Good morning ladies and gentlemen. My name is Shrish Budree, I’m a fellow in paeds GIT at RXH. I will be talking to you this morning on an approach to constipation in children.
I thought we would start by looking at the definition of constipation. Unfortunately, there is no standardised definition for constipation. This makes the comparison of studies and populations very difficult. The first definition here comes from the N. American society for paed gastroenterology, hepatology and nutrition.
According to the NICE guidelines, which is The national institute for health and clinical excellence (NICE), an evidence based guideline for UK doctors, the diagnosis of constipation requires that certain criteria be fulfilled. These criteria take into consideration stool patterns such as frequency, consistancy and the presence of fecal loading. Symptoms associated with defecation, straining, pain and retentive posturing. History of previous constipation or fissures.
The Rome III definition was dawn up by a group of paediatricians in Rome in order to standardize the diagnostic criteria for various functional gastroenterological disorders in children and was updated in 2006. According to the Rome III criteria at least 2 symptoms must be present for at least 1 month in a child <4 years and more than 2 months for a child over 4 years. The symptoms include a positive history, abnormal stool patterns and symptoms associated with defecation.
Definitions

- Chronic Constipation
  - Constipation lasting longer than 8 weeks. (NICE Clinical Guideline 2010)
- Intractable Constipation
  - Constipation that does not respond to sustained, optimum medical management (NICE Clinical Guideline 2010)
- Fecal loading
  - ineffective and incomplete evacuation of stools resulting in accumulation of stool in rectum
- Fecal soiling
  - involuntary leakage of small amounts of soft or watery stool secondary to faecal loading and rectal distension
- Encopresis
  - apparently willful passage of normal consistency stool into underclothes or other places.

Other definitions to consider include
It is important to differentiate fecal soiling, which is an involuntary act, with encopresis, which is a voluntary act associated with behavioural problems.
With regards to epidemiology, Figures are from mostly european studies. Constipation is responsible for 3% of general paed and 25% in paed GIT consultations. Prevalence ranges between 5-30% depending on the definition used for constipation.
Chronic constipation is rarely associated with chronic morbidity or mortality. However, in children, it can increase the risk of UTI, worsen GOR cause severe abdominal pain, anal fissures and if not treated appropriately will get progressively worse.
Constipation can be classified into functional constipation where there is no objective evidence of a pathological condition and organic constipation is due to an underlying disease process.
The pathogenesis of functional constipation is a vicious cycle. It starts with the painful passage or voluntary withholding of feces. This leads to prolonged fecal stasis in the colon and increase in size and consistency of stool with ongoing fluid reabsorption resulting in hard, large stools. The painful passage of these stools reinforces the voluntary withholding of feces. Many factors can contribute to the withholding of stools. (Red Arrow) the aim of treatment is to break the cycle. With early diagnosis and treatment, we can prevent an acute episode of constipation causing anal fissures leading to chronic constipation.
The mechanism of fecal loading and soiling is a stepwise progression. It starts with the passage of hard, large painful stools leads to a fear of defecation. This results in Voluntary withholding of stools. children may rise on their toes and rock back and forth while stiffening their buttocks and legs, or wriggle, fidget, or assume unusual postures, often performed while hiding in a corner. The voluntary withholding of stools results in enlarging of rectal fecal mass. The rectum eventually dilates with the large stools and the urge to defecates subsides. This results in the involuntary leakage of watery stools around the fecal mass causing soiling of underwear. Pain is due to fissures together with internal sphincter spasm
In most cases the parents worry that the child’s stools are too infrequent. This table, published in 1987 illustrates the variety in the frequency of stool at different ages, ranging from <1 stool per day to more than 4 stools per day in infants. The frequency of stools gradually decreases with increasing age to around 1 stools per day in children >3 years. It is important to remember that some normal breast-fed babies do not have stools for several days or longer.
When approaching constipation, children should be separated into 2 groups, those <1 year in whom there is a higher prevalence of organic constipation and those older than 1 year, where functional constipation is most likely.
This is a broad overview of the approach to constipation in children older than 1 year.

Approach in a child >1 year

1. Confirm the presence of constipation
2. Exclude any ‘Red-Flags’ on history and examination (patients needing referral)
3. Initiate treatment
4. Maintain therapy
5. Wean medication
This flow chart is adapted from the 2006 NASPGHAN constipation guidelines. Once you have determined that constipation is present, do a thorough history and examination.
On history, determine what the family and child understand by the term ‘constipation’. Determine the onset of symptoms such as age of onset, passage of meconium and duration of symptoms. The characteristics of symptoms, frequency and consistancy of stools, pain or bleeding. It is important to note that fecal soiling may be mistaken for diarrhoea by some parents.
History

• Potential precipitating factors
  – coinciding with the start of symptoms
  – fissure
  – change of diet
  – timing of potty/toilet training
  – infections

Look for precipitating factors which coincide with onset of symptoms such as fissures, dietary changes, toilet training, infections and stressors.
Assess diet, in particular fluid intake and medications that can cause constipation. Developmental history is important, as children with global developmental delay are at a higher risk of constipation.
Examination

- Look for any syndromic or dysmorphic features
- Abdominal exam
  - Distension
  - Palpable fecal mass (LIF, suprapubic)
- Inspection of perianal area
  - Appearance
  - Position
  - Patency
Examine the neurology in the lower limb and carefully inspect the lumbar spine looking for sacral dimples, tufts of hair and sacral agenesis.

<table>
<thead>
<tr>
<th>Examination</th>
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<tbody>
<tr>
<td><strong>• Lower limb neuromuscular examination</strong></td>
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<tr>
<td>– Tone</td>
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<td>– Power</td>
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<td>– Reflexes</td>
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<td>– Gait</td>
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<td><strong>• Back and spine examination</strong></td>
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<tr>
<td>– Dimple</td>
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<tr>
<td>– Tuft of hair</td>
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<tr>
<td>– Evidence of sacral agenesis</td>
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</tbody>
</table>
Once history and examination have been completed, determine if any red flags are present. Red flags are abnormal findings on history and examination that point the an underlying organic disease process. Should any red flags be present, do not treat the patient for constipation but rather refer to the appropriate specialist services.
Actively exclude the following red flags, Constipation present since birth or first few weeks of life, Failure to thrive, Abdominal distension / Vomiting, Bloody stools, the presence of Pelvic abnormalities such as Sacral dimple covered by a tuft of hair, Sacral agenesis and Ano-rectal masse.
Look for abnormalities in the perianal area such as **Fistulae, bruising, multiple fissures, a Patulous anus or Anteriorly displaced anus.** Check for **Urinary Incontinence, Lower limb abnormalities** and a **Abnormal Abdominal Wall Musculature.**

<table>
<thead>
<tr>
<th>Red Flag</th>
<th>Possible Cause</th>
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<tbody>
<tr>
<td>Perianal</td>
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<tr>
<td>Fistulae, bruising, multiple fissures</td>
<td>• Inflammatory Bowel Disease</td>
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<tr>
<td>Patulous anus</td>
<td>• Spinal cord lesions</td>
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<td>Anteriorly displaced anus</td>
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<tr>
<td>Urinary Incontinence</td>
<td></td>
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<tr>
<td>Lower limb abnormalities</td>
<td>• Tethered Cord Syndrome</td>
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<td></td>
<td>• Spina Bifida Occulta</td>
</tr>
<tr>
<td>Abnormal Abdominal Wall Musculature</td>
<td>• Prune Belly Syndrome</td>
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</tbody>
</table>
Once you have excluded the presence of any red flags, you are most likely dealing with functional constipation. The first step in the management of functional constipation is to determine if there is any fecal impaction present.
In the majority of cases, the diagnosis of fecal impaction can be made on history and examination.
If fecal impaction is present, the child requires disimpaction before we can proceed any further.
At this point, I would like to explain the different classes of laxatives. Osmotic agents increasing the water content of stool and therefore making stool softer and easier to pass, as well as increasing colonic peristalsis. Examples are PEG substances such as pegicol and non-absorbable CHO such as lactulose and sorbitol.
Stimulant laxatives such as senna and bisacodyl act on the intestinal mucosa, increasing water and electrolyte secretion. They also stimulate peristaltic action.

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Osmotic and stimulant laxatives for the management of childhood constipation (Review)

Gusnerod M, Redlund-Johnell I
http://www.thecochranelibrary.com
### Classification of Laxatives

- **Lubricants**
  - Mechanism: Softens stool and decreases water absorption. More palatable if chilled
  - Examples
    - Mineral oil
    - Liquid Paraffin

- **Bulk Forming Agents**
  - Mechanism: bulk-forming agents increase stool bulk. The increased stool bulk then stimulates peristalsis.
  - Examples:
    - Fybogel

Lubricants Softens stool and decreases colonic water absorption for example liquid paraffin. Bulk forming agents contain undigestable fibre, which increase stool bulk thereby stimulating peristalsis example fybogel.
This is an example of an outpatient methods to perform fecal disimpaction. Start with a PEG solution such as pegicol. In Child 1–5 years: start with 2 sachets on 1st day, increasing to 4 sachets daily for 2 days, then 6 sachets daily for 2 days, increasing to a maximum of 8 sachets daily. In Child 5–12 years: start with 4 sachets on 1st day, then increased in steps of 2 sachets daily to maximum of 12 sachets daily. If no effect after 2 weeks, try adding a stimulant laxative such as senna.

If PEG is not tolerated, try substituting it with a stimulant laxative. If stools are still hard, add lactulose or sorbitol. An alternative is a combination of PEG solution and liquid paraffin. Should the child not respond to the above regime, then refer patient to an inpatient specialist management is required.
Once the child has been effectively disimpacted, you can proceed to treatment which includes education, diet, oral medication, the use of a stool diary and close follow-up.
Educate the family as a whole. Explain the pathogenesis of constipation and fecal soiling. Provide written information and possible sources of good quality information.
Ensure adequate fluids. Children between 1 and 13 years require between 1 and two liters of fluid intake.
Advise adequate fibre intake in the form of fruit, vegetables, high-fibre bread, baked beans and wholegrain breakfast cereals. Increase the intake of certain fruit juices which contain nature sorbitol.
Retraining of the bowel is essential to management. Regular, undisturbed time on the toilet after meals. Keep a diary or calendar of stool frequency and make use of positive reinforcement such as star charts. Encourage regular physical activity. In certain cases with severe behavioural problems, referral to a psychologist may be necessary.
Studies have shown that Children who received medications in combination with dietary intervention achieved remission significantly sooner than children who did not. Offer the following regimen for ongoing treatment or maintenance therapy. Start with a PEG solution as 1st line treatment for example Pegicol. In Child 1–6 years: give 1 sachet daily and adjust dose to produce regular soft stools (maximum 4 sachets daily). In Child 6–12 years: 2 sachets daily; adjust dose to produce regular soft stools. Consider adding a stimulant laxative if Pegicol is not working.
Avoid prolonged use of stimulant laxatives. Maintenance therapy may be necessary for many months. Be aware that relapses are frequent.
Follow Up

- Regular telephonic or face-to-face consultations
- Refer children with functional constipation that does not respond to initial treatment within 3 months

These children require Regular telephonic or face-to-face consultations. Consider referring children with functional constipation that does not respond to initial treatment within 3 months.
Should treatment be ineffective or relapses common, reassess child for the presence of red flags discussed earlier, check compliance, reemphasise the importance of diet and behavioural modification and consider trying a different class of laxative. If the child still does not respond to treatment, do the thyroid function test and serum calcium and refer patient to a paediatrician.
In children who respond well to treatment, continue medication for several weeks after regular bowel habit is established. Do not stop medication abruptly, wean over several months. Consider restarting for short durations if recurs.
So, how does our approach differ in children less than 1 year?

Approach to Constipation in a Child
Less than 1 year
The passage of meconium is an important factor when approaching constipation in a child <1 year old. In the case of constipation with a history of delayed passage of meconium, the patient should be referred for a suction biopsy to exclude hirschsprungs disease. Should the biopsy be normal, cystic fibrosis should be considered. In patients with normal passage of meconium, evaluated for the presence of any red flags. If no red flags present and child is exclusively breastfed, reassure parents that there is nothing to be concerned about and follow up patient closely. Normal BF infants may continue for days without passing stools. If the child is on a formula feed or weaning diet, treat for functional constipation. Educate parents, increase fluids with juices containing sorbitol and verify formula preparation. In certain cases, glycerine suppositories can be used with caution.
Actively exclude the following red flags, Constipation from birth, Failure to pass meconium/delay (more than 24 hours after birth, in term baby), Constipation that coincides with Changes in formula, particularly change to a cows milk based formula, consider cows milk protein enteropathy. Look for Recurrent vomiting (Bile stained), Abdominal Distension, Bloody stools.

<table>
<thead>
<tr>
<th>Red Flags</th>
<th>Possible Cause</th>
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<tbody>
<tr>
<td>• Constipation from birth</td>
<td>• Hirschsprung Disease</td>
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<tr>
<td>• Failure to pass meconium/delay (more than 24 hours after birth, in term baby)</td>
<td>• Cystic Fibrosis</td>
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<td>• Intestinal Malformation</td>
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<tr>
<td>Changes in infant formula</td>
<td>• Cow’s Milk Protein Enteropathy</td>
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<tr>
<td>• Recurrent vomiting (Bile stained)</td>
<td>• Intestinal Obstruction (Acute/Sub-acute)</td>
</tr>
<tr>
<td>• Abdominal Distension</td>
<td>• Intestinal webs, atresia</td>
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<tr>
<td>• Bloody stools</td>
<td>• Malrotation</td>
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<td>• Pyloric stenosis</td>
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</table>
Studies have shown that Prognosis is better the earlier treatment starts.
There is no standardised definition for constipation, however, diagnosis needs to include stool frequency, symptoms associated with defecation and history. Remember that organic constipation is dangerous and requires management of the underlying disease. In children under 1 year there is a greater risk of organic constipation.
Actively exclude red flags on history and examination. If ‘Red Flags’ present, do not treat constipation and refer child urgently.

The salient points in the management of functional constipation include:

Conclusion

- Exclusion of ‘Red Flags’ on history and clinical exam
  - If ‘Red Flags’ present, do not treat constipation and refer child urgently
- Mainstay of treatment
  1. Confirm constipation
  2. Disimpaction
  3. Maintenance
     - Educate
     - Diet
     - Bowel retraining
  4. Wean medication
- Treatment is often prolonged (months to years) and in some cases, can persist into adolescence
References


References


- Pijpers M, Tabbers M. *Currently recommended treatments of childhood constipation are not evidence based: a systematic literature review on the effect of laxative treatment and dietary measures*. Arch Dis Child 2009;94:117–131
prospective randomized, double-blind, controlled trial, 159 constipated children. receive either a fermented dairy product that contains B lactis DN-173 010 (n79) or a control product (n80) twice a day for 3 weeks. No significant difference between the experimental and control groups. There is currently not sufficient evidence to recommend fermented dairy products containing B lactis strain DN-173 010 in this category of patients

**Use of Probiotics in Functional Constipation**

- **Fermented milk containing Bifidobacterium lactis DN-173 010 in childhood constipation: a randomized, double-blind, controlled trial.** Tabbers et al.  

- **Systematic review of randomised controlled trials: Probiotics for functional constipation.** Chmielewska et al.  
  *World J Gastroenterology.* 2010 January 7; 16(1): 69-75