

Management of gastroesophageal reflux disease in pediatric patients with cerebral palsy

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Abstract

Question As a family physician who provides care to a large pediatric population in the community, I see children with various neurologic impairments, many with cerebral palsy (CP), presenting with gastroesophageal reflux disease (GERD). What are the current recommendations to manage GERD in pediatric patients with CP?

Answer A variety of lifestyle modifications can be used to manage GERD in pediatric patients with CP, including raising the head of the patient's bed, reducing patient weight, limiting exposure to smoke, and avoiding caffeine, spicy foods, fatty foods, and chocolate. The primary pharmacologic treatments currently recommended are histamine-2 receptor antagonists and proton pump inhibitors. Surgical treatments for GERD, like the Nissen fundoplication, might result in complications, so there is ongoing research looking at the benefits of using high-pectin diets, baclofen, and prokinetic agents like mosapride instead.

Gastroesophageal reflux (GER) is the movement of gastric contents up past the lower esophageal sphincter (LES) and into the esophagus.¹ Gastroesophageal reflux disease (GERD) specifically refers to symptoms of complications that are a result of GER, such as dysphagia, dental erosions, poor weight gain, and vomiting,^{1,2} and has an annual prevalence of 10% to 15%.³ Reflux is common in infants, ranging from 50% in 3-month-old infants to 5% in those 10 to 12 months old.¹ The predominant mechanism underlying the early prevalence of GER is transient LES relaxation (TLESR).^{2,4} Reflux in infants generally resolves by 12 months of age, as children stay upright more often, eat more solid food, and have improved LES muscle tone.¹

Children with cerebral palsy and GERD

Cerebral palsy (CP) is a neurologic disorder resulting in movement and postural limitations, including poor head control and hyperreflexia,⁵ and is commonly associated with GERD (15% to 77%).⁶⁻⁸ Factors that contribute to this high prevalence stem from the fact that many patients with CP are in a chronic supine position, have scoliosis that displaces the stomach and stretches the LES, and have increased intra-abdominal pressure from spasticity.⁹ Anticonvulsants, often used to manage CP, might also increase nausea, vomiting, heartburn, and dysphagia, all of which might exacerbate the severity of GERD.⁹

Diagnosing GERD in patients with CP

In school-aged children and adolescents without neurologic impairment, GERD might be diagnosed based on clinical symptoms, such as heartburn, dyspepsia, epigastric "burning pain," and regurgitation.¹⁰ In younger children, esophageal pH can be monitored to detect episodes of acid reflux; however, it cannot detect nonacidic

or weakly acidic episodes of reflux.¹⁰ A recently developed method to measure GERD is the multichannel intraluminal impedance monitoring technique.¹¹ It is useful for diagnosing reflux in children with CP, as it measures both the pH value and the retrograde or anterograde bolus transport in the esophagus, thereby allowing the detection of all episodes of reflux over a 24-hour period.¹²

Effects on quality of life

A study using the Pediatric Quality of Life Inventory, a self-reported questionnaire that measures physical, emotional, social, and school functioning in children aged 5 to 18, found significantly lower scores in 40 children with GERD compared with 41 healthy children ($P < .001$).¹³ Furthermore, GERD might negatively affect those in the circle of care, as the quality of life of parents of children with GERD was decreased when measured as a component of the Children's Eating Behavior Inventory.¹⁴

Nonpharmacologic treatment options

There are various nonpharmacologic management strategies for GERD. Raising the head of the bed, reducing weight, limiting secondary exposure to smoke, and avoiding caffeine, spicy foods, fatty foods, and chocolate can all help to lower episodes of reflux and prevent further complications.^{1,15} In a study of 18 children with CP who were fed through a nasogastric tube, food thickening, specifically the addition of pectin at a high concentration, significantly reduced reflux episodes ($P < .05$) and the duration of the longest reflux episode ($P < .05$) as compared with a low-pectin diet.¹⁶ Furthermore, the study also found that the pH value in the lower and upper esophagus was below 4 for a significantly shorter time with a high-pectin diet compared with a non-pectin diet ($P < .01$).¹⁶

Pharmacologic treatment options

Evidence for short-term use of antacids (which neutralize gastric acid) and mucosal protectants (like sodium alginate, forming a protective layer over gastric contents) is very limited.^{1,2} A study from the early 1990s on infants aged 0 to 24 months taking aluminum-containing antacids found that plasma aluminum levels were 9 times higher than in infants not taking aluminum-containing antacids ($P < .005$); aluminum toxicity has been linked to microcytic anemia and osteomalacia.¹⁷ As for mucosal protectants, most studies have been conducted in adults, so there are insufficient data to support the use of mucosal protectants in chronic GERD among children.^{1,2} A 2018 prospective observational study using alginates to treat GER in infants found a significant decrease in the total number of reflux episodes ($P < .001$), as well as in episodes of crying or fussing, cough, and regurgitation ($P = .00012$, $P = .005$, and $P = .04$, respectively), when compared with baseline.¹⁸ Owing to a lack of studies looking at the use of antacids and mucosal protectants in managing GERD in pediatric patients, the 2018 Pediatric Gastroesophageal Reflux Clinical Practice Guidelines, published jointly by the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN), recommend against their use in managing chronic GERD in this population.¹⁹

Acid suppressants are one of the main pharmacologic agents used to manage GERD in pediatric patients, with histamine-2 receptor antagonists (H_2 RAs) and proton pump inhibitors (PPIs) as the mainstay of therapy.^{1,15} Reducing stomach acid levels prevents damage to the esophagus even if reflux occurs.¹ Histamine-2 receptor antagonists, although effective in reducing gastric acid secretions, become increasingly ineffective within 6 weeks of initiating treatment (tachyphylaxis).²⁰ This might be due to changes in the sensitivity of H_2 receptors, changes in H_2 receptor turnover, and an increase in receptors for other mediators of acid secretion (eg, gastrin),²⁰ and therefore H_2 RAs are not a viable long-term option for GERD.¹⁵

Proton pump inhibitors, on the other hand, are a more potent class of acid suppressants. A 2013 study examined the effect of PPIs on 3 types of reflux (acidic, weakly acidic, and weakly alkaline reflux) in 21 children (average age of 10.5 years), 6 of whom had CP.²¹ The number of weakly acidic reflux episodes increased, but there was a significant decrease in the number of acidic reflux episodes ($P < .01$) when compared with the pre-PPI treatment period.²¹ The 2018 guidelines by NASPGHAN and ESPGHAN suggest using a 4- to 8-week course of either H_2 RAs or PPIs for treating GERD symptoms and regularly assessing the need for long-term acid suppression therapy.¹⁹ A retrospective cohort study of 166 patients taking PPIs assessed the safety of long-term use and

reported adverse events in only 4 (2.4%) patients.²² The 166 patients received PPIs for up to 11 years, with most of them (141 of 166) receiving them for up to 5 years, so they can be considered safe for long periods of time.²²


Prokinetic agents lower the rate of reflux by promoting an increased rate of gastric emptying, improving esophageal peristalsis, and increasing LES pressure.¹ Cisapride, a serotonergic agonist that had promising benefits, was removed from the market in 2000 because of documented arrhythmias.²³ Metoclopramide, a similar agent, received strong warnings against its use owing to the risk of tardive dyskinesia.²⁴ The gastric-motility enhancers erythromycin, domperidone, and bethanechol did not consistently demonstrate reduced frequency of reflux and likely should not routinely be used.¹ Mosapride, another prokinetic agent, was used in a single trial for 8 weeks for GERD treatment among 11 children with neurologic impairment, 6 of whom had CP.²⁵ Both the number of long acid reflux episodes ($P = .002$) and the duration of acid reflux episodes ($P = .002$) decreased significantly, with a favourable safety profile.²⁵ Esophageal clearance, the time taken to clear esophageal contents, also decreased significantly after treatment ($P = .02$).²⁵ A larger sample size is likely needed for further recommendations.

Baclofen, a γ -aminobutyric acid receptor agonist, reduces TLESR episodes.²⁶ In one study, 8 children with neurologic impairment, 4 of whom had CP, were given baclofen 3 times daily for 7 days with 24-hour esophageal pH monitoring before and after therapy, showing significant reduction in acid reflux episodes ($P = .01$).²⁶ In a randomized, double-blind, placebo-controlled study with 30 children with severe GERD, there was a significant reduction of TLESR and acidic GER episodes among those who received baclofen compared with those in the placebo group ($P < .05$), with only a few participants reporting side effects like shortness of breath and fatigue.⁴ It also had a significant effect on the rate of gastric emptying ($P < .05$), as measured by a ^{13}C -octanoate breath test, which further reduced the risk of reflux episodes.⁴ However, owing to side effects such as dizziness, fatigue, and a lower threshold for seizures seen in adults, the 2018 guidelines by NASPGHAN and ESPGHAN suggest that baclofen should only be considered in children if other pharmacologic treatments have failed.¹⁹

Surgical option

Neurectomy, wrapping the stomach fundus around the lower end of the esophagus to increase pressure on the LES, is the criterion standard surgical option for pediatric patients when pharmacologic therapy fails.¹⁵ However, the complication rate in children with neurologic impairments (12.8%) is higher than in the general population (4.2%), so judicious use of this technique is needed.²⁷

Conclusion

Gastroesophageal reflux disease is a common sequela in children with CP. There are various nonpharmacologic methods to alleviate symptoms, like avoiding certain foods or changing posture, and more research is being done on the effectiveness of various pharmacologic therapies. Current guidelines suggest using a trial of PPIs to confirm GERD if there is a high clinical suspicion; guidelines on the care of adult patients with intellectual and developmental disabilities recommend screening for GERD annually.²⁸ Nissen fundoplication is the preferred surgical option for GERD that is resistant to pharmacologic therapy. High-pectin diets, baclofen, and prokinetic agents like mosapride decrease reflux episodes with minimal side effects, but more trials are needed to identify long-term benefits. 

Competing interests

None declared

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