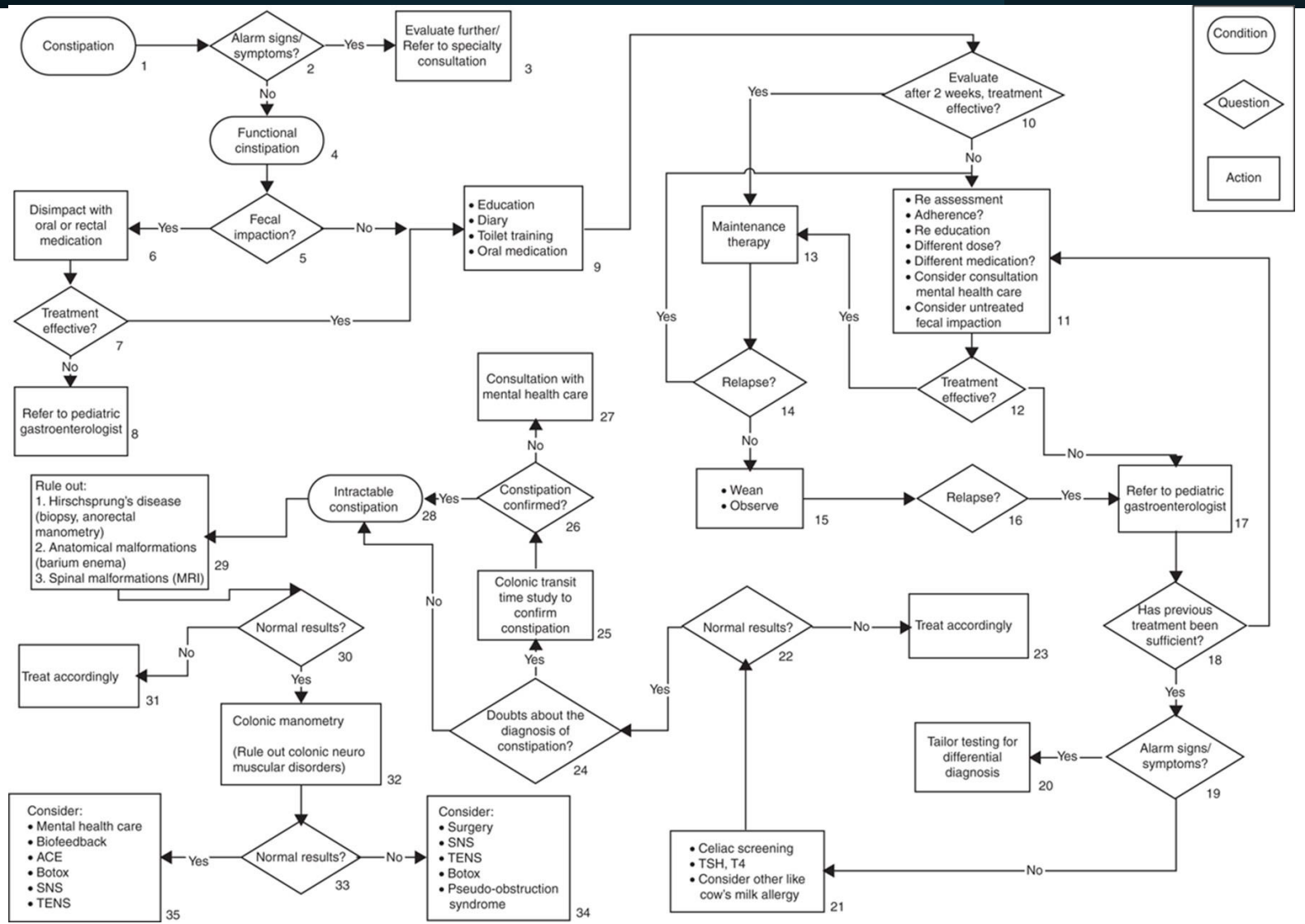
Tabers MM, et al. *J Pediatr Gastroenterol Nutr* 2014

Treatment, <6 months



Tabers MM, et al. *J Pediatr Gastroenterol Nutr* 2014

Treatment, ≥ 6 months



Tabers MM, et al. *J Pediatr Gastroenterol Nutr* 2014

Functional nausea and functional vomiting

Nausea is a common symptom, described as unpleasant feeling in the epigastrium or the throat, associated with the feeling of needing to vomit.

Vomiting is forceful expulsion of upper GIT contents after contractions of intestines and abdominal and chest muscles.

Functional nausea

All criteria must be fulfilled for at least 2 months:

1. Nausea affecting daily activities as the chief complaint. Present at least twice weekly, not associated with feeding.
2. Not always associated with vomiting.
3. No other explanation.

Functional vomiting

All criteria must be fulfilled for at least 2 months:

1. One or two vomiting episodes weekly.
2. Vomiting is not self-induced and does not fulfil eating disorders criteria.
3. No other explanation.

Rumination

Rumination is repeated regurgitation of recently ingested gastric contents into the oral cavity, which is then expelled or swallowed.

Most common in teenage girls.

Prevalence 5,1 % pf school aged children.

Criteria

All criteria must be fulfilled for at least two months:

1. Repeated regurgitations and chewing or expulsion of expelled food, starting shortly after end of feeding and not appearing while asleep..
2. Not preceded by belching.
3. No other explanation. Feeding disorders must be excluded.

Aerophagia

Aerophagia is associated with excessive and repeated air swallowing, leading to progressive abdominal distention.

Up to 4,2 % in the USA and 7,5 % in Sri Lanka.

Mostly in children with mental affections.

Criteria

All criteria must be fulfilled for at least two months:

1. Excessive air swallowing.
2. Abdominal distention as a results, progressing during the day.
3. Repeated belching.
4. No other explanation.

Functional dyspepsia

Dyspepsia is upper abdominal discomfort, including abdominal pain, post-prandial satiety, early satiety, bloating, nausea, belching and vomiting.

Up to 5-10 % of teenagers in the USA.

Criteria

All criteria must be fulfilled, at least 4 times monthly, for at least 2 months:

1. Postprandial satiety.
2. Early satiety.
3. Epigastric pain or burning sensation not associated with defecation.
4. No other explanation.

Hyams JS, et al. *Gastroenterology* 2016

Classification

Postprandial distress syndrome.

Epigastric pain syndrome.

Red flags

Positive family history of IBD, coeliac disease or gastroduodenal ulcer disease	Arthritis
Persistent pain in upper or lower right quadrant	Perianal disease
Dysphagia	Unintentional weight loss
Odynophagia	Growth deceleration
Persistent vomiting	Delayed puberty
GIT bleeding	Unexplained fever
Night diarrhoea	

Hyams JS, et al. *Gastroenterology* 2016

Irritable bowel syndrome (IBS)

IBS is abdominal discomfort with defecation or change of stools.

Prevalence 1,2-2,9 % in the USA, 4,9 % in Columbia and 5,4 % in Sri Lanka.

Criteria

Fulfilling all criteria for at least 2 months:

1. Abdominal pain at least 4 days monthly, which are associated with defecation, frequency change or stool consistency alteration.
2. In children with constipation, abdominal pain does not wane after constipation resolution.
3. No other explanation.

Classification

- IBS predominantly with diarrhoea.
- IBS predominantly with constipation.
- Unspecified IBS.

Abdominal migraine

Abdominal migraine is characterized with severe, paroxysmal and stereotypical abdominal pain episodes associated with autonome symptomatology, leading to negative impacts on the child‘s activities. The episodes are usually separated by weeks to months.

Prevalence 1-23 %.

Criteria

All criteria must be present at least twice within six months:

1. Paroxysmal episodes of intense, acute abdominal pain localized periumbilically, in the middle line or diffusely, lasting at least one hour.
2. Interval of weeks to months between episodes.
3. The pain is severe, not permitting the child to perform his usual activities.
4. Symptoms are stereotypical and identical in each child.
5. At least two accompanying symptoms:
    a. Loss of appetite.
    b. Nausea.
    c. Vomiting.
    d. Headache.
    e. Photophobia.
    f. Paleness.
6. No other explanation.

Functional abdominal pain

Functional abdominal pain not otherwise specified are present in children and teenagers for at least two months and does not fulfil any other diagnostic criteria.

Up to 38 % of school aged children.

Criteria

At least one symptom must be present 4x monthly for at least two months:

1. Episodic or continual abdominal pain, not associated with physiological functions, such as eating or menstruation.
2. Not fulfilling criteria of functional dyspepsia, IBS or abdominal migraine.
3. No other explanation.

Non-retentive faecal incontinence

Non-retentive faecal incontinence, previously known as encopresis and soiling is characterized by repeated stool motions at places, which are not socially acceptable.

Affecting 0,8-4,1 % of children.

Criteria

All criteria must be fulfilled for at least one month in a child older than 4 years:

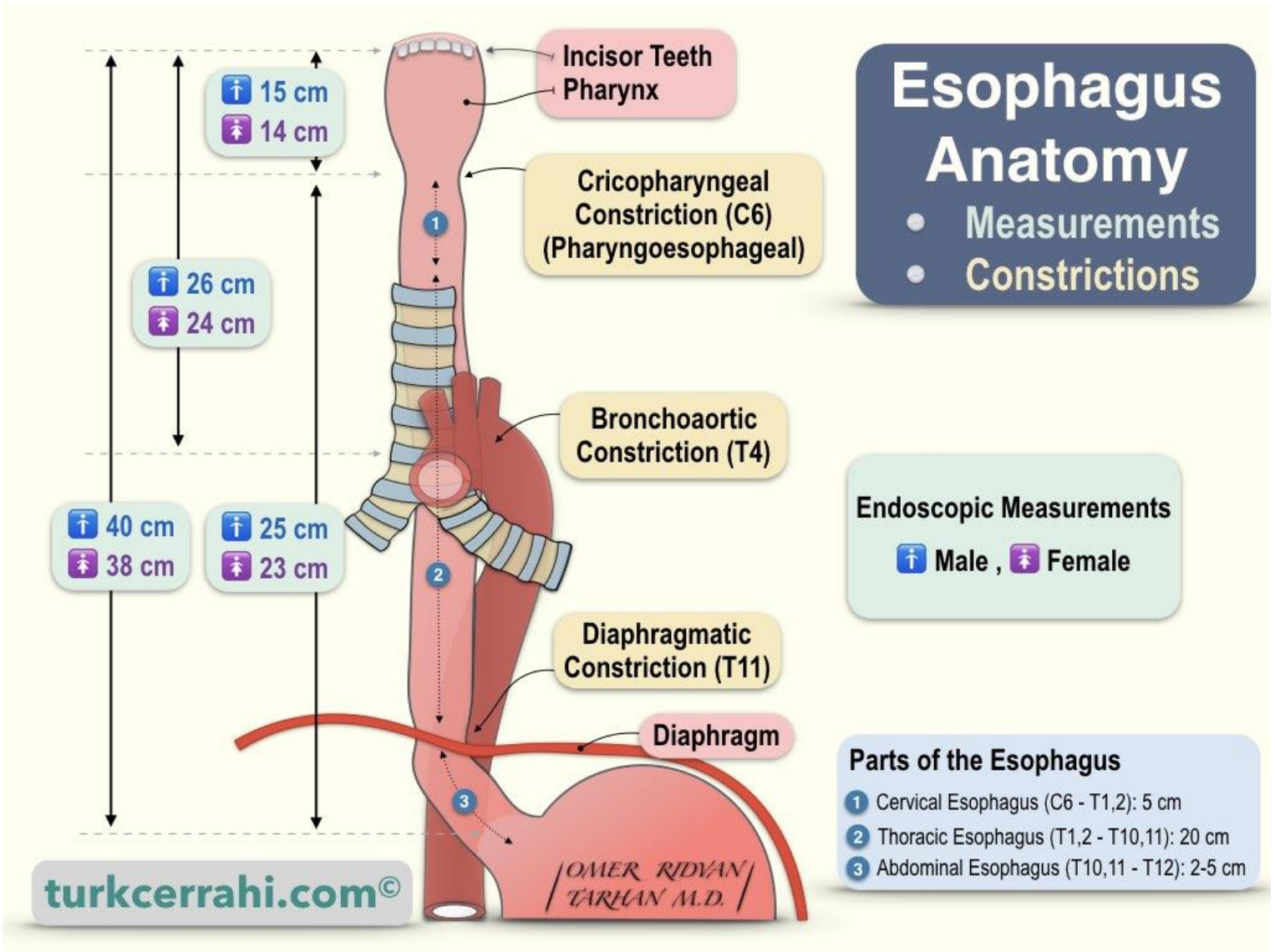
1. Defecation in places not acceptable in the given sociocultural context.
2. No symptoms of stool retention.
3. No other explanation

Foreign bodies in the GIT

Foreign bodies in the GIT

- A farily common issue in paediatrics.
- Up to 75 % of foreign bodies ≤5-year-olds.
- 80-90 % of swallowed foreign bodies pass through the GIT.
- 10-20 % are extracted endoscopically.
- 1 % require surgical intervention.

Foreign bodies in the oesophagus

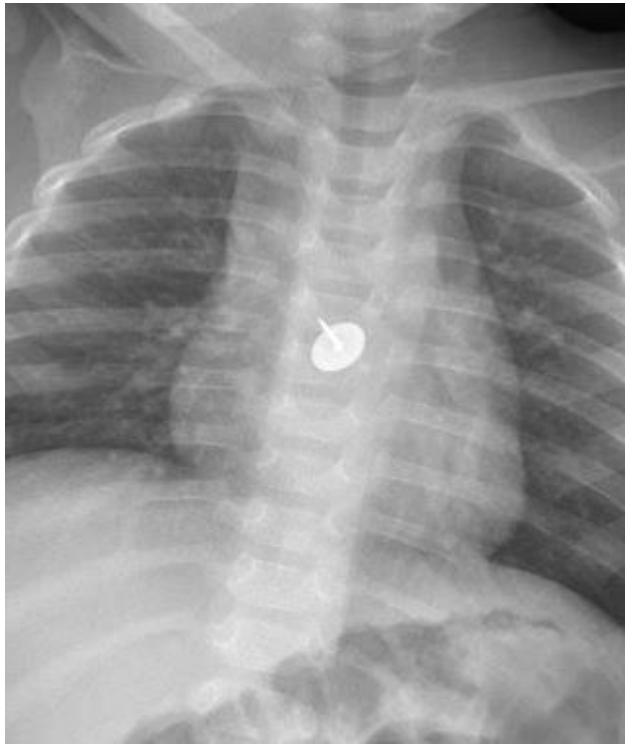


Anatomy of the Esophagus | turkcerrahi.com/en

Diagnosis of foreign bodies in the oesophagus

- History.
- Physical examination.
- Imaging techniques.
- Endoscopy.

X-Rays



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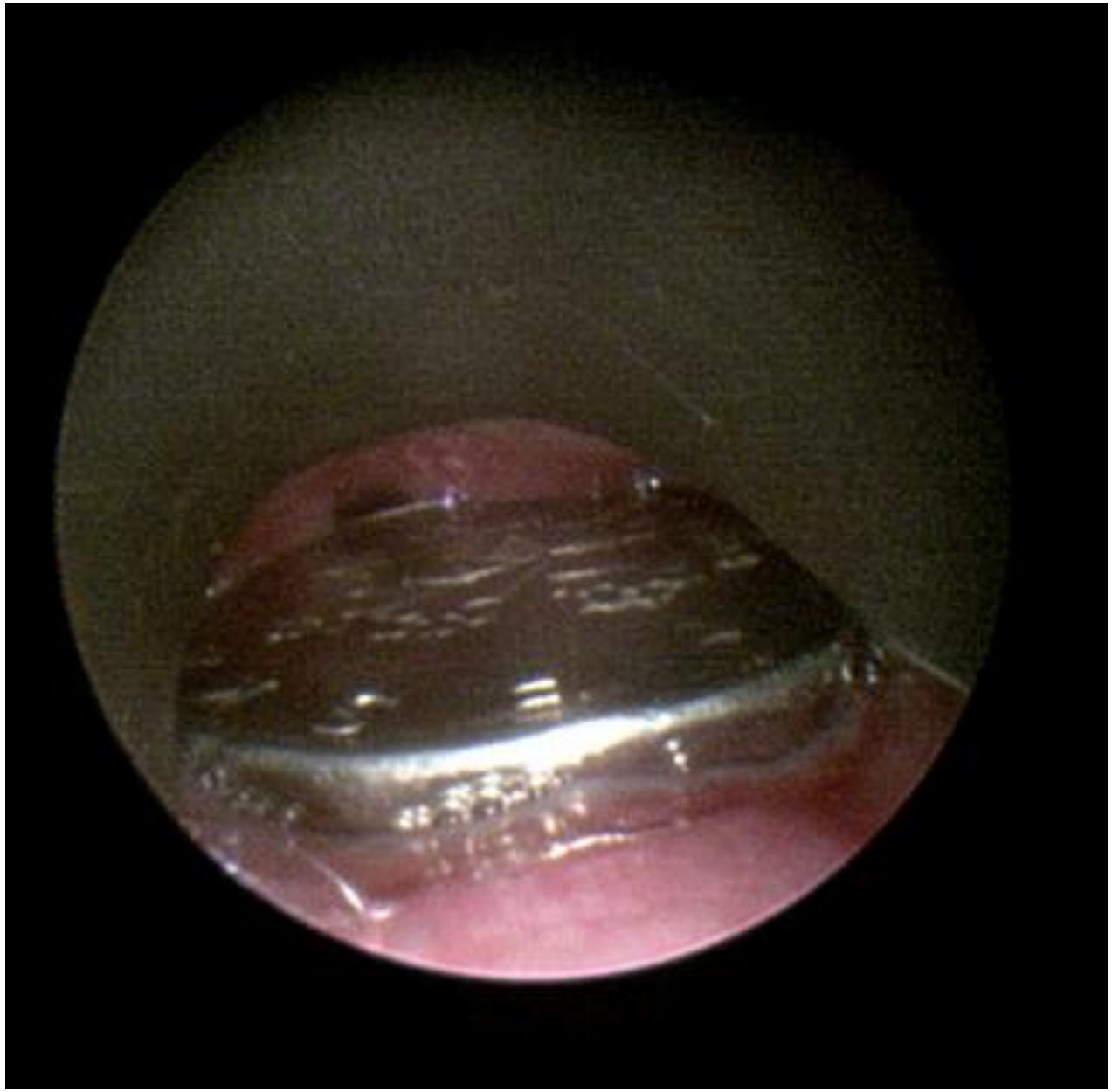
Endoscopic findings



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Extraction of oesophageal foreign bodies

In the oropharynx does not usually require anaesthesia.

From the oesophagus using rigid endoscopy.

Risk of complications.

Caustic oesophageal injury

Due to ingestion of lye of alkali.

80 % in children <5 years.

Endoscopy is mandatory even in absence of symptoms!!!

Caustic oesophageal injury

Acids → coagulation necrosis → usually, does not proceed to deeper layers.

Alkali → coalescing necrosis → easily penetrates into deeper layers.

Titration reserve: the amount of standard liquid required to reach a pH of 8.

Complaints

- Depends on the character and amount of the caustic agent.
- Small volumes may be asymptomatic.
- Up to 70 % of caustic injuries to the mouth have an undamaged oesophagus.
- Usually, burning of the lips and oral cavity.
- Severe pain beyond the sternum and in the epigastrium.
- Risk of caustic injury of the airways.
- Shock with circulatory failure is possible.

Complaints

Perforation of the oesophagus and/or the stomach with mediastinitis development.

Strictures and obliteration of the lumen is possible.

Diagnosis

Laryngoscopy.

Rigid esophagoscopy.

Other imaging techniques when complications are suspected (X-Ray, ultrasound, CT,...).

First aid

- Ingestion of large volumes of a neutral liquid (water), ideally within minutes since ingestion.
- pH neutralization attempts are not performed!!
- Inducing vomiting is contraindicated!!
- Carbo medicinalis is contraindicated.
- Immediate hospital transferral.

Treatment

- Nasogastric tube placement.
- Steroids?
- ATB and PPIs.
- Endotracheal intubation and tracheostomy.
- Surgical revision.
- Risk of stricture development → balloon dilatation.

Foreign bodies in the stomach

- Up to 50 % are asymptomatic.
- Possible nausea, vomiting, loss of appetite, abdominal pain, satiety.
- In infants and toddlers restlessness, irritability and agitation.
- Development of peritonitis and shock.
- Risk of intestinal obstruction.

Diagnosis

X-Ray.

In radiolucent items CT.

Treatment – dull objects

- Endoscopic extraction in diameter 2,5 cm and length 6 cm.
- Stool inspection.
- Laxatives.
- If not defecated within 2-4 weeks then endoscopic removal.
- Cave! Patient with history of previous abdominal surgery!

Treatment – Sharp items

Risk of GIT perforation.

Increment of risk in presence of symptoms, diagnosis after ≥48 hours, ingestion of radiolucent material.

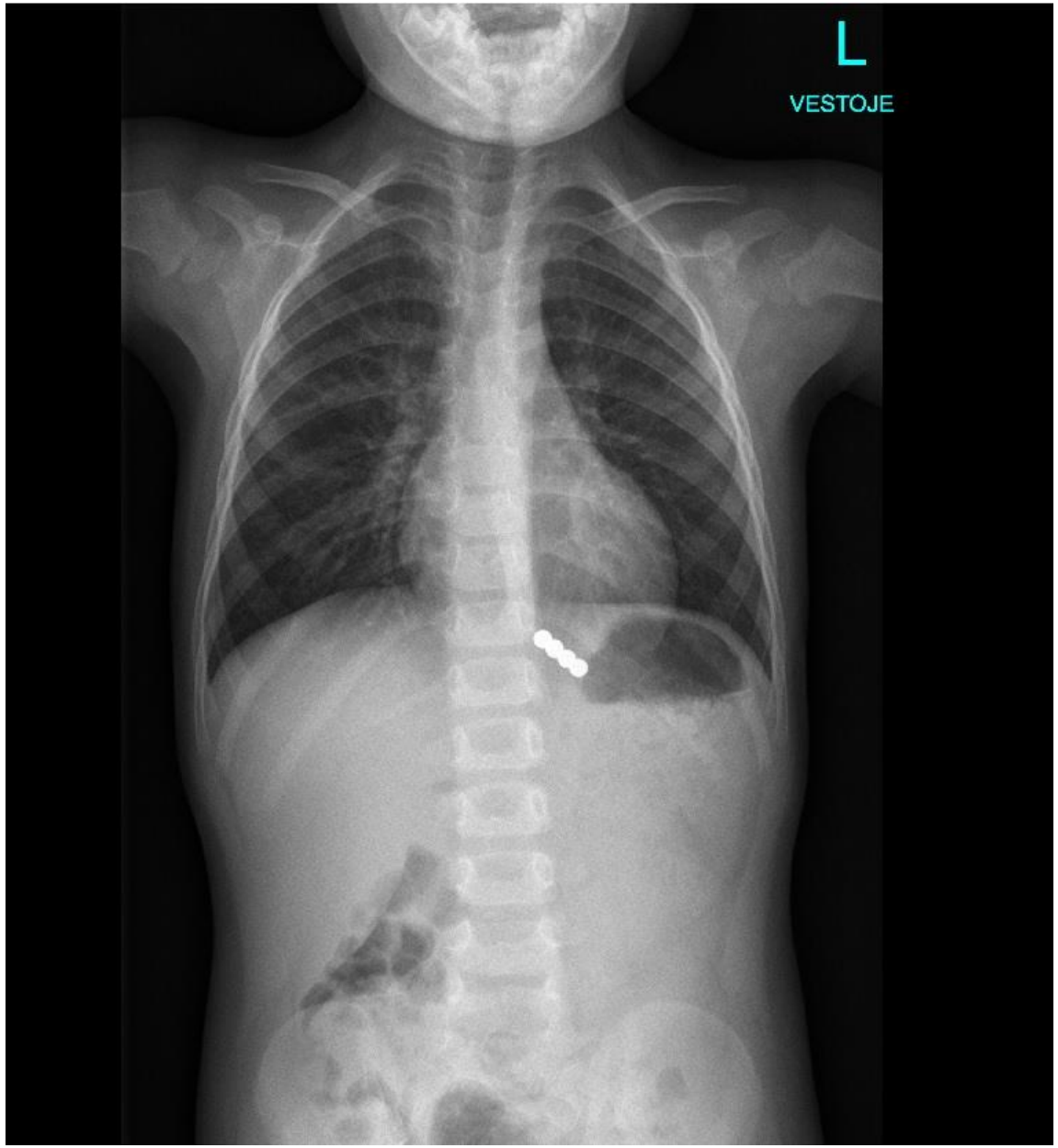
Immediate X-ray and emergent endoscopy.

CT.

Magnets

- Increment of incidence.
- Risk after ingestion of ≥2 magnets.
- Native X-ray.
- Extraction is mandatory.

Magnets

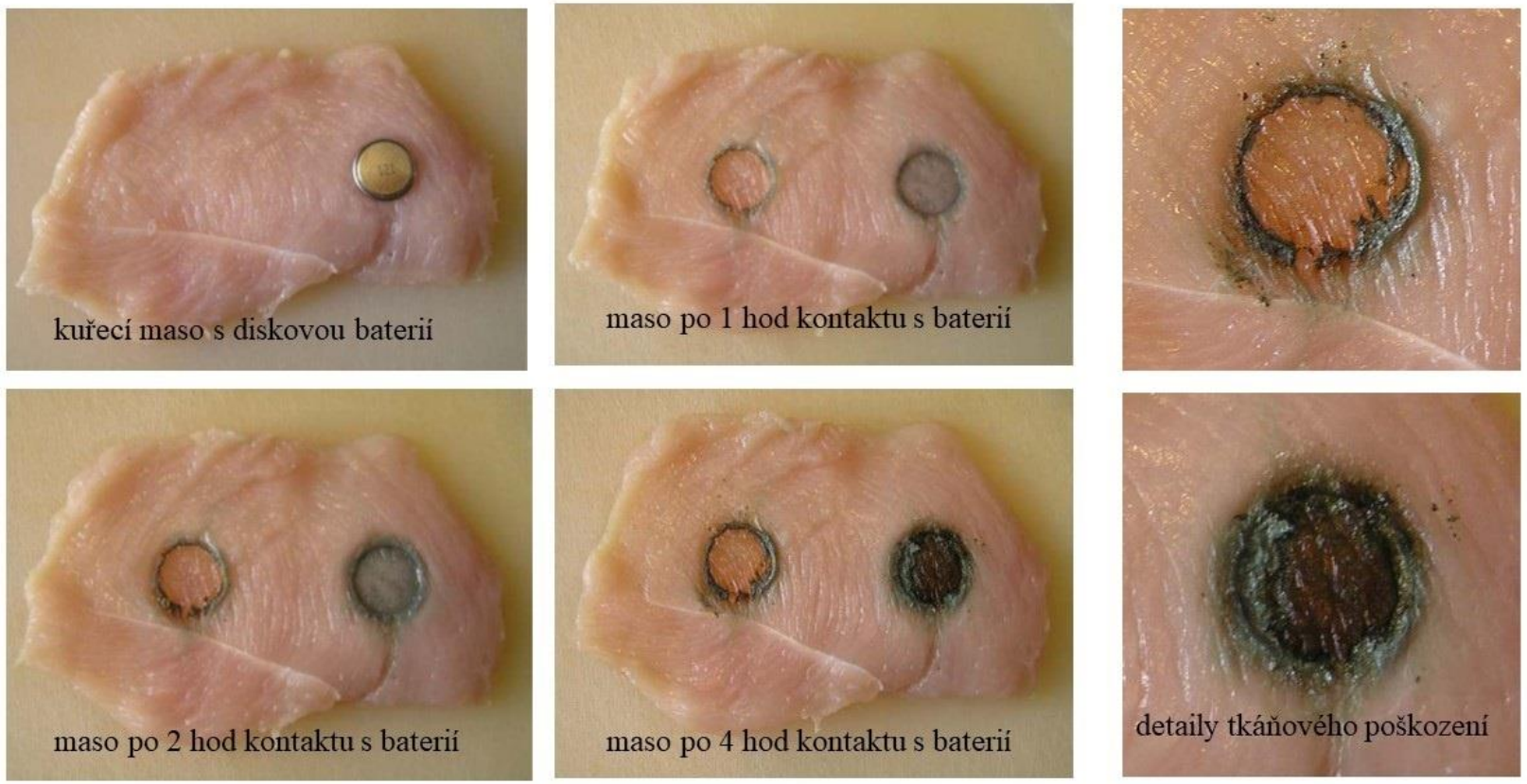


Z archivu Radiodiagnostického oddělení Oblastní nemocnice Kolín, a.s.

Batteries

- Increment of battery ingestion.
- 68,1 % of ingested batteries in children up to 6 years, maximum between 1-3 years.
- Devastating effects on the GIT.
- After wedging in humid environment short circuit between tissues occur.

Batteries



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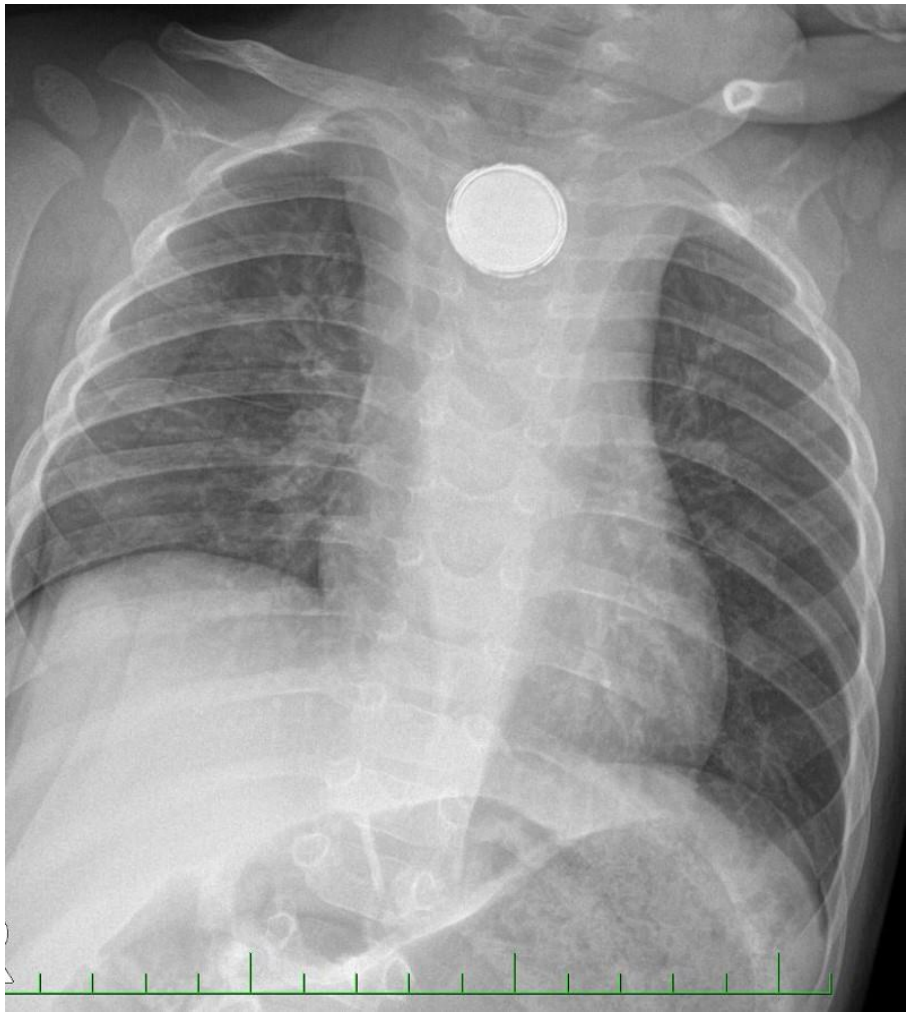
Batteries - complaints

- Asymptomatic in early phase.
- In 10-20 % nausea, vomiting, dysphagia and or drooling.
- Laryngeal cough, stridor and/or dyspnoea.
- Chest and abdominal pain.
- In case of perforation: coughing associated with feeding, haematemesis, severe abdominal pain, fevers, limited motion.
- N. reccurens palsy.

Diagnosis

- Consider it!
- X-ray.



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Treatment

- Immediate hospital transferral!
- In children >1 honey or sucralfate every 10 minutes (max. 6 doses).
- X-ray.
- Immediate extraction if in oesophagus.
- In case of oesophageal injury, NG tube.
- In case of intact wall, flushing of affected area.
- ATB, analgesics, PPI, steroids.

Treatment

- Early removal from stomach.
- Risk of necrosis even after 15 minutes!!
- Risk of stricture development even after extraction.
- Emergent removal in asymptomatic patients.
- Urgent removal in children <5 years and diameter ≥20 mm.
- Elective in asymptomatic patients, diameter ≥20 mm and did not pass within 48 hours.

Thank you for your attention!