phn NORTH WESTERN MELBOURNE

An Australian Government Initiative

Gastrointestinal illness in children

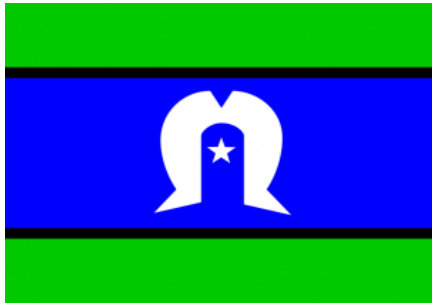
Thursday 29 February 2024

The content in this session is valid at date of presentation

Acknowledgement of Country

North Western Melbourne Primary Health Network would like to acknowledge the Traditional Custodians of the land on which our work takes place, The Wurundjeri Woi Wurrung People, The Boon Wurrung People and The Wathaurong People.

We pay respects to Elders past, present and emerging as well as pay respects to any Aboriginal and Torres Strait Islander people in the session with us today.



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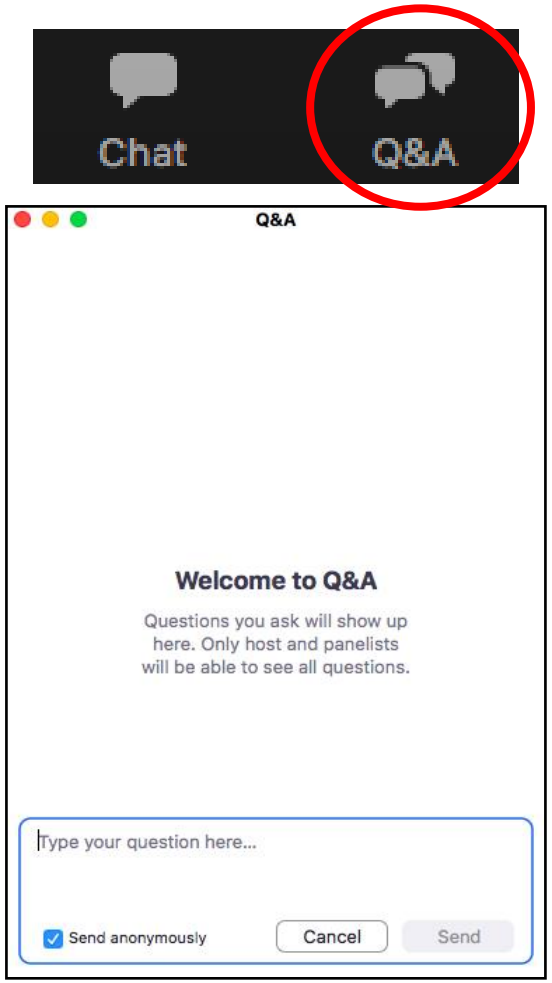

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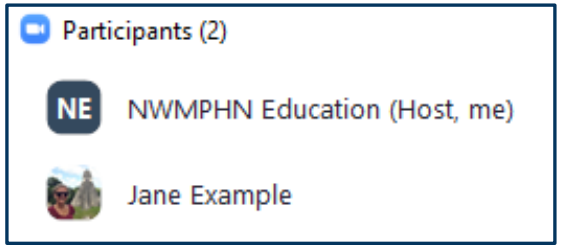

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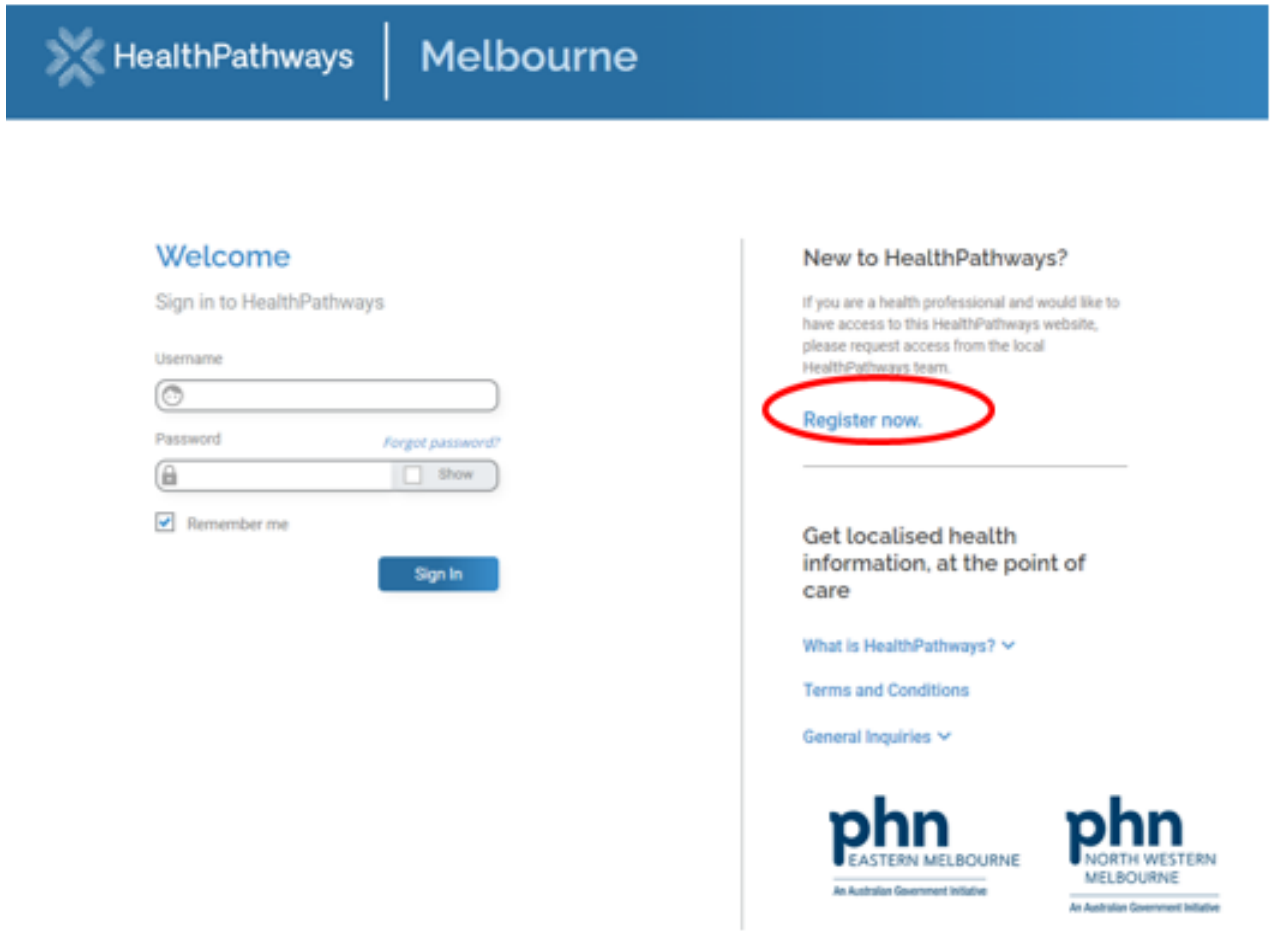

Register via QR code

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Pathways are written by GP clinical editors with support from local GPs, hospital-based specialists and other subject matter experts

- clear and concise, evidence-based medical advice
- Reduce variation in care
- how to refer to the most appropriate hospital, community health service or allied health provider.
- what services are available to my patients

HealthPathways – Gastrointestinal Illness in Children

Disclaimer: For presentation purposes only

Gastrointestinal Illness in Children Relevant and related pathways

Relevant Pathways

- Acute Abdominal Pain in Children
- Adverse Food Reactions in Children
- Analgesia in Children with Acute Pain
- Chronic Diarrhoea in Children
- Constipation in Children
- Fever in Children
- Gastroenteritis in Children
- Recurrent Abdominal Pain in Children

Related Pathways

- Coeliac Disease in Children
- Jaundice in Infants
- Infant Routine Check
- Infant Sleep Concerns
- Low Birth Weight and Premature Infants
- Rash in Unwell Children
- Slow Weight Gain in Infants
- Unsettled Infant
- Urinary Tract Infection (UTI) in Children
- Anaphylaxis

Gastrointestinal Illness in Children Relevant referral pages

Referrals

- Acute Paediatric Gastroenterology Referral (Same-day)
- Non-acute Paediatric Gastroenterology Referral (> 24 hours)
- Acute Paediatric Medicine Referral or Admission(Same-day)
- Non-acute Paediatric Medicine Referral (> 24 hours)
- Paediatric Dietetic Referral

HealthPathways Melbourne

Building local pathways for better care

Thank you.

melbourne.healthpathways.org.au

Speaker

Dr Celia Bagshaw

- Dr Bagshaw is a fellow of FACEM (Australian College for Emergency Medicine) and is employed full-time as a Paediatric Emergency Physician.
- She is also currently the educational supervisor for all ACEM trainees in the MMC emergency department.

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Common paediatric gastrointestinal ED presentations

Dr Celia Bagshaw

Topics covered

- Vomiting
- Diarrhoea
- Constipation

- Focus on Acute Management by presenting complaint and age group
- Caveats - ED vs primary care population

My Approach

to anything in ED

- What time critical illness could this be?
- What condition requiring a specific treatment in a day or so could this be?
- What else might it be that may be useful to diagnose but not necessarily by me?
- **What benign self limiting illness could this be?**

Vomiting

- Incredibly non specific
- History vital - bilious?
- Exam including assessment of hydration, general state of child
- Bedside clinical tests can be useful eg BSL/ketones.

Some Pointers on History

- Early morning vomiting/headache
- Post tussive vomits
- Fever
- Diarrhoea
- Pain
- Pale floppy episodes
- Potential exposure to poisons/button batteries/drugs/alcohol

Direct to ED

- Neonates who are vomiting (not just posseting)
- Bilious vomiting
- Can’t walk/look sick
- Significant pain

Infection

Usually has a fever

- Viral gastroenteritis
- UTI - who needs a urine?
- Pneumonia, meningitis or other SBI

Gastrointestinal obstruction

Malrotation/volvulus/HPS

- Can occur at any age but seen more frequently in neonates
- May not be bilious initially (or at all if HPS)
- Most volvulus look really unwell but neonates may not, initially

- Hypertrophic pyloric stenosis: age 2-6ish weeks, recurrent, progressively more forceful NON bilious. Hungry baby with weight loss or poor weight gain. USS for diagnosis. Initial management is IV fluids and correction of electrolytes.

Intussusception

High index of suspicion

- Usually infants with episodic distress, vomiting or unexplained lethargy
- Child can appear well in-between and exam can be unremarkable
- Any age but commonest 2 months to 2 years
- Red currant jelly stools are a late sign of bowel wall ischaemia

Intussusception

- ED management in suspected cases

- IV access and fluid bolus
- Urgent USS abdo (AXR has <50% sensitivity)

Endocrine/Metabolic disease

- Another reason for a low threshold to refer young infants to ED with vomiting
- DKA can present with vomiting - usually appear quite unwell
- ? check a BSL+/- ketone in a lethargic child

Accelerated starvation

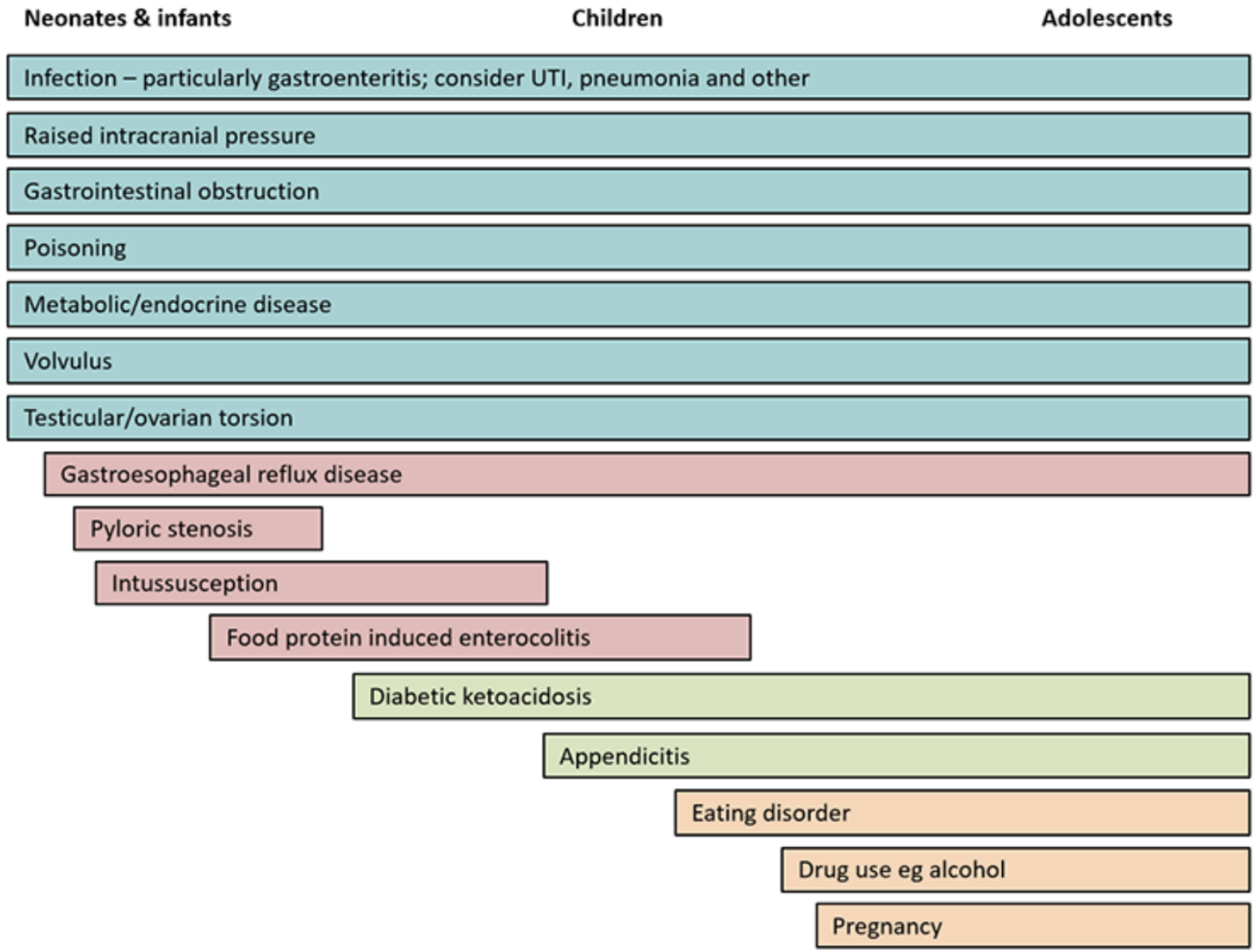
- Kids burn through there glycogen stores due to starvation eg gastro illness and just drinking water
- Ketones then produced and though to cause lethargy, abdo pain, more vomiting etc
- In severe cases child then becomes hypoglycaemic
- Rationale behind trying ondansetron and then apple juice or similar for these kids
- May need ED referral for exclusion of other pathology and to ensure good po intake

FPIES

Food protein-induced enterocolitis syndrome

- Non IgE mediated gut allergic reaction to some foods
- Usually presents around the time new foods are introduced
- Profuse repetitive vomiting 1-4 hours post ingestion and can cause circulatory collapse (pale and floppy) and diarrhoea
- Rice, oats dairy, egg are common precipitants
- Most respond well to ondansetron
- Nice hand out from ASCIA

Differential Diagnoses by Age



So I’ve decided it is likely to be simple infective gastroenteritis….

Infective Gastroenteritis…

When to worry and what to do

- Age - < 6 months probably warrant an ED review
- Length of illness
- Intake
- Output - amount of vomiting and number of diarrhoea as well as urine
- **General state of the child**

- Overseas travel/PMHX - refer to fever in the returned traveller CPG
- Caution in complex cardiac or endo/metabolic

Infective Gastroenteritis

What next?

- Most children do not become significantly dehydrated with simple gastroenteritis
- In my experience the ones that do have been vomiting profusely for >1 day or have frequent large volume diarrhoea
- Some younger kids develop accelerated starvation/ketotic hypoglycaemia
- Most can be managed with a dose of ondansetron and some guidance around fluid management at home

Hydration assessment

is wildly inaccurate

- a change in weight is gold standard (naked for infants)
- alert and responsive = <5% dehydrated in our population
- if you are not significantly dehydrated you don't need to be rehydrated and can be discharged with advice

Assessment of severity

	Mild dehydration (<5%)	**Moderate dehydration (5-9%)** Signs mildly to moderately abnormal	**Shock (≥10%)** Signs markedly abnormal
Conscious state	Alert and responsive	Lethargic, irritable	Reduced conscious state
Heart rate	Normal	Normal/mild tachycardia	Tachycardia
Breathing	Normal	Increased respiratory rate	Increased respiratory rate Deep acidotic breathing
Blood pressure	Normal	Normal	Hypotension
Skin colour	Normal	Normal	Pale or mottled
Extremities	Warm	Warm	Cold
Peripheral pulses	Normal	Normal	Weak
Eyes & fontanelle	Not sunken	Sunken	Deeply sunken
Mucous membranes	Moist	Dry	Dry
Skin turgor	Instant recoil	Mildly decreased	Decreased
Central capillary refill time	Normal	Prolonged	Markedly prolonged

Treatment

- Ondansetron if > 6 months
- Clear apple juice in addition to water or similar to ward off ketosis
- Can use ORS if child takes it. Not much sugar in it though
- Caution parents against pushing food intake +++.

Weight	Dose
8-15 kg	2 mg
15-30 kg	4 mg
>30 kg	6-8 mg

Evidence?

- Canadian trial in ED
- 300ish kids age 6 to 60 months
- Diagnosed viral gastro and mild dehydration
- 16.7% Rx failure with dilute apple juice vs 25% with ORS

Randomized Controlled Trial > JAMA. 2016 May 10;315(18):1966-74.
doi: 10.1001/jama.2016.5352.

Effect of Dilute Apple Juice and Preferred Fluids vs Electrolyte Maintenance Solution on Treatment Failure Among Children With Mild Gastroenteritis: A Randomized Clinical Trial

Stephen B Freedman [1], Andrew R Willan [2], Kathy Boutis [3], Suzanne Schuh [3]

RCH Handout

Care at home

The main treatment is to keep your child drinking fluids often such as water, oral rehydration solution, breastmilk or formula. It is very important to replace the fluids lost due to the vomiting and diarrhoea.

Gastrolyte, HYDRAlyte, Pedialyte and Repalyte are different types of oral rehydration fluid that can be used to replace fluids and body salts. These are the best option if your child is dehydrated. They are also available as icy poles, which children are often happy to have.

If your child refuses water or oral rehydration fluids, try diluted apple juice. Do not give drinks that are high in sugar (e.g. flat lemonade or sports drinks), because they can make dehydration worse. You can give your child their usual milk; however, some children may not feel like drinking milk if they have gastro.

Infants
If your baby is under six months old, they should always be seen by a doctor if they have gastro. For babies over six months: • If you are breastfeeding your baby, continue to do this but feed more often. Offer your baby a drink every time they vomit. You can also give an oral rehydration solution or water for the first 12 hours. • If you are bottle feeding your baby, replace formula feeds with oral rehydration solution or water for the first 12 hours, then give normal formula in small, but more frequent amounts. Offer your baby a drink every time they vomit.
Older children
• Give small amounts of fluid often – give a few mouthfuls every 15 minutes for all children with diarrhoea or vomiting. This is especially important if your child is vomiting a lot. • Your child may refuse food when they first get gastro. This is not a problem as long as they are drinking fluids.

Diarrhoea - acute

- Usually part of an acute infective illness in our setting usually 24-48 hours after onset of vomiting
- Can be quite dehydrating if profuse
- Blood in stool more common if bacterial
- Treatment is the same acutely as vomiting in setting of gastro
- RCH Primary Care liaison has a good guideline on chronic non bloody diarrhoea

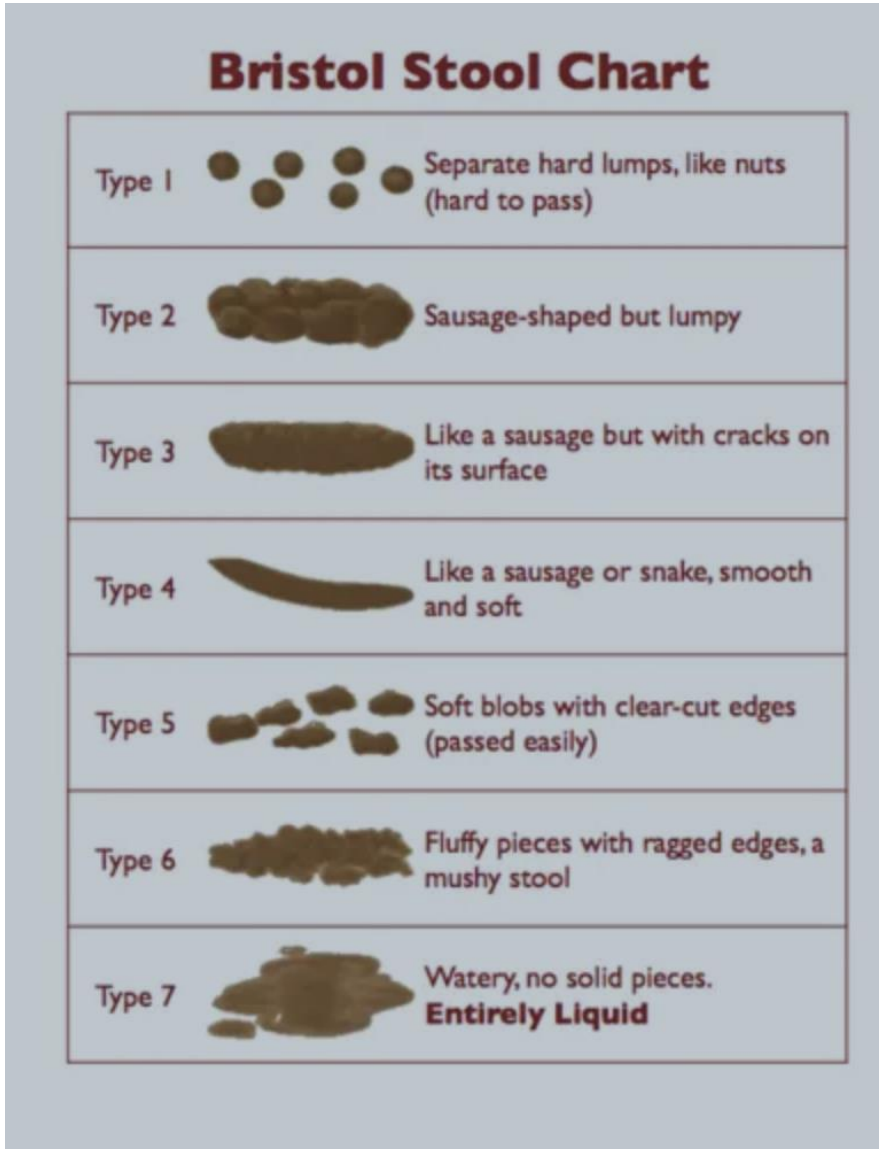
Bloody stool

- If well child and an acute infective illness suspected then manage as per RCH Bloody stool PCL guideline: stool MCS and C diff toxin +/- bloods
- Obviously consider Intussusception as an acute time critical cause
- Can be a presentation of CMPI in some infants
- Consider IBD in older children - Bloods, ? faecal calprotectin

Haemolytic Uraemic Syndrome

- Haemolytic anaemia, Acute renal failure, thrombocytopaenia - a host of causes
- 5-10% mortality
- 90% post Shiga toxin producing E coli
- Most children present 5-10 days post onset of bloody diahorrea with oliguria, haematuria, anaemia and renal failure - oedema and hypertension
- Obviously if this is suspected clinically then immediate ED referral warranted

Constipation



Constipation

A really common cause of Abdo pain in ED

- Occurs in 1/3 of kids and peak onset with solid introduction, toilet training and starting school - plus holidays
- Entirely breast fed babies may only have one soft poo ever 7-10 days and that is fine
- Beware the phrases “normal poos” and use the Bristol stool chart. Ask the child if you can
- Beware the child with chronic diarrhoea and soiling - it is overflow?
- Ask about blood, painful stools, toilet refusal,
- Most is functional

Rome IV diagnostic criteria

≥ 2 criteria of > 1 month in infants and >2 months in older kids

- ≤ 2 stools per week
- history of withholding stool
- history of large diameter stools
- facecal mass in rectum
- at least 1 episode per week of soiling after toilet training

What I see in ED

- Colicky abdo pain that has been going on a while but now getting worse
- Loss of appetite, bit listless
- Type 1-3 stools every day or so for weeks/months and now hasn’t been of a few days
- Pain getting worse +/- blood on stool and pain from fissures
- Often need to get the history from the child

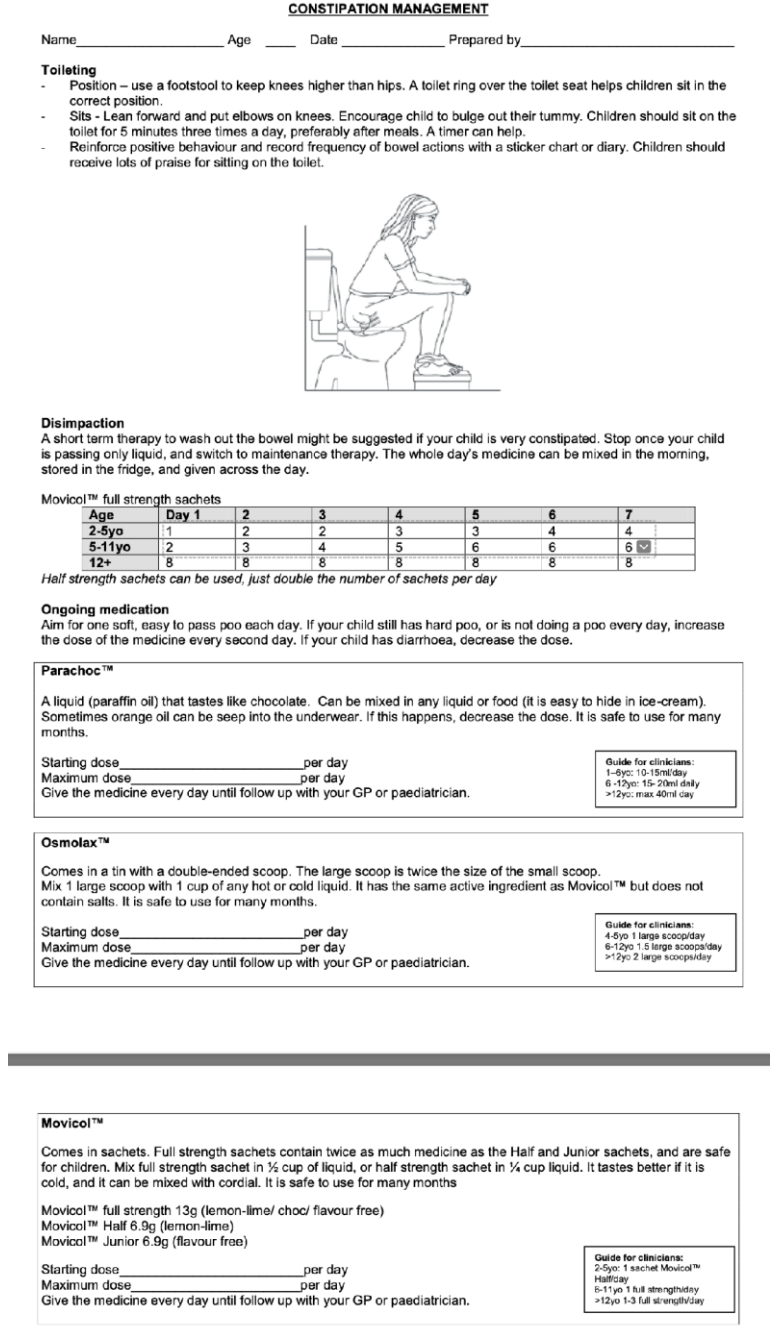
Red flags

Mostly related to infants

- < 6 weeks of age
- delayed passage of meconium (>24 hours)
- ribbon like stools
- poor growth/weight loss
- abdominal mass- other then stools

Acute management

- RCH handout
- “Conquering Wees and Poos” is useful for older children with more chronic constipation
- General rule is that you need to take laxatives longer then you have been constipated
- Regular GP follow up
- No need for Xray



CONSTIPATION MANAGEMENT

Name_____ Age ____ Date _____ Prepared by_____

Toileting

- Position – use a footstool to keep knees higher than hips. A toilet ring over the toilet seat helps children sit in the correct position.
- Sits - Lean forward and put elbows on knees. Encourage child to bulge out their tummy. Children should sit on the toilet for 5 minutes three times a day, preferably after meals. A timer can help.
- Reinforce positive behaviour and record frequency of bowel actions with a sticker chart or diary. Children should receive lots of praise for sitting on the toilet.

Inpatient disimpaction

- Pretty uncommon in an otherwise well child
- Usually reserved for children who have failed a good go at community management
- Via NGT in younger kids
- Will still need ongoing oral laxatives following disimpaction

Speaker

Dr Christina Fong

- Christina trained as a Fellow of the Australian College for Emergency Medicine (FACEM) at Monash Medical Centre (MMC) and had further paediatric emergency medicine (PEM) training at Boston Children's Hospital.
- She returned in 2000 to work in the paediatric emergency department and MMC, where she still works currently.
- Christina is an Advanced Paediatric Life Support (APLS) Instructor and enjoy training medical students, residents and registrars, and anyone who wants to care for sick children.

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“Tummy Ache”

Abdominal pain in children

Dr Christina Fong

Objectives:

- Revise the pathophysiology of abdominal pain
- Abdominal pain through the ages
- Problem solving some case studies
- An approach to diagnosis and investigation of abdominal pain in children

Some truths about abdominal pain

- Very common symptom

- Acute vs Chronic

- most of them will be fine
  some will be constipated
  many will be functional

BUT 1 will have something serious

- Many many aeitiologies!

Pathophysiology of abdominal pain

- Visceral Pain : Stretch of smooth muscle

  3 midline zones = sum of pain from the R and L splanchnic pathways

  poorly localised
- Somatic Pain : well localized unilateral pain

  intensified by jarring, deep insp or pressure on the abdominal wall
- Referred pain: phrenic nv, Obturator nv, genitofemoral nv
- Irritation from nearby organs

- Splanchnic neural pathway runs with the thoracic sympathetic
  - visceral pain sensitive to stretch and spam
  - colicky abdominal pain

- *Cerebrospinal neural pathway* T6-T12 to the parietal peritoneum
  - somatic pain sensitive to friction, cutting, burning
  - peritontic pain

Abdominal Pain through the Ages

Neonates

- Malrotation
- Volvulus
- Intestinal obstruction
- Incarcerated Hernia
- Hirshsprung enterocolitis
- Necrotising enterocolitis
- Intusussception
- Trauma
- GOR

Infants

- Intussusception
- Incarcerated hernia
- Pyloric stenosis / Duodenal atresia
- Volvulus
- Meckels

- Trauma
- Constipation
- Gastroenteritis
- Appendicitis

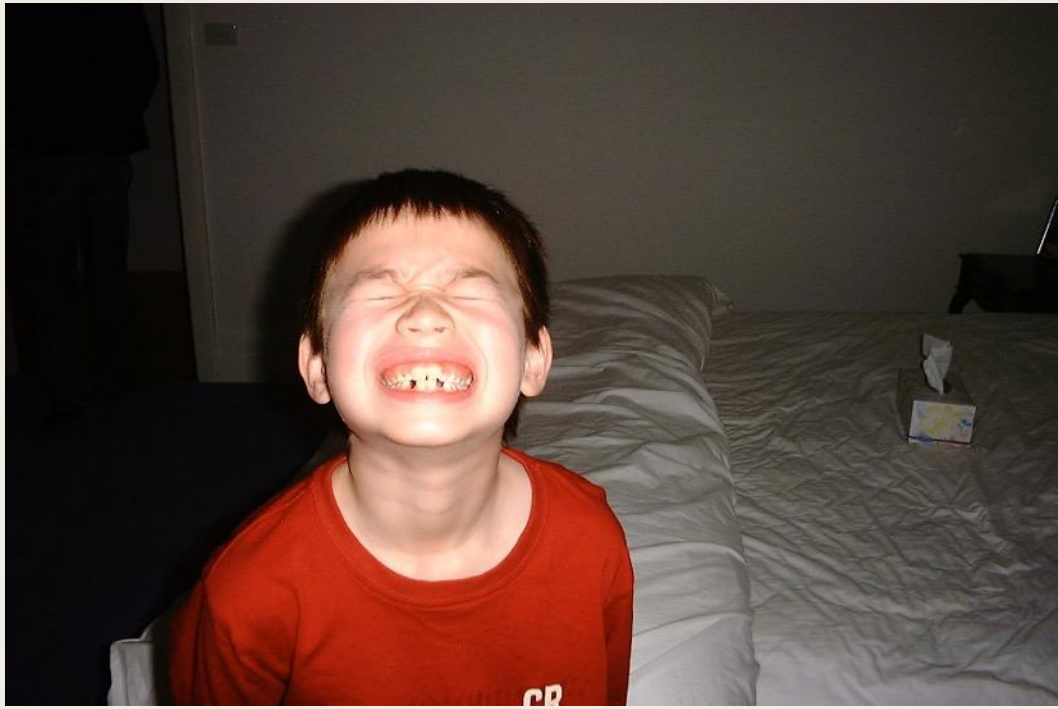
- Testicular / ovarian torsion
- Ectopic ovaries

Children

- Gastroenteritis
- Constipation
- Mesenteric adenitis

- Functional /abdominal migraine /IBS
- Inflammatory Bowel dis
- Coeliac/food intolerence

- Appendicitis
- Trauma
- FB ingestion
- Intestinal Obstruction



Adolescents

- Trauma
- Testicular torsion

- Inflammatory bowel disease
- Cholecystitis/lithiasis, pancreatitis
- Gastroenteritis
- Renal Colic
- Constipation

- Dysmenorrhoea , Endometriosis
- Ruptured ovarian cyst
- Ectopic preg
- Ovarian torsion
- PID

- Functional /abdominal migraine /IBS
- Inflammatory Bowel dis
- Coeliac/food intolerence

Non Abdominal cause of abdominal pain

UTI DKA HSP PIMS-TS Sickle Cell crisis Sepsis Toxins : alcohol , NSAIDs Psychological /functional	Pneumonia, mycoplasma Pericarditis /myocarditis Testicular torsion Ovarian torsion Ectopic STD

Case 1

- 12 yr old girl with Downs syndrome presents with right lower chest pain while attending special school. No witnessed injury, child was dancing when pain started,

  Patient was unable to give accurate history

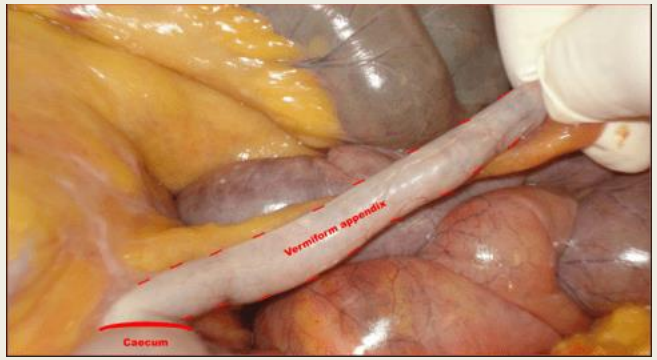
Afebrile, abdomen soft non tender, Chest clear

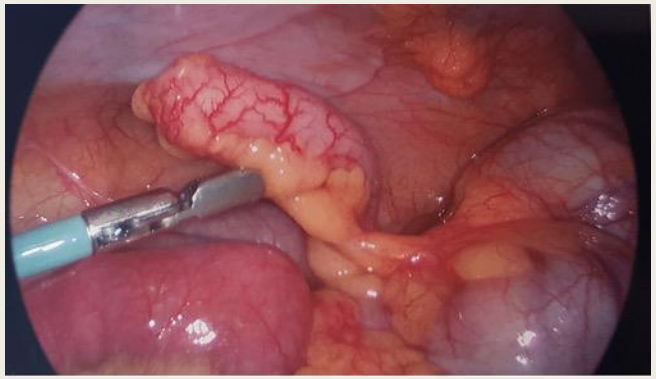
Mildly tender to palpation right anterolateral lower rib area.

Discharged with dx of Musculoskeletal strain

Represented 2 days later with acute appendicitis,

Appendicitis





- Very common in children accounts for1-2% surgical admissions
- Uncommon in preschool aged children .....

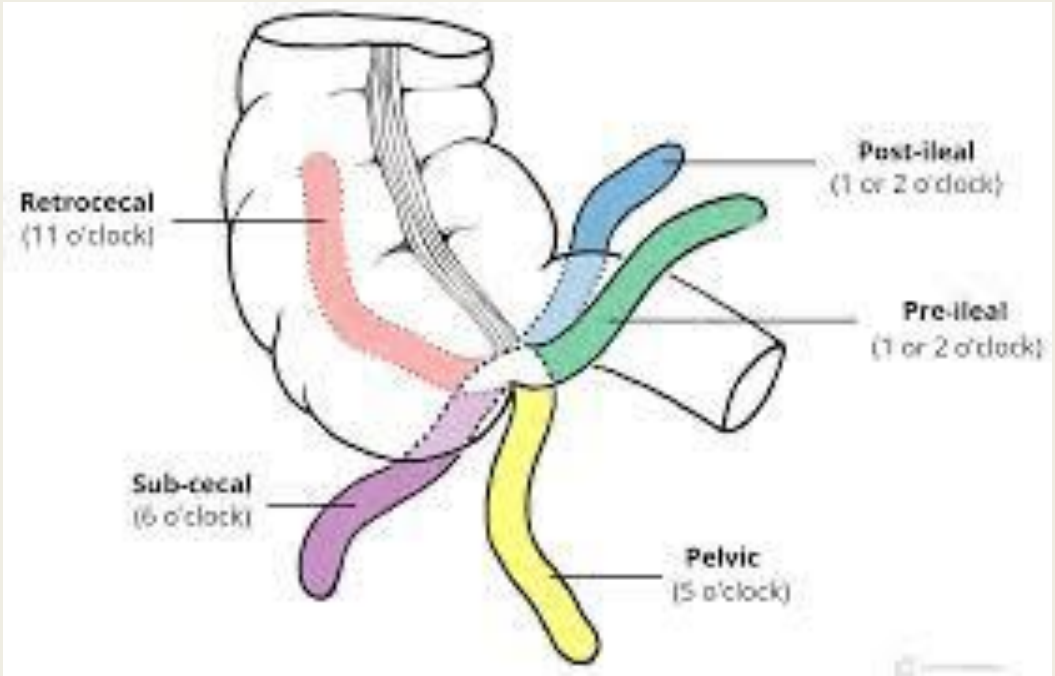
  misdiagnosis rate nearly 100% in preschool and 28-57% in 2yr-12yr
- Position :

Retrocaecal

Pelvic

Subcaecal

Ant /peri-ileaIRUQ



Alvarado Score : MANTRELS

Features	Points
Migration of pain from central abdomen to right lower quadrant	1
Anorexia	1
Nausea with vomiting	1
Tenderness in right lower quadrant	2
Rebound tenderness	1
Elevated temperature ≥38 °c (100.4 °F)	1
Leukocytosis (≥10, 400/mm3)	2
Shifted WBC count (75% neutrophils)	1
Total possible points	10

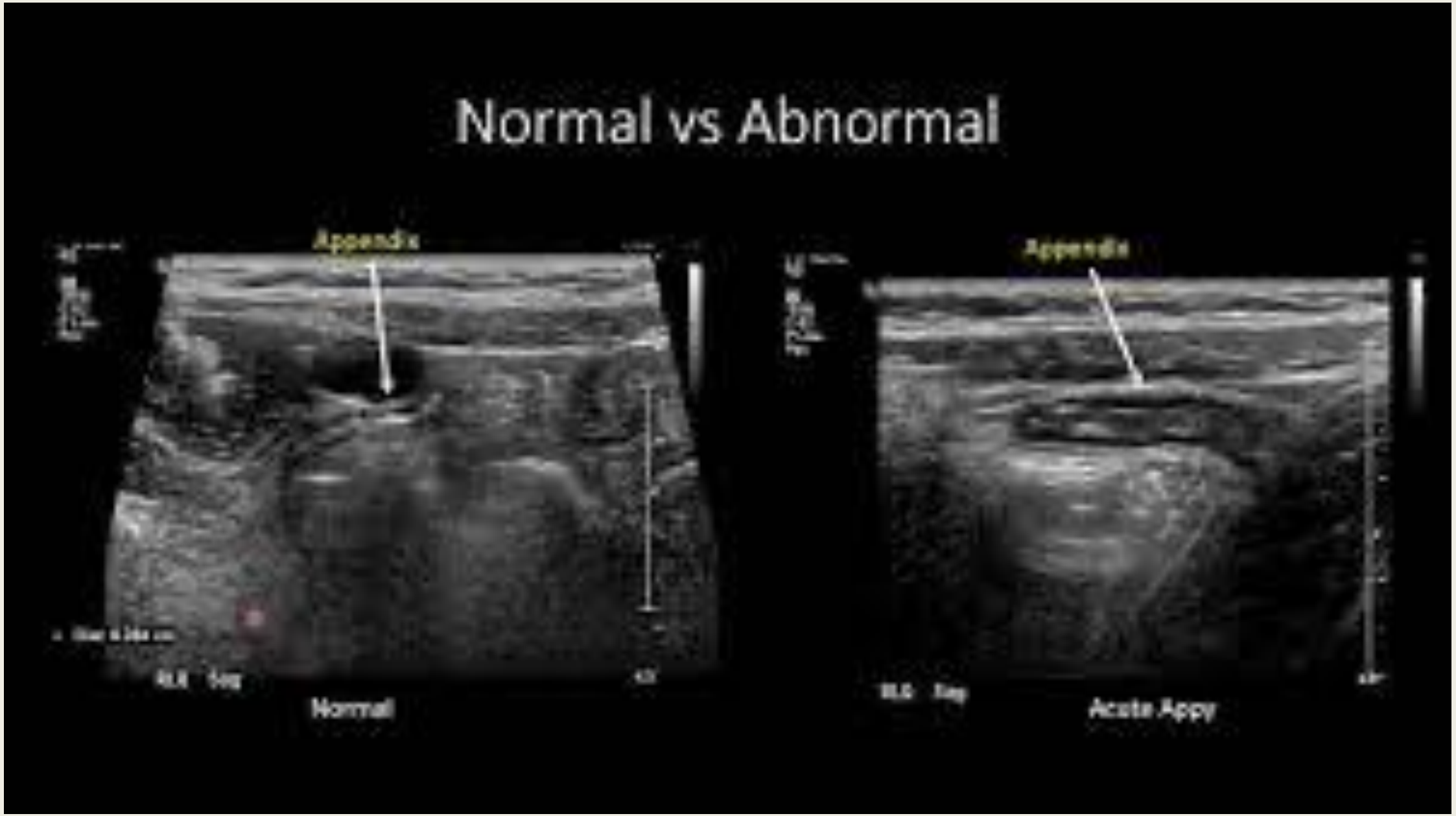
Paediatric Appendicitis Score PAS

Features	Points
Migration of pain	1
Anorexia	1
Nausea/vomiting	1
Right lower quadrant tenderness	2
Cough/hopping/percussion tenderness in the right lower quadrant	2
Elevated temperature (>38-C)	1
Leukocytes Q10.000/KL > 10,000	1
Polymorphonuclear neutrophilia >75%	1
Total points	10

US

- Specificity is high if you see the appendix
- Sensitivity very variable 11.7-85% among many studies

  Still has an unacceptable false negative rate ie poor NPV


Normal vs Abnormal
Appendix
Normal
Appendix
Acute Appy

Case 2

- 6 yr old boy TR transferred from Wonthaggi with 7 days of fever and periumbilical abdominal pain .

  US: Multiple morphologically normal lymph nodes at least 20 consistent with mesenteric adenitis. Appendix not seen, no free fluid.

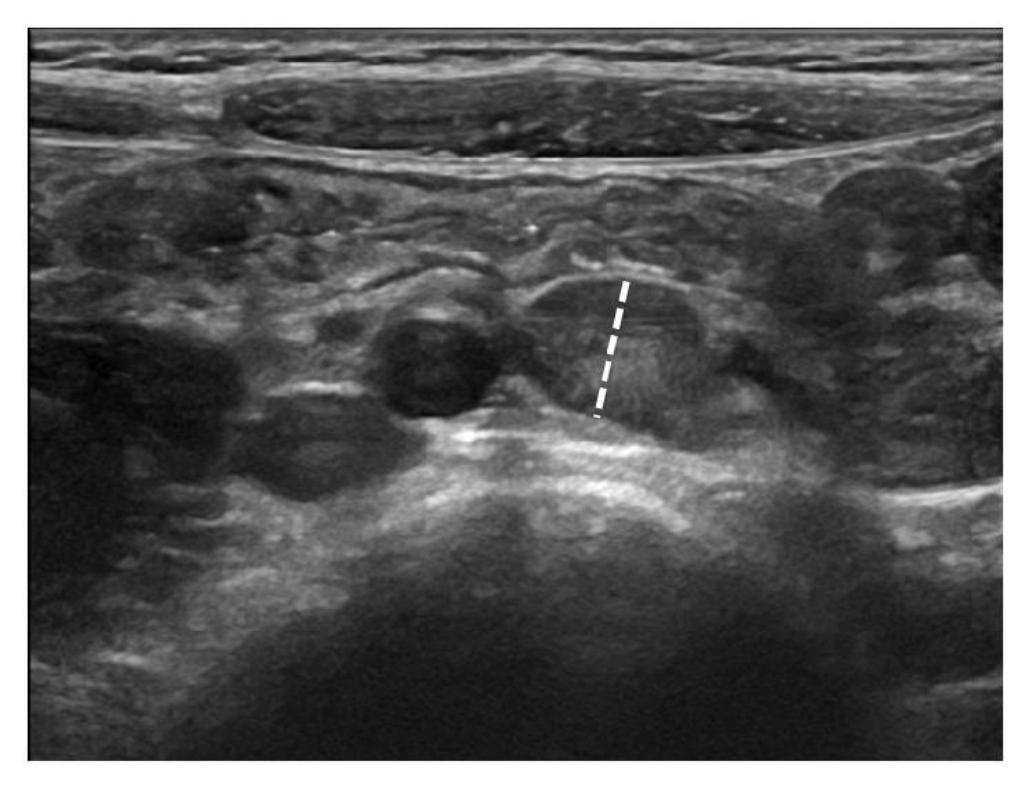
Sent to MMC for Paed Gen Surgical Review to rule out appendicitis.

37.2C HR=102 SaO2=96% RA

Abdomen was soft no guarding. Inconsistently tender all over.

Surgeons did not think he had acute appendicitis, consistent with dx of : mesenteric adenitis

Mesenteric Adenitis



- 3 or more lymph nodes >5mm short axis
- One or more enlarged node >8mm short axis
- With a normal appendix

Mesenteric Adenitis

- Primary mesenteric adenitis :

  Lymphadenopathy in the mesentry near the terminal ileum without a discoverable underlying cause

- Secondary mesenteric adenitis :

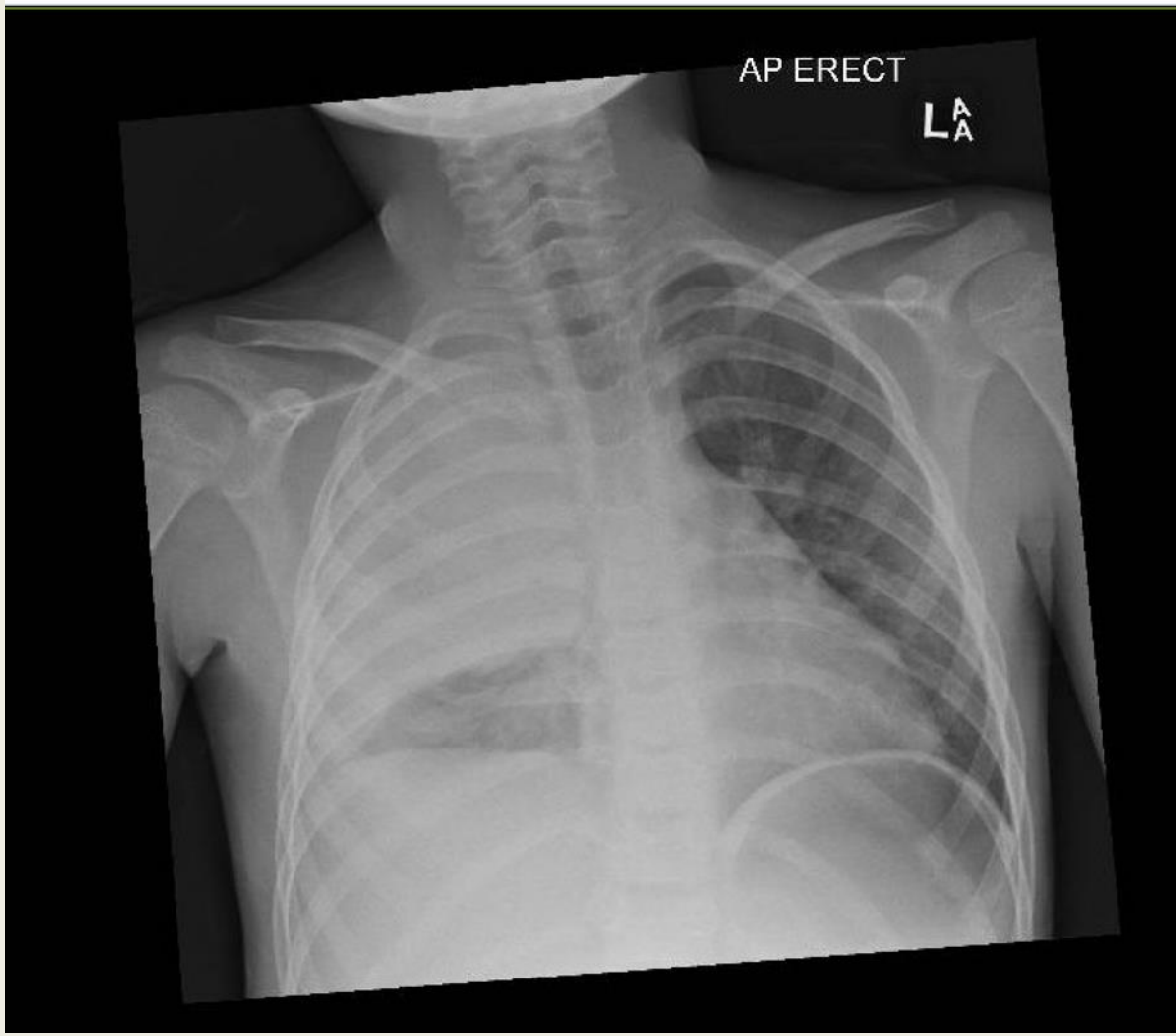
  Lymphadenopathy virus, bacteria, inflammatory bowel dis, lymphoma

  Can be present with appendicitis and be indistinguishable from appendicitis

- Self limiting 2-3weeks

Case 2

- Remember TR with mesenteric adenitis?
- At discharge : child had productive cough, bronchial BS RUL
- Admitted 21/5-17/6



Case 3

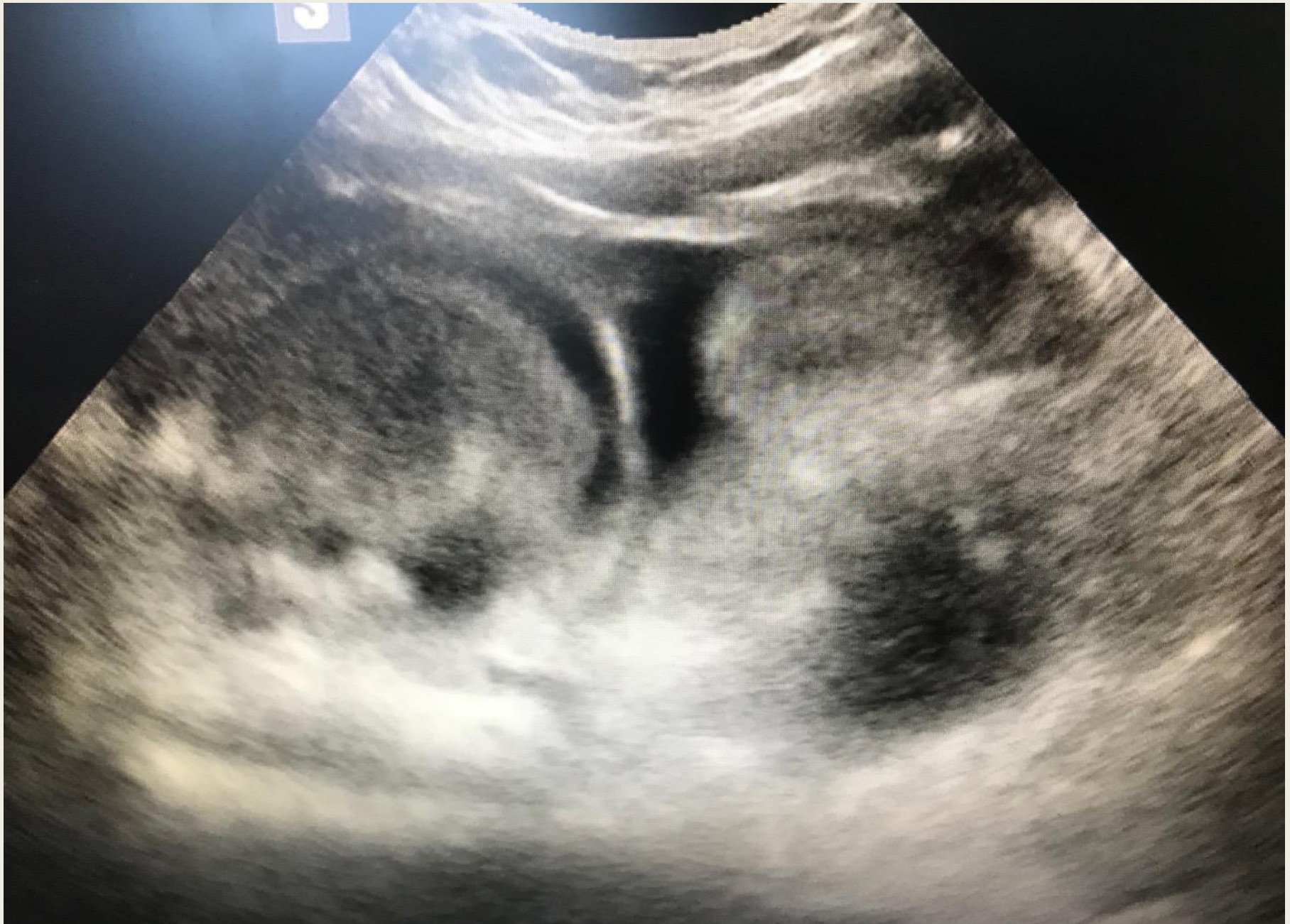
- 10mth old baby RL presented with near syncope.

RL was playing on the ground when parents noticed he started crying then went pale and quiet, ambulance was called.

By the time ambulance arrived, RL was back to normal.

Examination, ECG and Cap gas was normal.

Any thoughts?



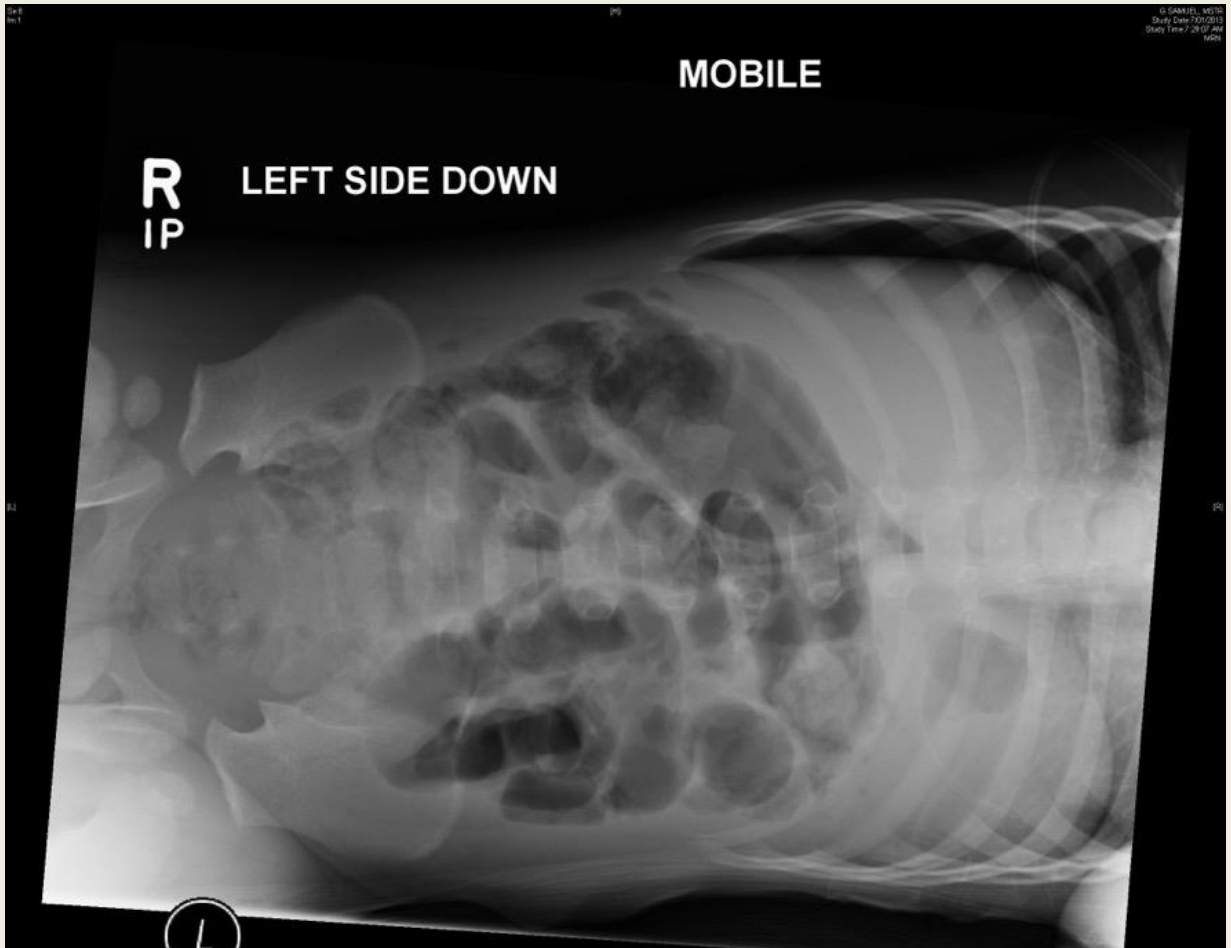
Intusussception

- Common between 2mths and 2 yrs but can happen in any age
- Ileal-ileal vs Ileal-colic intussusception
- Classically episodes of abdo pain followed by lethargy, floppiness
- Ileal-colic intussusception requires air enema for reduction

Case 4

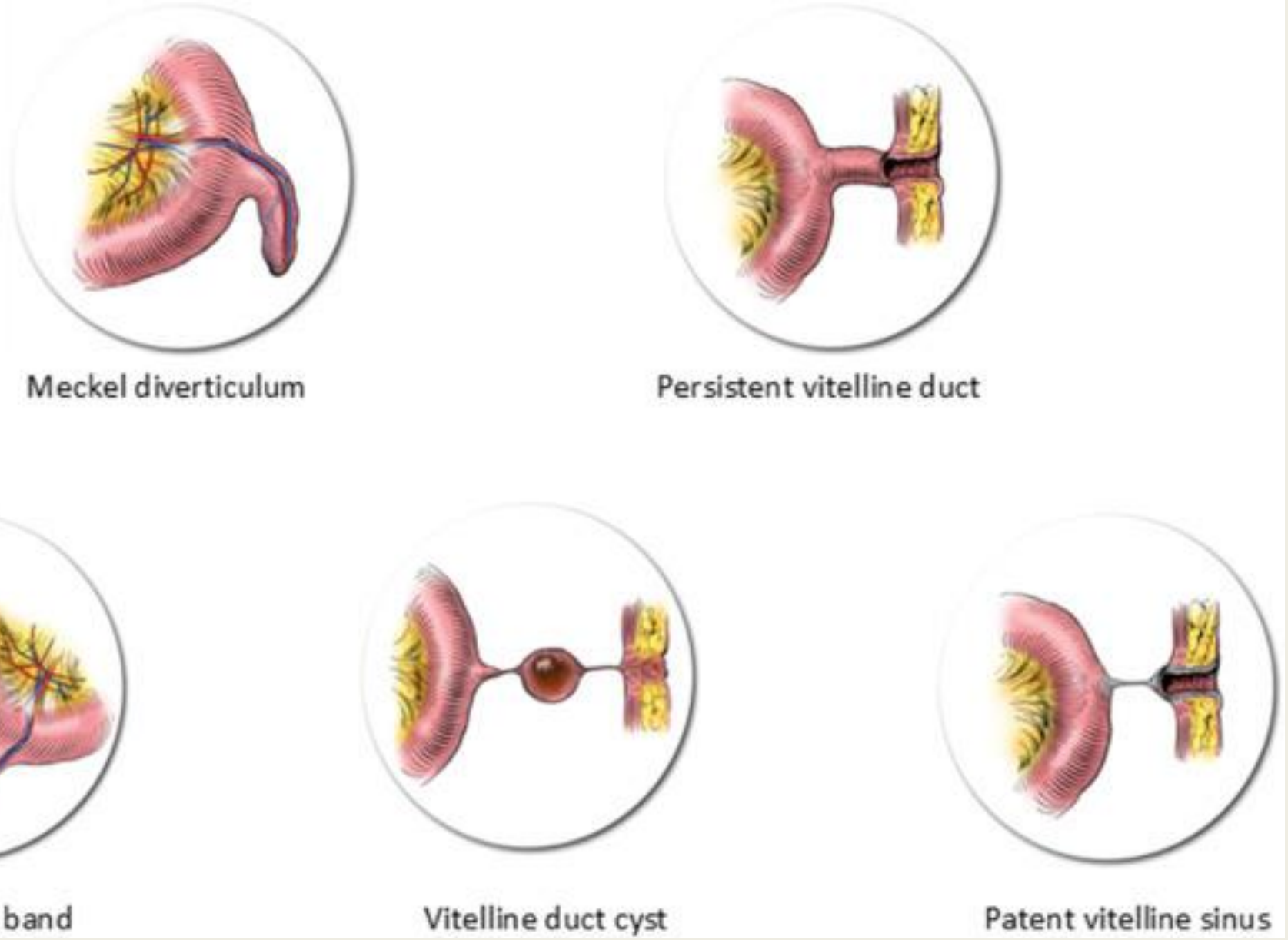
2yr baby presented with fever, vomiting, poor feeding.

Exam: acute guarded abdomen

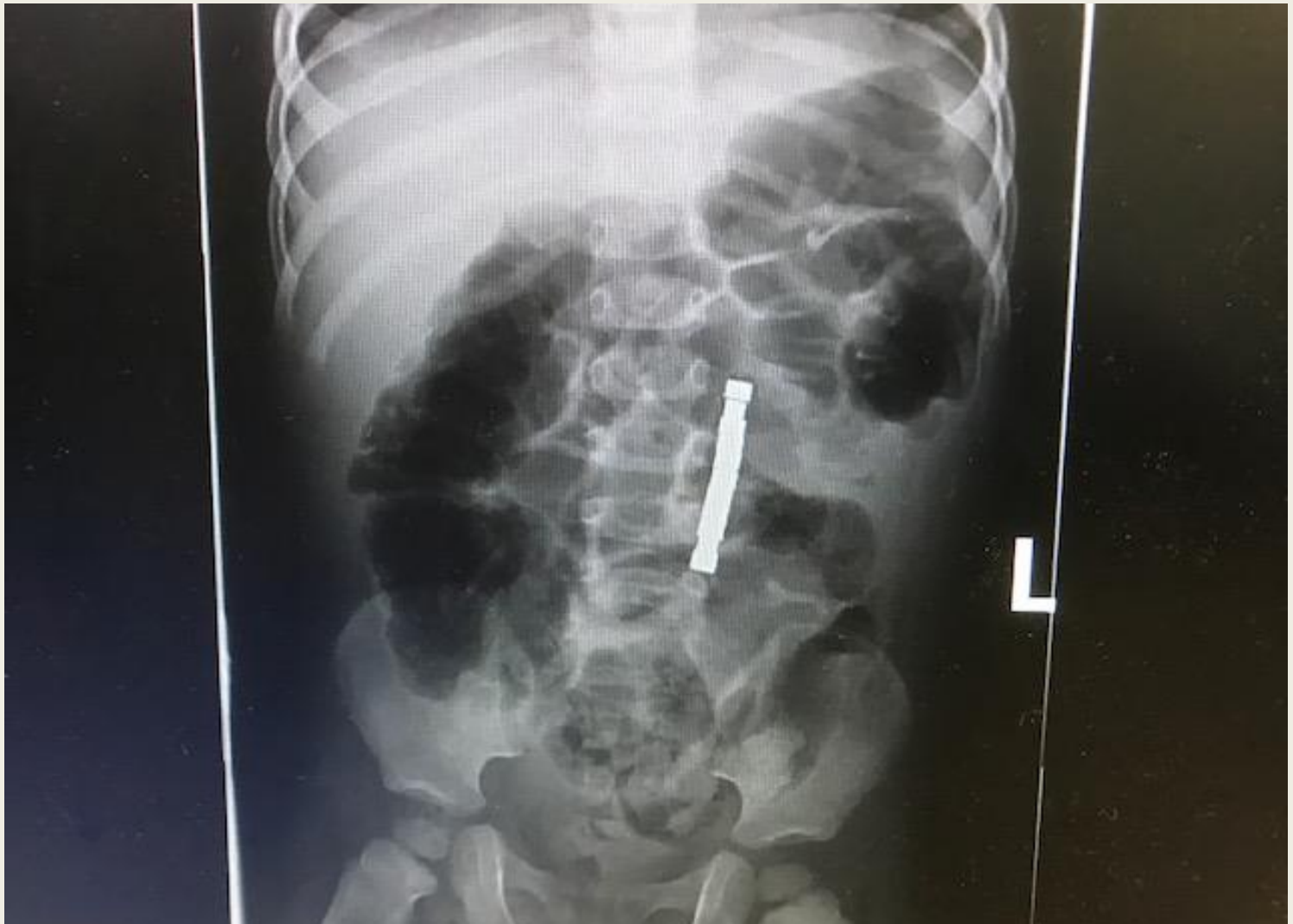


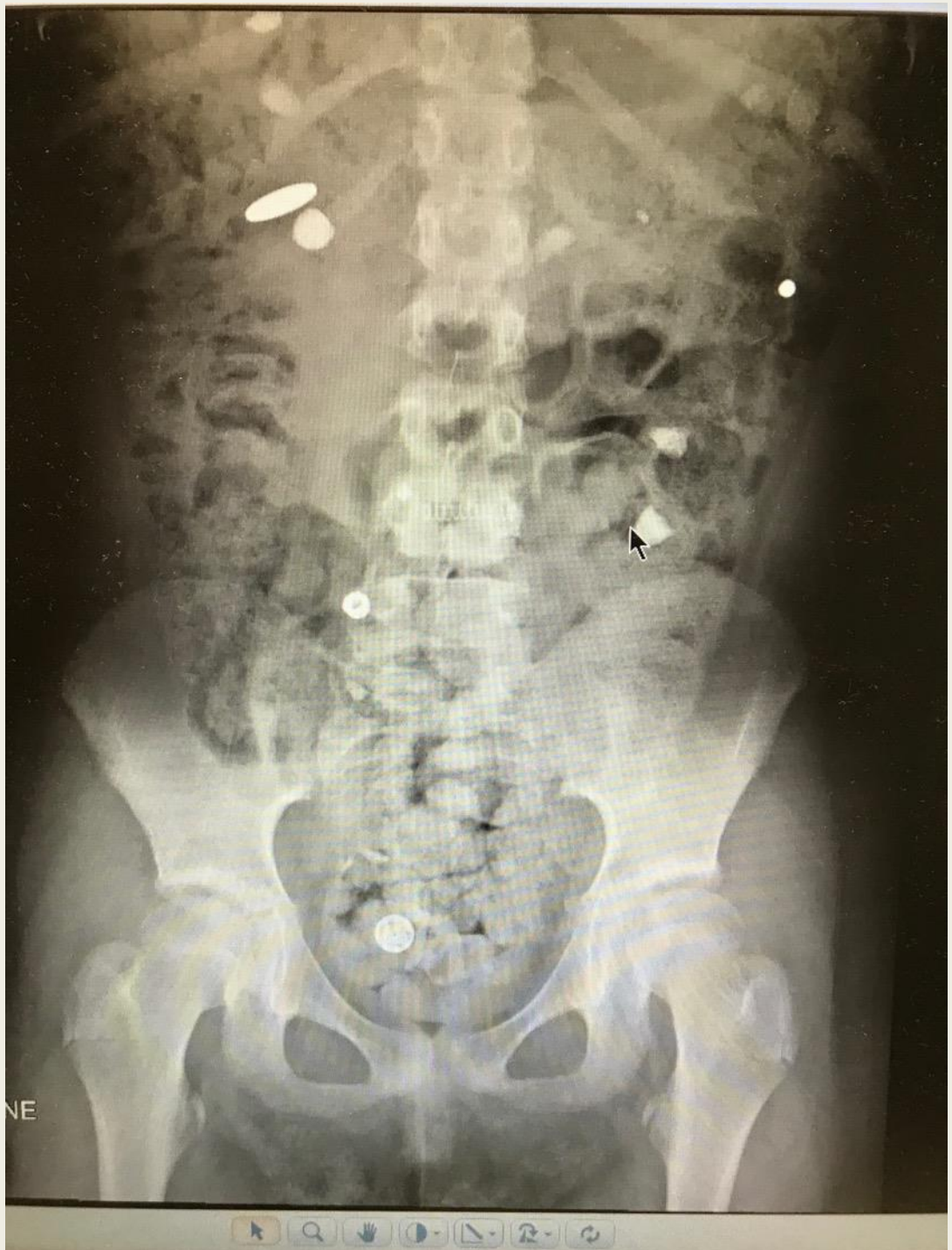
Meckels Diverticulum

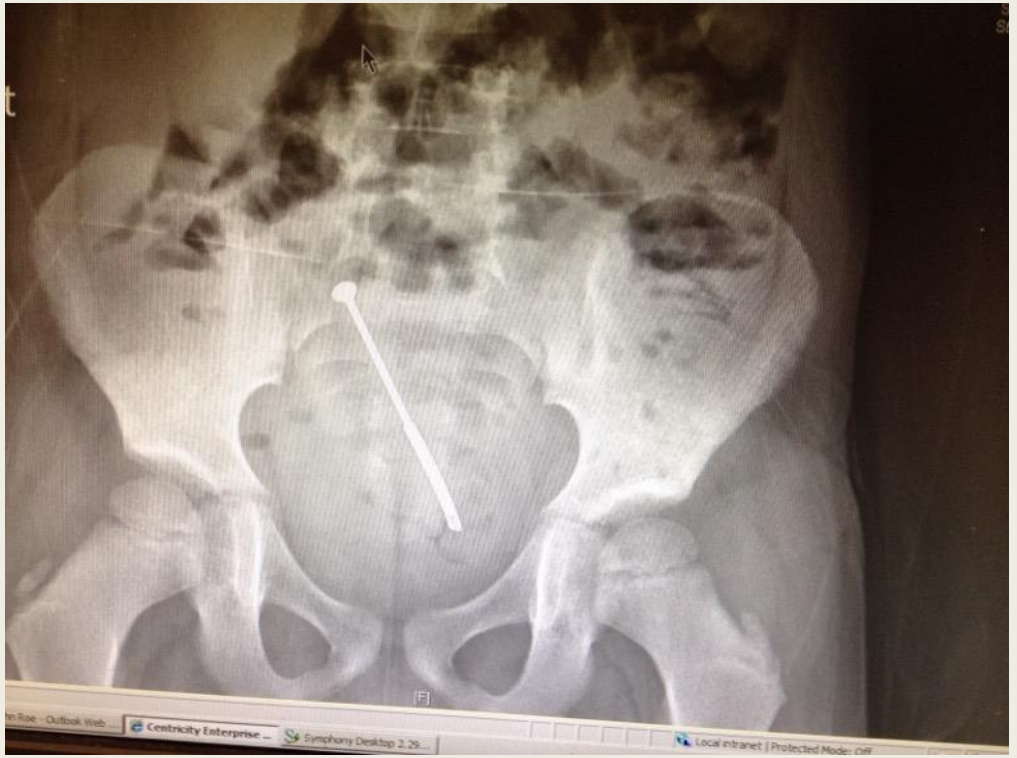
- 2 % population
- 2 inches long
- 2 feet from the ileocaecal valve
- 2 X more likely in males
- 2yrs old
- 2 types of mucosa: gastric and pancreatic


Meckel diverticulum
Persistent vitelline duct
Fibrous band
Vitelline duct cyst
Patent vitelline sinus

Case 5







Ingested FB

BEWARE:
Multiple magnets

Button batteries

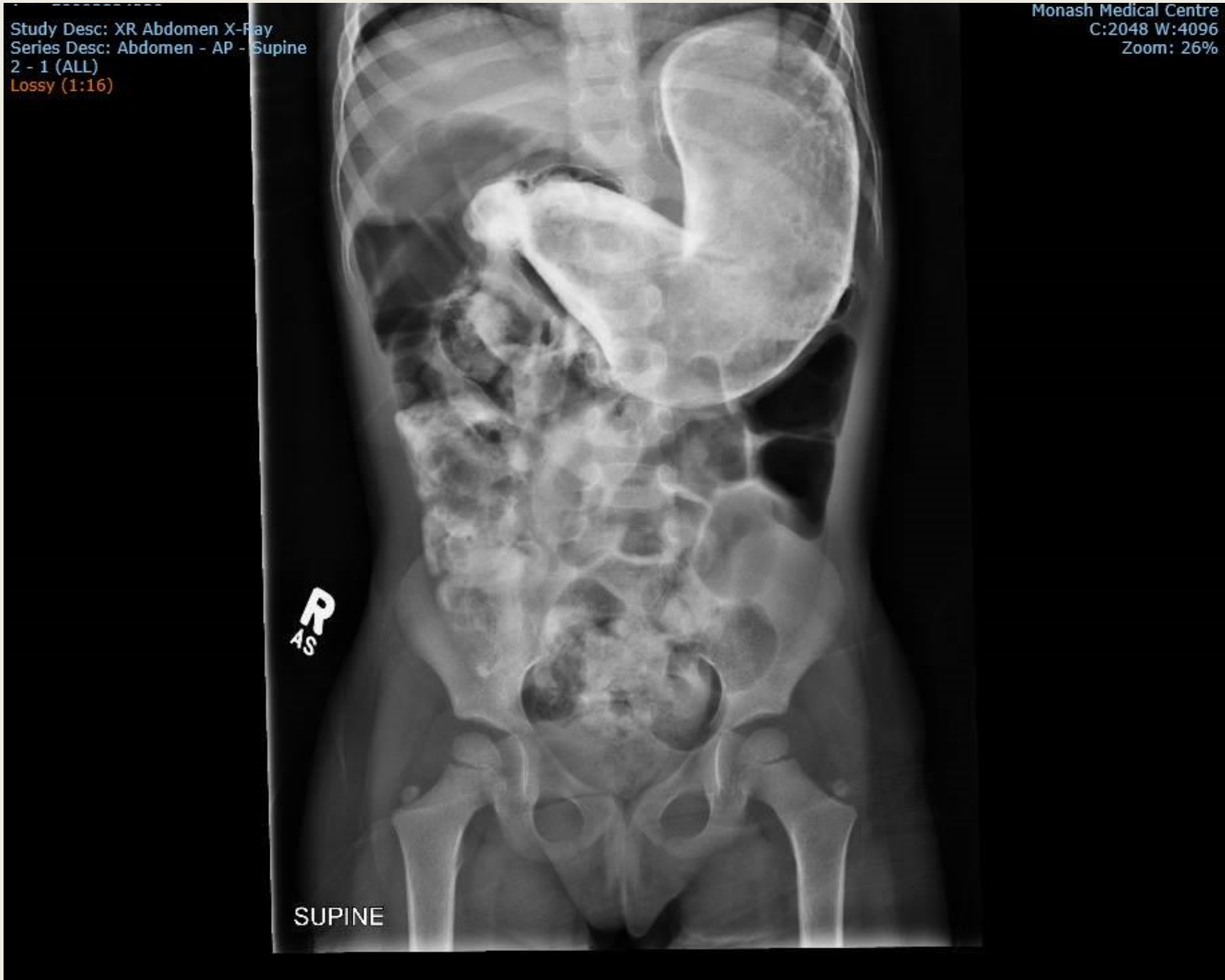
Larger objects (>6cm long or >2.5cm wide)

Suprabsorbent polymers

Lead containing objects

Most children will pass the object, discharged to return if vomiting, abod pain or PR bleeding

- /


Study Desc: XR Abdomen X-Ray
Series Desc: Abdomen - AP - Supine
2 - 1 (ALL)
Lossy (1:16)
Monash Medical Centre
C:2048 W:4096
Zoom: 26%
R
AS
SUPINE

Case 6

- 4 yr old presents for the 3rd time in 2 weeks with abdominal pain and refusing to open his bowels. Has had a few small hard poos.

- Had seen GP , then ED at Casey, then MMC Paeds ED last night and represented today (4th doctor visit in 1 week) with abdominal pain and refusing to defaecate.

No joy with Coloxyl, Movicol, prev ED had attempted microlax but mainly spilled in the bed.

CONSTIPATION

95% functional

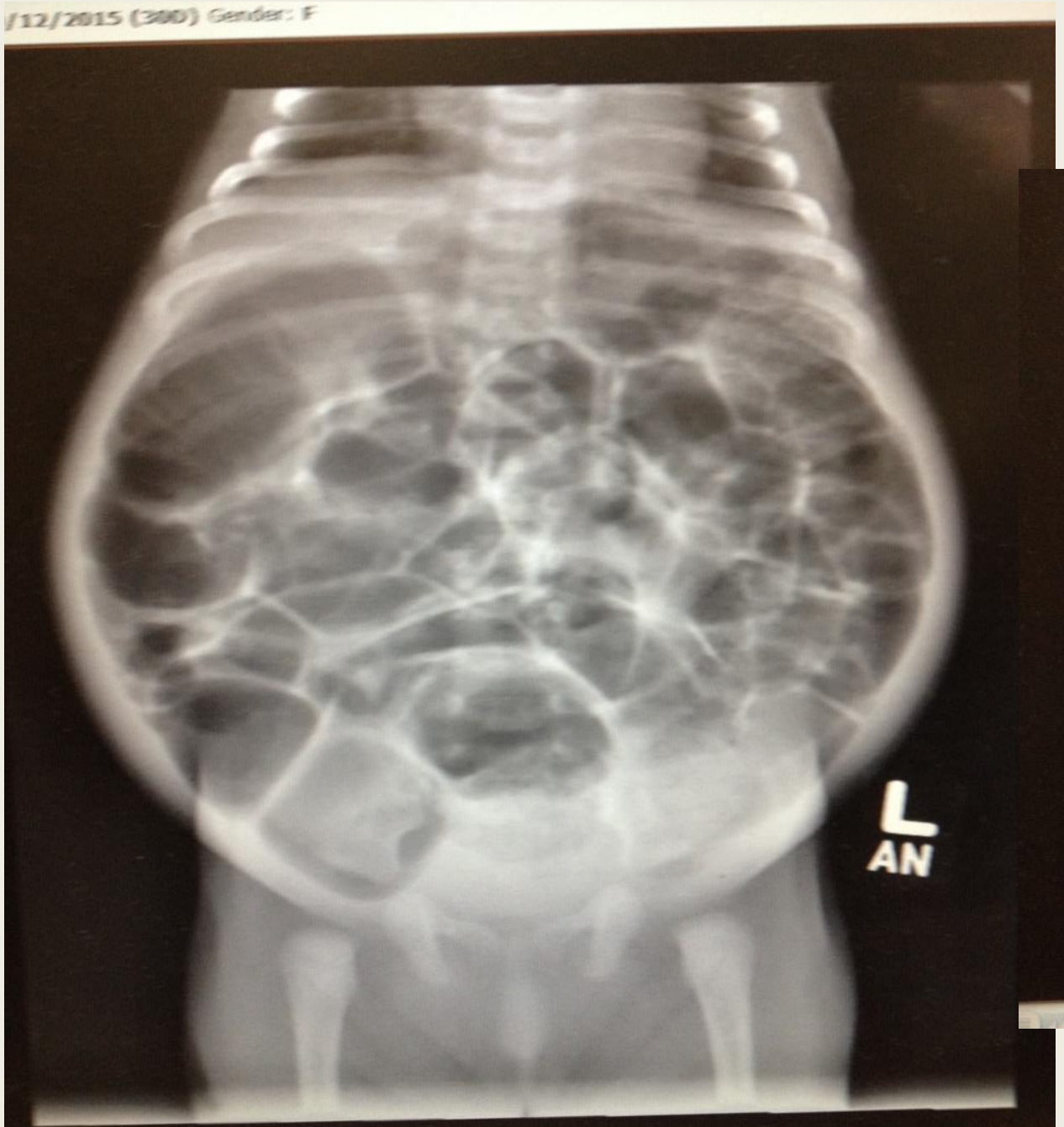
- Delay in meconium
- Perianal exam-appearance, position, patency, fissures
- Neuro :check spine, skin overlying spine, gait, lower limb neuro
- Abdominal masses , urinary retention , pregnancy

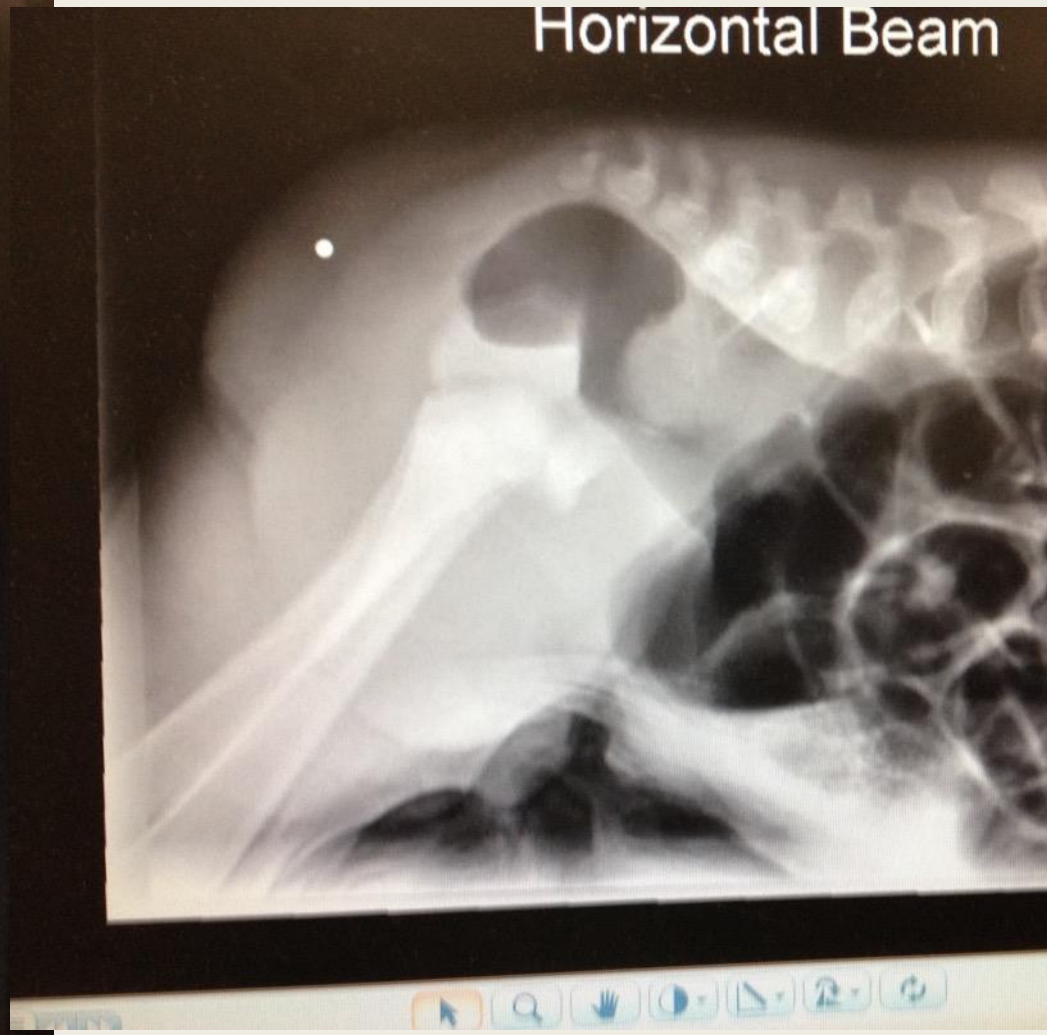
Case 6

- 11 day old term baby girl presents with abdominal distension and has not opened bowels for 6 days. Has had no vomiting and still tolerating breast feeds.

  Passed meconium at birth.

IT IS NOT CONSTIPATION


/12/2015 (300) Gender: F
L
AN


Horizontal Beam

Neonatal conditions

- Difficult to diagnose
- Often presents with poor feeding, vomiting, drowsiness.
- Failure to thrive
- Abdominal distension common in young infants


Billous vomitting


hypoglycaemia


Has not passed meconium

Approach to dx /mx:

-obstructed,perforated, infected or inflamed
-surgical vs non surgical
-onset, constant, intermittent, location
-vomiting
-fever
-diarrhoea, overflow , not opening bowels
-acute vs chronic, failure to thrive

Past hx: nephrotic synd, sickle cell

Examine temp/HR/BP/ weight

Abdomen : masses, localized tenderness
peritonism, look for hernias
Back and renal angle
Chest
Scrotal

Ix:
BSL and ketones
Urine FWT

Stool : culture, micro, calprotectin

Imaging :None

US
AXR :FB, obstruction
CXR: perforation, pneumonia
Upper GI series : malrotation
CT : trauma

Lack of meconium passage
LOW , failure to thrive
Billous vomiting
Hx of lethargy

FB in the non verbal child

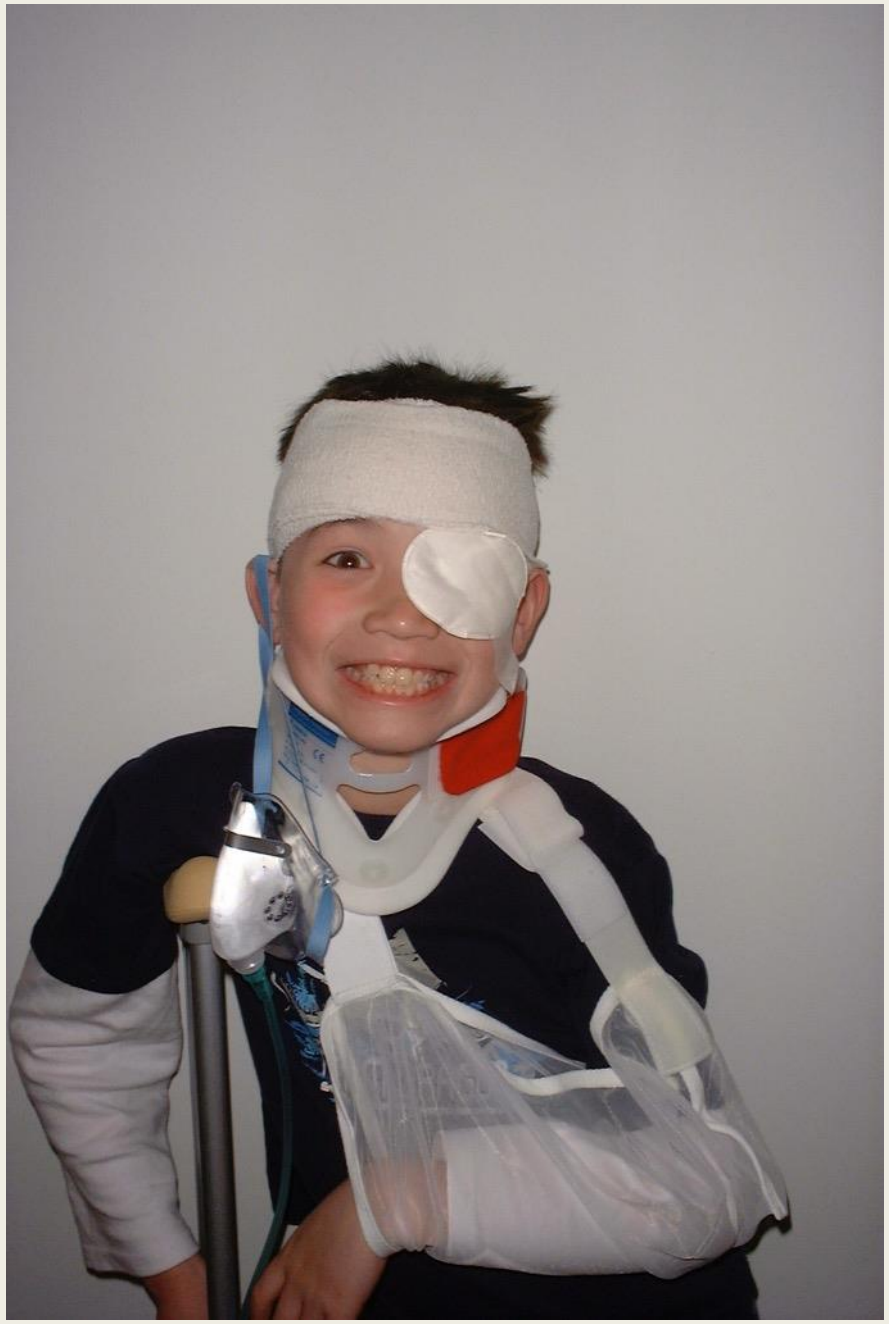
Ovaries , pregnancy test

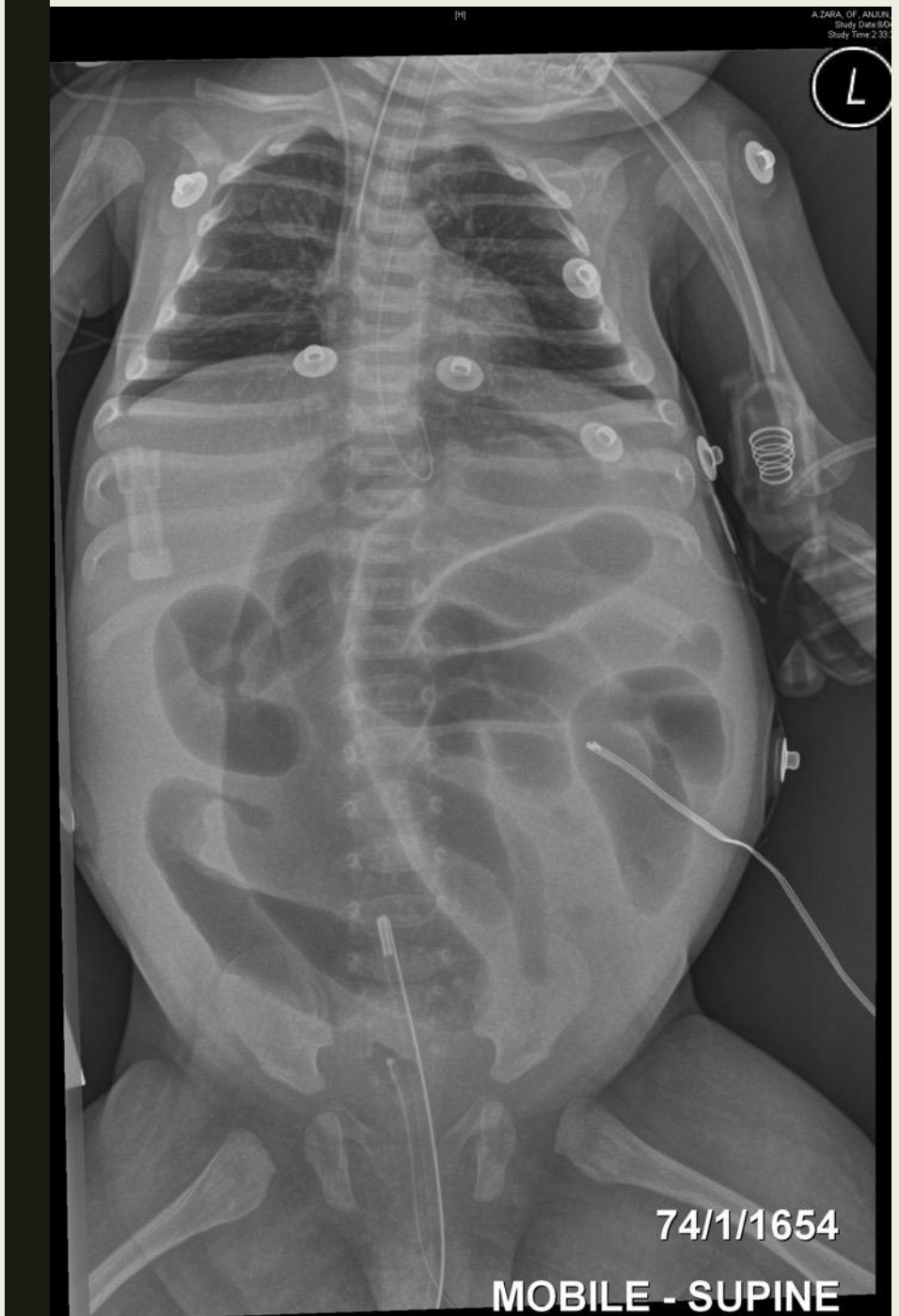
Testicles

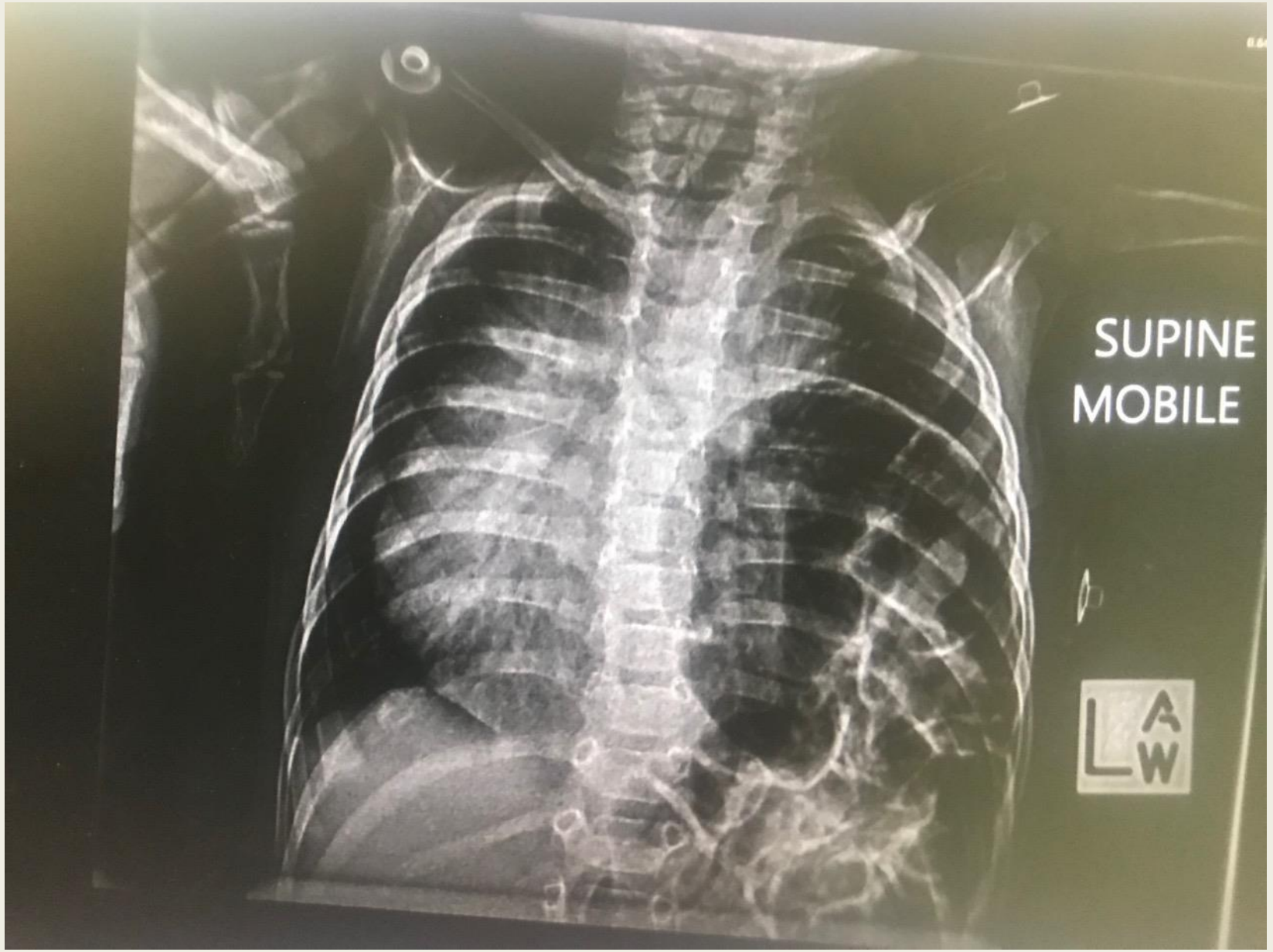
If you need to prescribe Opiods for abdominal pain, they prob should be in hospital

Remember non GIT causes of abdo pain

I have NOT covered:
Trauma
Functional abdominal pain
Constipation
Food allergies/intolerences
FPIES
IBS
Inflammatory bowel dis
PIMS TS




[H]
L
74/1/1654
MOBILE - SUPINE


SUPINE
MOBILE
LAW

Session Conclusion

We value your feedback, let us know your thoughts.

Scan this QR code

You will receive a post session email within a week which will include slides and resources discussed during this session.

Attendance certificate will be received within 4-6 weeks.

RACGP CPD hours will be uploaded within 30 days.

To attend further education sessions, visit,

https://nwmphn.org.au/resources-events/events/

This session was recorded, and you will be able to view the recording at this link within the next week.