

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “**Constipation**” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

Constipation

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Introduction

Hello, and welcome to the PedsCases podcast on constipation. My name is Harrison Anzinger, and I am a second-year medical student at the University of Alberta. This podcast was made in collaboration with Dr. Jason Silverman, a pediatric gastroenterologist at the Stollery Children’s Hospital and Assistant Professor at the University of Alberta.

Constipation is commonly defined as the infrequent, difficult, painful, or incomplete evacuation of hard stools.⁽¹⁾ Constipation is a very common pediatric condition. It is estimated that 3% of visits to a paediatrician are in some way related to constipation and at least 25% of visits to a pediatric gastroenterologist are due to problems associated with constipation.⁽²⁾ However, many patients suffering from constipation do not seek medical assistance due to a misunderstanding of the condition. Symptoms can become chronic in up to a third of patients often due to delayed diagnosis and suboptimal treatment.⁽³⁾

This podcast will focus on developing an approach to constipation in children. After listening to this podcast the learner should be able to:

1. Understand the pathophysiology of constipation in pediatric patients.
2. Differentiate between organic and functional constipation, including red flags suggestive of organic pathology
3. Understand how to diagnose functional constipation in a pediatric patient from history and physical exam using the Rome IV guidelines.
4. Develop an approach to treating functional constipation in pediatric patients

Case

Let’s start with a case.

You are working in a primary care clinic. You see that your next patient is Phil, a 5-year-old boy with no significant medical history. Phil’s mother explains to you that since starting kindergarten earlier in the year, he has been having progressively worse periodic abdominal pain. When he has this pain he is cranky, refuses to eat, and has even vomited on a few occasions. She also explains that since starting school he has been having regular soiling accidents despite successfully potty training over a year ago. What could be causing these symptoms in a child like Phil? Could these symptoms be caused by constipation?

We will return to this case throughout the podcast.

Differential Diagnosis

Constipation can be subdivided based on etiology into organic and functional constipation. Organic constipation is caused by an underlying anatomical or physiological abnormality. In contrast, functional constipation is constipation in the absence of an organic cause.

We will begin by talking about functional constipation, which is responsible for the vast majority of constipation cases in children. Functional constipation commonly results from painful bowel movements often leading to behavioural changes with children withholding feces. ⁽¹⁾ Kids can develop large, hard stools, from inadequate dietary fibre or water intake, the transition to solid foods, reduction in physical activity, or simply from holding it in. ⁽⁴⁾ These large stools are painful to pass. Thus a cycle is created. A child does not want to have a bowel movement because it hurts or is inconvenient and withholds stool. Withholding leads to the stool remaining in the colon longer, resulting in more water to being drawn out of the stool due to colonic reabsorption. At the same time, more fecal material continues to be added, leading to bowel movements that are larger and harder, and hurting even more! And so the cycle repeats. A child with functional constipation may demonstrate “retentive posturing” to avoid defecation. Retentive posturing may be noticed as squatting, rocking, stiff walking on tiptoes, crossing the legs, or sitting with the heels pressed against the perineum. The child may also hide in a corner or be visibly straining to hold stool inside. ⁽¹⁾

Eventually the stool can become so large and hard that it becomes impacted, preventing feces from leaving the colon. With impacted stool, children may still have bowel movements every day, however these are typically small, hard like rabbit pellets, and represent only the tip of a very large iceberg. Sometimes the stool impaction can lead to a back-up of liquid stool, which can occasionally leak around the impacted stool, and come out as diarrhea. This overflow diarrhea may cause incontinence, also known as encopresis, in toilet-trained children. The presence of an increased fecal mass in the rectum may also cause the rectum to dilate, leading to decreased sensation and awareness of the need to defecate. Increased fecal size, and the passing of hard stools can lead to anal fissures which are painful and can cause rectal bleeding. While bleeding resulting from an anal fissure can alarm parents and children, the blood loss is limited and does not pose a risk to the child. ⁽⁵⁾ In summary, kids with functional constipation can present with hard infrequent stools. However, they can also have small daily stools, overflow diarrhea, fecal incontinence, and rectal bleeding! These symptoms can make the diagnosis of functional constipation quite challenging, and it is often missed.

While the majority of cases of constipation are functional, it is critical to consider organic causes of constipation. While rare, due to the possibility of serious underlying disease, an organic cause should be considered for all patients presenting with constipation. Any underlying pathophysiology that reduces or prevents the movement of feces through the colon can lead to constipation. The entire differential diagnosis of organic constipation is large and beyond the scope of this podcast. However, it's important to understand that organic constipation should be considered on your differential and may present with a diverse set of signs and symptoms. We will now briefly discuss several of the more common causes of organic constipation and the red flag signs and symptoms they may present with.

- Firstly, is Hirschsprung disease, which is caused by a congenital absence of ganglion cells in the distal rectum, preventing the rectum from relaxing. Hirschsprung often presents as failure to pass meconium within 48 hours of life. Hirschsprung disease should be considered in constipated children younger than 1 month, or if there is a family history.

- Next, we have Hypothyroidism can be congenital or acquired. It can present with a goiter, fatigue and poor growth, in addition to constipation.
- Celiac Disease is an autoimmune enteropathy caused by gluten exposure. It may present with abdominal pain, failure to thrive (FTT), and other GI symptoms such as vomiting, abdominal distention and anorexia. Celiac disease should also be considered if there is a family history.
- Next, Cystic Fibrosis is a complex multisystem disease of chloride transporters. It can presents with respiratory symptoms and GI symptoms such as failure to thrive, malabsorption and meconium ileus.
- Spinal cord anomalies such as spina bifida or tethered cord can impair the neurologic supply to the bowels. They may have other associated findings such as spasticity of the lower limbs, hyperreflexia or gait changes.
- Furthermore, Anorectal malformations such as imperforate anus or anal stenosis can cause constipation. These can often be seen on anorectal inspection. Anal stenosis may also present as thin, ribbon like stools.
- Lastly, several classes of drugs, such as opioids, antacids, antihypertensives, anticholinergic, and antidepressants are associated with constipation. ⁽⁶⁾

Now that we understand the underlying pathophysiology of functional constipation, and are aware of several organic etiologies, we will move on to developing an approach to the history and physical exam.

History

The objectives of the history and physical exam should be to

1. Establish constipation as the primary concern
2. determine if a fecal impaction is present.
3. Screen for a potential organic cause

The diagnosis of functional constipation is based on the Rome IV criteria, and can be made based on history and physical exam alone as long as no organic etiologies are suspected. To meet the Rome IV criteria, a child must meet 2 or more of the criteria at least once per week for at least one month. Furthermore, children with a developmental age greater than 4 must meet insufficient criteria for irritable bowel disorder.

The Rome IV criteria are as follows:

1. 2 or fewer defecations per week
2. History of retentive posturing or excessive stool retention
3. History of painful or hard bowel movements
4. Presence of large fecal mass in the rectum (fecal impaction)
5. History of large diameter stools that may obstruct the toilet if toilet trained.
6. At least 1 episode of incontinence per week after the acquisition of toileting skills
7. Lastly, after an appropriate evaluation, the patient symptoms must not be fully explained by another medical condition ^(5,7)

During the history a patient should be asked about the frequency and consistency of their stools, oftentimes patients and families can have a hard time describing their stools, so showing them a visual representation like the Bristol Stool Chart can make the conversation much easier. The Bristol stool chart is a method of standardizing stool description and displays a range of 7 stool shapes and consistencies. Type 7 stools are small hard “rabbit pellet” bowel movements. Type 1 stools are frank watery diarrhea, and there is a spectrum of stools in

between. The Bristol stool chart can be found along with the transcript of this podcast for reference at pedscases.com.

The type of stool passed may indicate the severity of constipation. A mildly constipated child may pass one type 2 or 3 stool every 2-3 days, while a more severely constipated child may pass small amounts of type 1 stool regularly with increased effort. However, the frequency of defecation in constipated children can vary significantly, and a decrease in fecal frequency does not need to be present to diagnose constipation. Even a child with daily bowel movement may actually meet criteria for functional constipation based on other important features. They may also have overflow diarrhea which can present as a type 7 watery stool, or encopresis. Always think about constipation when you see fecal incontinence in a previously toilet-trained child.⁽¹⁾ Ask about any pain with passing stool or straining. Ask about rectal bleeding. The bleeding in functional constipation typically presents as small amounts of blood seen on the toilet paper, however there can be more significant bleeding. Furthermore, ask if the child's bowel movements ever clog the toilet, as this is a good indicator for increased stool diameter. Changes in appetite or abdominal pain may also be present in constipation, which may decrease or disappear after the passage of stool. Constipation is one of the most common causes of chronic abdominal pain in children.

Additionally, a medication history should be taken, as several medications such as opioids, anticholinergics and antidepressants may cause constipation in children as previously discussed.

Be sure to review red flag symptoms such as passage of meconium in the first 48 hours of life, failure to thrive, poor growth, blood in the stools, perianal abnormalities and neurologic symptoms.

Next a general physical exam should be conducted.

A palpable fecal mass should be felt for on abdominal examination, or during a digital rectal examination. A visual inspection of the anorectal area should be completed for all patients to identify possible organic etiologies. While a digital rectal examination is not required to diagnose functional constipation, it may be useful if uncertain about the diagnosis, previous treatment has failed, or potential anatomical abnormalities are suspected.⁽⁵⁾

Children with functional constipation typically appear generally well. They are growing normally, and other than the possible presence of a palpable fecal mass, have few outward signs. Therefore, a complete physical exam is important primarily to identify red flags indicating an organic etiology.

In the absence of red flags, functional constipation is typically diagnosed on history and physical exam alone.^(1,9) While historically abdominal X-rays were used to assist in diagnosis of functional constipation, they are of low diagnostic accuracy and have little evidence to justify their use.⁽⁸⁾

Let's take a minute and go back to our case. Phil's mother tells you that Phil has been passing small rabbit-pellet feces after straining most days, and liquid stools several times per week

She mentions that Phil is very uncomfortable when he has his stomach pains. He often sits crossing his legs, and sometimes sits on his heels and rocks back and forth. Aha! you think...Sounds like retentive posturing!

You pull out your handy Bristol stool chart and Phil begins laughing hysterically. When asked about what his current stools look like he enthusiastically points at type 1 and type 6, and his mother rolling her eyes confirms.

Phil tells you it hurts when he goes to the bathroom. He also says he hates using the toilet at school with all his friends around.

The physical exam is mostly unremarkable, and you notice no red flags suggesting organic constipation. Phil has been growing and gaining weight steadily and appears well. You do appreciate a mass inferior to his umbilicus upon abdominal palpation. You note that Phil's spine and anus appear normal and no neurological deficits appear to be present. Phil's mother confirms that they have no family history of gastrointestinal disorders other than constipation. Phil is on no medication.

After synthesizing these findings, you believe that the most likely diagnosis for Phil is functional constipation. After confirming with your preceptor, you let Phil's mother know that you believe Phil is constipated.

"That can do this to you doctor? How do we fix it! I can't keep up with the laundry, it's driving me mad!"

Let's take another break from the case to discuss the treatment of functional constipation.

The goals of treatment are to generate 1-2 soft, painless stools per day and to prevent fecal impaction.⁽¹⁾ All patients require education on life style and diet changes that can reduce or even completely resolve constipation symptoms on their own. Some patients will also require more comprehensive medical management, involving daily stool softeners, and sometimes fecal disimpaction.

The first step in treatment should be educating the child and parent about the mechanism behind functional constipation.⁽¹⁾ By the time patients seek medical help constipation has often been a long lasting struggle in the child and parent's life. Thus, education should be positive and aim to build a systematic and long term plan to address the parents and child's concerns. Encopresis, in particular, should be addressed as it is often very alarming and confusing to parents and children. Parents should be reminded that their child has no control over overflow soiling and have often lost the sensation of needing to defecate due to their constipation. Children may not even know that they have soiled until they can smell it. While encopresis is extremely challenging, children should not be punished for accidents and encopresis and sensation will improve with treatment.

Furthermore, it is crucial to emphasise the long-term management needed to treat constipation. Realistic goals should be set and regular follow-ups booked. Parents should be reminded that while treatment can last for months to years, it will not last forever and that the medications used do not induce dependence in the bowel.

Behavioural modification:

Behavioral modification is a cornerstone of constipation management. Toilet trained children should be started on a toileting regimen to promote healthy stooling habits.⁽¹⁾ A constipated child should have a routine of sitting on the toilet for 3-10 minutes dependent on age, two to three times per day after eating. After eating is often the best time as the gastro-colic reflex leads to peristalsis. Many people recognize this sensation after their morning coffee. This time should be “focused”, not involving the use of books, technology, or other distractions that may prevent a child from focusing on passing stool. After defecating, a child should be encouraged to remain on the toilet for 1-2 minutes to ensure a complete void of the bowels has occurred. The child should also have a footstool to improve the effectiveness of the Valsalva maneuver and put them in a more physiological position for defecating. It is important to focus on the habits, rather than the outcomes. A child should never be punished for not stooling during these times. Praise and reward for following through on the scheduled toilet visits may help reinforce the habit. Praise and positive comments for improved bowel movement frequency and decreased accidents are also helpful.

It is often more difficult to modify the behavior of children not yet toilet trained.⁽¹⁾ The child has learned that stooling is painful, thus something to be avoided. Diet changes and medical management should remove the pain associated with stooling, but the child must relearn that defecating is a good and painless process. The child should be encouraged when showing retentive posturing and praised when attempting to or successfully stooling. The child may also be placed or encouraged into a squatting position to make stooling easier. Parents or caregivers should also refrain from using negative words when referring to stool such as “stinky” or “dirty” as that may make the child reluctant or feel bad about stooling.⁽⁴⁾ Toilet training should not be attempted until the constipation is adequately controlled and should not be forced before child readiness, as this significantly increases the chance of recurrence.

Dietary modifications:

After behavioral modification the next cornerstone to treatment is dietary changes. Constipated children should eat a well-balanced diet containing whole grains, fruits, and vegetables which meets the recommended intake of fiber for all children of 0.5g/kg/day. While fiber intake below the recommended amount is a risk factor for constipation, there is insufficient evidence to recommend supplementing a constipated child's diet with fiber above the recommended amount. Constipated children should also be allowed to consume regular amounts of cow's milk during initial therapy. However, since excessive cows milk consumption, or cows milk allergy may exacerbate constipation, if the child's constipation is resistant to treatment, a milk free trial may be helpful.⁽¹⁾ To avoid unnecessary dietary restriction, it is important that this trial be time-limited (2-4 weeks) and discontinued if not clearly beneficial. If it does appear to be helpful, appropriate dairy alternatives should be introduced to avoid nutritional deficiencies.

Maintenance:

Laxatives are the next line of therapy if diet and lifestyle changes are not enough on their own to achieve 1-2 soft painless stools per day.^(1,9) While many laxatives are available, the preferred medication is Polyethylene glycol 3350 without electrolytes, which I will refer to as PEG for the remainder of the podcast. PEG is an osmotic laxative that draws water into the bowels to make stools softer. It is reassuring to tell parents that PEG is not systemically absorbed and unlike stimulant laxatives, does not lead to dependence or “lazy bowels.” PEG is a tasteless, odourless powder that can be dissolved in any beverage. PEG should be started at a dose of 0.4 to 1g/kg/day and titrated up or down every 2-3 days until the desired goal is achieved. The most common reason for lack of response to PEG is inadequate dosing. Thus, physicians and

parents should not be afraid to increase the dose as required. PEG can be given in one dose per day and has been shown to be better tolerated than other oral laxatives. PEG has been extensively tested in children and adults and safely used in children for over a decade. The side effects are typically minor and include bloating, flatulence, abdominal pain and loose stools. Lactulose may be used as a second line therapy, using 1 to 3 mL/kg/day in divided doses. Lactulose can cause abdominal cramps and bloating which may decrease patient adherence. Lactulose should also be titrated to the desired effect of 1 to 2 soft, painless stools per day.

Disimpaction:

If fecal impaction is present, as indicated by the history or physical exam, it is essential to clear the colon. This step is critical as failing to resolve fecal impaction before giving maintenance stool softeners can worsen overflow incontinence and fail to adequately treat the child's constipation. Disimpaction is typically achieved using high dose laxatives such as Pico-salax or PEG.

Pico-Salax is a stimulant and osmotic laxative consisting of a mixture of a stimulant laxative called sodium picosulfate and an osmotic laxative, magnesium oxide. For fecal disimpaction using Pico-Salax, half to one sachet is dissolved in approximately 150 mL of clear fluid and given once in the morning and once in the afternoon.⁽⁶⁾ It is essential that each Pico-Salax dose be followed by 1 to 2L of fluid over the next 4 hours to get the desired effect. If the child is not fully cleared after the first day, it may be repeated the next day.

PEG in high doses is also very effective and well tolerated in pediatric patients for fecal disimpaction. PEG is given over three days at a dose of 1 to 1.5g/kg/day up to a maximum dose of 100g/day. However, the requirement of multiple days of treatment may decrease adherence. Regardless of the method used for disimpaction, fluid intake must be increased to avoid dehydration.

Follow up:

Regular follow-ups are essential to ensuring adequate treatment and continued bowel health. If stool softeners are needed, they often must be taken for months or years to promote soft daily stools and prevent a relapse. Children requiring medical management for constipation should be treated for a minimum of two months and until they have one to two bowel movements daily without difficulty for at least 1 month. Children should always be weaned from maintenance therapy and never stopped abruptly as this greatly increases the chance of recurrence.⁽⁹⁾

Children in the developmental stage of toilet training should remain on maintenance therapy until successful toilet training is achieved.

If the medical, behavioral, and dietary changes have failed to resolve the patient's functional constipation, or an organic etiology is suspected a consult to a pediatric gastroenterologist should be considered.⁽¹⁾

Now that we have developed an approach to treatment let's finish off with our case.

You explain that since it hurts when Phil stools, he has learned to hold it in to avoid this pain. This has only been made worse by his reluctance to use the toilets at school. You inform Phil's mother that all of his backed up stool has created a block in his bowels. Liquid stool can flow around this old dry stool and come out without Phil even realizing. You let Phil's mother know that constipation is a common problem in kids and that you have excellent ways to treat it.

You explain that the first step will be to focus on Phil's bowel habits. Phil should be encouraged to sit on the toilet after eating for 3 to 10 minutes without any distractions twice a day, so he can focus on having a bowel movement. You encourage her to keep giving Phil a well-balanced diet of whole grains, fruits and vegetables, and that it will be unnecessary to stop dairy or supplement his fiber intake above what he gets in his diet. Lastly, to get Phil's constipation under control his bowels will need to be cleared of the impacted stool using Pico-Salax or high-dose PEG. Phil will then need to be placed on stool softeners at a dose where he has one to two soft, painless stools per day. You inform her that the dose you start Phil on may not be right for his body and that she should feel free to increase or reduce the dose every 2-3 days until the desired effect has been reached.

Lastly, you book a follow-up appointment and let her know to call the clinic if she has any problems until then.

Phil's mother initially has an overwhelmed look on her face but looks relieved when you give her a pamphlet with all the information on it. Phil notices the Bristol stool chart on the back of the pamphlet and starts giggling again.

"Thanks, Doctor, I really hope this helps. Hopefully, we can get out of this stinky situation."

Conclusion/Summary

If you are like me, you are probably feeling overwhelmed with information. Let's take a minute to summarize the key points from the podcast.

1. Functional constipation is by far the most common form of constipation in kids. It is often caused by purposeful retention to avoid painful stools or to avoid using the toilet. Functional constipation is diagnosed on history and physical exam based on the Rome IV guidelines
2. While organic constipation is rare, it should be screened for on history and physical exam to avoid missing underlying pathology.
3. The treatment of functional constipation involves education, fecal disimpaction, maintenance therapy with stool softeners, behavioural modifications, and dietary modifications. The goal of treatment is to have 1 to 2 soft, painless stools per day.
4. Constipation is often a chronic problem. Patients should be followed up regularly to ensure continued success and prevent recurrence.
5. If treatment for constipation is unsuccessful or an organic cause of constipation is suspected, refer to pediatric gastroenterology.

Thanks for listening!

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