CASE STUDY

Resolution of Chronic Gastroesophageal Reflux Disease and Constipation in an Infant Following Chiropractic to Reduce Vertebral Subluxation: A Case Report & Review of the Literature

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Abstract

Objective: To describe the chiropractic care of an infant suffering from persistent acid reflux and constipation.

Clinical Features: A two-month-old female was experiencing severe acid reflux and constipation since birth. Her pediatrician prescribed Prilosec for her acid reflux which did not resolve the problem. The infant was characterized as unable to eat without spitting up, unable to sleep because of pain and was visibly straining and in pain while trying to defecate. The pediatrician recommended Miralax for the constipation, but the mother was hesitant to start her daughter on it. The patient's mother indicated compromised quality of life and sleep.

Intervention and Outcome: The patient was cared for with spinal adjustments characterized as "touch and hold" appropriate for the child's age along with use of the Activator Instrument. The infant attended a total of 12 visits over a period of 6 weeks with the chiropractor addressing subluxations at the atlas and thoracic spine and ilium. The patient's presenting complaints resolved under chiropractic care.

Conclusion: This case report provides an educational vehicle and evidence on the successful chiropractic care of infants with a history of medical care for GERD. We encourage continued documentation of similar cases in the scientific literature to inform practice and research.

Keywords: *Gastroesophageal reflux, GER, GERD, constipation, vertebral subluxation, adjustment, pediatric*

Introduction

A number of case reports have described the successful chiropractic care of infants suffering from gastroesophageal reflux disease or GERD. Gastroesophageal reflux (GER) or acid reflux is a common occurrence in infancy with up to 65% of infants regurgitating their stomach contents at least once a day at age of 3 to 6months. According to Hegar et al.[1], in a majority of infants (i.e., 95%) this problem will resolve spontaneously by 1 year of age. When a child suffers from frequent episodes of acid reflux, parents take their child to a pediatrician. As we have seen in previous publications, a common medical approach to patient care (and counter to prescribed medical guidelines) is the prescription of some type of anti-GER medications. As we will discuss further in this report, there is growing evidence that these medications for infants and children have debatable effectiveness and safety. Not surprisingly, parents turn to alternative therapies such as

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chiropractic. Of the practitioner-based non-allopathic approaches to patient care, chiropractic is the most popular and highly utilized.[2-3] Towards continuing efforts to provide evidence on the success of chiropractic in the care of infants and children, we describe the successful chiropractic care of an infant suffering from persistent GER.

Case Report

History

The patient was a 2-month-old female presented by her parents for chiropractic consultation and possible care with a chief complaint of severe acid reflux and constipation. According to her mother, her daughter's clinical presentation began at birth and noticeable at one week of age. The infant was taken to a pediatrician at 2 weeks of age and was prescribed Prilosec to address her acid reflux complaint.

According to the patient's mother, the Prilosec provided only temporary and minor relief, but the acid reflux would return and has worsened if she goes without the medication. The patient's mother indicated that her daughter continued to experience intense spitting up particularly without the medication. According to the infant's mother, nothing seems to be helping at the time of clinical presentation. The infant was characterized as unable to eat without spitting up, unable to sleep because of pain and was visibly straining and in pain while trying to defecate.

According to the infant's mother, the pediatrician recommended Miralax for the constipation, but the mother was hesitant to start her daughter on it. The acid reflux was characterized as constant during the day and preventing the infant from sleeping more than 30 minutes to an hour at a time. The patient's mother also indicated that due to their daughter's problems, they were desperate for help. She indicated that her own quality of life and sleep was disturbed. She was unable to care for her oldest daughter as well due to amount of attention the infant of interest required. Other notable history examination findings include denial of seeking any other forms of healthcare besides the infant's pediatrician and were recommended chiropractic care from the infant's maternal grandmother as she was a chiropractic patient.

Examination

On physical examination, the infant appeared visibly agitated. The infant's parents and grandparent indicated that the infant refused to be held or lay on her back. They indicated that the infant would cry and scream in agony when touched on the back. Upon digital palpation of the infant's spine, the patient winced when palpated on the right side of her thoracic spine. She started to cry during the examination.

Her extensor muscles appeared hypertonic on the right side. Passive range of motion (ROM) indicated no apparent ROM deficits observed. Orthopedic testing included Barlow's Test and the Ortolani's Test that were negative. Neurological testing performed included the rooting reflex, grasp reflex, Babinski's reflex, and step reflex. All were intact and unremarkable. Subluxation findings indicated a right lateral atlas (i.e., ASR; -θX,-X), the T_2-T_7 functional spinal unit as body right (i.e., +θY) and the right ilium as subluxated posterior and inferior (i.e., PI ilium; -θX).

Intervention & Outcomes

With parental consent, a course of care was scheduled at 3 times a week until improvements in the patient's presenting complaints were observed. Thereafter the patient was scheduled to twice a week of care. After 2 weeks of no symptoms or physical restrictions (i.e., resolution of symptoms), the patient was scheduled to once a week to address residual subluxation and then eventually transitioned wellness care.

For the patient's cervical adjustment, a "touch and hold" adjustment on the infant's right atlas was applied with a lateral to medial line of drive. The infant's cranial bones were also examined and found unremarkable. To address the infant's subluxation in the thoracic spine and ilium, the activator instrument was utilized. The T_5 vertebral body (i.e., body right; +θY) and the right ilium (i.e., PI ilium; -θX) was adjusted initially with the Activator 4 instrument on a #1 setting.

The patient completed 12 visits over the course of 6 weeks. She is currently on wellness care. After receiving the first set of adjustments, the parents observed that their child seemed more peaceful, was able to be held while feeding and slept through the night continuously for a 6-hour period. The infant's parents were enthusiastically optimistic about their daughter's future appointments. After the infant's 3rd set of adjustments, the patient was no longer straining to have a bowel movement and her mother noted that the bowel movements were "more regular."

After her 4th and 5th visit, the infant's parents made the decision that their daughter no longer needed the prescribed Prilosec medication and took her off of the medication under the supervision of the infant's pediatrician. The patient progressed through the rest of her chiropractic care without the need for medication with only minor "spit ups". The infant's constipation also resolved. The patient was also able to sleep throughout the night at 5-6 hours at a time. Long-term follow-up found continued resolution of the infant's initial clinical presentation.

Discussion

The case reported presents a number of topics noteworthy for discussion. Beyond the obvious discussions on the epidemiology of the infant's clinical presentation and the effectiveness of chiropractic care, we find ourselves examining the medical approach (i.e., off-label prescribing) to patient care in such a young infant and the impact the results of care have on the quality of life of her parents and family members. The clinical presentation, diagnosis and epidemiology of GERD and constipation have been addressed by other authors in this Journal.[4-5] We recommend the reader access the referenced articles on this subject.

As in the case presented, the medical diagnosis of GERD is often made clinically based on the bothersome symptoms (i.e., recurrent regurgitation with/without vomiting weight loss or

poor weight gain, irritability in infants) or signs (i.e., feeding refusal) that may be associated with GER. However, the signs and symptoms for GERD are often unreliable and non-specific in infants and children younger than 8 years of age are nonspecific. A working diagnosis of GERD is made when there is excessive frequency or duration of reflux events, esophagitis, or a clear association of signs and symptoms with acid reflux events in the absence of alternative diagnoses.[6] Furthermore, according to the North American Society for Pediatric Gastroenterology Hepatology and Nutrition and the European Society for Pediatric Gastroenterology Hepatology and Nutrition, there is no evidence to support an empiric trial of pharmacologic treatment in infants and young children as a diagnostic test of GERD.[6] Insofar as we can infer, the medical care of this patient and in other cases reported similarly, the medical practice guidelines as set forth by the these two groups have not been followed.[7]

The infant in the case was medically prescribed Prilosec. Prilosec is the marketing brand for omeprazole, a proton pump inhibitor (PPI). Chung et al.[8] reviewed the literature to determine the association between acid-suppressive medications and serious adverse effects in infants and children. The investigators found 14 studies meeting their inclusion criteria. The majority of studies found a significant association between acid-suppressive medications and the risk of necrotizing enterocolitis, sepsis/bacteremia, pneumonia, and gastrointestinal infections in infants and children. According to Chung et al., given the questionable efficacy of H_2 antagonists and proton pump inhibitors (PPIs) and the growing evidence of increased risk of serious infections, acid-suppressive medications should be used cautiously in infants and children suspected of having acid reflux or GERD.

More recently, Cohen et al.[9] reviewed the reported adverse events (AEs) of pharmacological agents used in the treatment of GERD in the pediatric population. Their search strategy included the following keywords: omeprazole, esomeprazole, lansoprazole, pantoprazole, rabeprazole, rantidine, cimetidine, famotidine, nizatidine, domperidone, metoclopramide, betanechol, erythromycin, baclofen, alginate and Pubmed's own filter of: "child: birth-18 years".

Only RCTs were retrieved for their review. Specific to the PPIs and particularly with omeprazole, Cohen et al., found the prevalence of at least one AE was 34% (N=108). These include: abdominal pain in 0.6% (N=2); eczema in one (0.3%); nausea, vomiting or regurgitation in 9.7% (N=31); pharyngitis in 5.3% (N=17); irritability in 0.9% (N=3); flatulence in 0.3% (N=1); somnolence in 0.9% (N=3); constipation in 1.9% (N=6); arthralgia in 0.9% (N=3) and headache in one patient (0.3%). The authors concluded that the use of prokinetic agents for infants with a working diagnosis of GERD have many adverse effects, without major benefits to support their routine use.

Constipation

The majority (i.e., about 95%) of pediatric chronic constipation is functional rather than due to an organic cause such as structural or endocrinological dysfunction or metabolic disease. The pathophysiology underlying functional constipation (FC) is multifactorial and currently not fully understood, even if a withholding behavior following painful defecation is considered one of the main factors leading to the onset of the disorder.[10] The medical approach to the care of infants with FC is a combination of dietary interventions, toilet training and oral laxatives.[11]

In terms of laxatives, the most popular and highly recommended in their use in infants and children is polyethylene glycol (PEG). For the infant presented in this case report, her pediatrician prescribed Miralax. The active ingredient in Miralax is Polyethylene glycol 3350 (PEG 3350).

Despite support for the safety and effectiveness of PEG[12-13], recent times have placed this into question. As an aside, we point to the reader the findings by Kuizenga-Wessel et al.[14] These investigators systematically assessed how definitions and outcome measures were defined in therapeutic randomized controlled trials (RCTs) involving children ≤4 years old with a clear definition of FC.

Kuizenga-Wessel et al. found that all of the trials meeting their inclusion criteria used non-validated parental diaries with different definitions and outcome measures. Overall, there was a lack of well-designed therapeutic trials in infants with constipation. This points to the questionable effectiveness of PEG. In terms of the questionable safety of PEG, van der Wulp et al.[15] found that PEG treatment changes the intestinal bacterial composition, decreases the bacterial dehydroxylation of primary bile salt and the metabolism of cholesterol as well as increasing the pool size of the primary bile salt cholate in rats.

Gorkiewicz et al.[16] found profound changes in microbial community structure related to PEG-induced osmotic diarrhea that were similar to those observed in other GI disorders such as inflammatory bowel syndrome.

Cuperus et al.[17] postulated that PEG may change the intestinal milieu by accelerating the passage of luminal contents and by increasing the luminal water content, change the intestinal microflora of the gut.

For the child presented here, readers may have inferred or suspect that the constipation experienced by the infant may be as a result of the prescribed Prilosec. As mentioned previously, Prilosec is associated with constipation as an adverse event. As such, the effects of chiropractic care are two-fold in regards to this child's care. One, chiropractic care mitigated the child's constipation complaint and two, as a positive consequence of chiropractic care, the infant's acid reflux improved and she was no longer dependent on Prilosec to abate her symptoms.

Based on a recent review by Egan and Alcantara[18], this is one of the youngest patients described as benefitting from chiropractic care with a chief complaint of persistent acid reflux. Barnes[19] described a three-month old infant also suffering from GERD. The care provided was Applied Kinesiology utilizing full-spine care, abdominal myofascial massage, and use of corrective Kinesio Taping.

Rollette and Monroe[20] described a one-month-old infant with acid reflux secondary to a primary complaint of infantile colic.

The infant was not responding to previously prescribed medication, resulting in 12-18 acid reflux episodes per day. The patient was described as also crying incessantly, resulting in deprivation of sleep for the infant and his parents. We are of the opinion that since infantile colic is a "waste-basket" diagnosis (i.e., a diagnosis of exclusion), the child presented by Rollette and Monroe[20] may have suffered from repeated acid reflux with infantile colic as a consequence. As in the case presented, we note similarities in the subluxation pattern addressed by Rollette and Monroe[20] at theC_1 and T_4 vertebral bodies and the sacrum using Diversified Technique.

In 2014, the brothers Alcantara[21] performed an integrative review of the literature on the chiropractic care of infants and children with constipation to inform clinical practice. The authors found 14 case reports, one case series, and one review of the literature. In total, 17 children (11 female: 6 males) were described as benefiting from chiropractic care. They ranged in age from 2 weeks to 8 years.

All presented with chronic constipation with the oldest subject (i.e., 8 years of age) suffering from constipation since birth. Medical care consisting of prescribed laxatives (i.e., Miralax) and suppositories, increased fluid intake and a high fiber diet that were reported by the children's parents as ineffective. Improvement in the subjects' constipation was reported following chiropractic care. An additional 5 manuscripts were found describing children with constipation as a secondary complaint. No less than a total 10 different techniques were described, all applied on an individualized care basis.

Our update of the literature (i.e., years 2008-2018) using similar search strategies (i.e., Pubmed, Index to Chiropractic Literature and MANTIS) and inclusion criteria resulted in the following narrative. Wilson and Duncan[22] recently published their case report on the care of a 5-year-old suffering from constipation augmented with a review of the literature. An additional 10 case reports have been published describing the successful care of infants suffering from chronic constipation.

In terms of quality of life, Varni et al.[23] utilized the Pediatric Quality of Life Inventory 4.0 Generic Core Scales in a 9-site study by 689 families with children diagnosed with chronic constipation, functional abdominal pain, irritable bowel syndrome, functional dyspepsia, Crohn's disease, ulcerative colitis, and GERD. The healthy control sample included 1114 families. The outcome measure examined school days missed, days in bed and needing care, parent missed workdays, work impact, and healthcare utilization were compared as well.

Varni et al. found that patients with an functional gastrointestinal disease (FGID) or organic gastrointestinal disease (GI) demonstrated lower health-related quality of life than healthy controls across all dimensions that include physical, emotional, social, and school performance and activities. Patients with an FGID or organic GI disease missed more school, spent more days in bed and needing care, had greater healthcare utilization, and had parents who missed more workdays that affected their work.

As was evident in the case present, parents experience a great deal of emotional distress due to their child suffering from the signs and symptoms associated with chronic acid reflux and/or GERD. In addition, many parents are faced with the hardships of paying for the care of their child. Oftentimes, the family feels helpless and anxious, since they also need to meet domestic and personal needs, which remain in the background. Many times, the high cost of diet with specific foods, and the costs of medications or alternative therapies such as chiropractic care can affect adherence to their child's healthcare.[24-25] This topic requires further attention with research.

In closing, we comment on the generalizability of the case described. The post-positivist paradigm of research[26] has an ontology of materialism and epistemology that prescribes a paradigm of objectivity. Based on this paradigm, the generalizability of case reports is lacking due to confounding effects that may lead to bias. These include the national history and spontaneous remission and regression to the mean, the effects of placebo, the demand characteristics of the therapeutic encounter and subjective validation on the part of the patient.

Conversely, we aspire to the clinical and research framework of constructivism.[27] This philosophy of research has an ontology based on individual perception and an epistemology that emphasizes the meaning from human experience. We believe this is more congruent with clinical practice. As chiropractors and a profession of healthcare, we learn from our individual and collective experience in the care of patients.

This is congruent with evidence-informed practice where clinical decision making takes into account the published literature, the clinical expertise/experience of the healthcare provider and the needs and wants of the patient.[28] Therefore, we espouse to the philosophy of constructivism and encourage the readers of this case report to interpret the results reported in the context of their clinical experience in the care of similar patients.

Conclusion

This case report provides an educational vehicle and evidence on the successful chiropractic care of infants with a history of medical care for acid reflux. We encourage continued documentation of similar cases in the scientific literature to inform practice and research.

References

1. Hegar B, Dewanti NR, Kadim M, Alatas S, Firmansyah A, Vandenplas Y. Natural evolution of regurgitation in healthy infants. Acta Paediatr 2009; 98: 1189-1193.
2. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. Natl Health Stat Report. 2008;(12):1-23.
3. Black LI, Clarke TC, Barnes PM, Stussman BJ, Nahin RL. Use of complementary health approaches among children aged 4-17 years in the United States: National Health Interview Survey, 2007-2012. Natl Health Stat Report 2015;78:1-19.

4. Ferranti M, Alcantara J, Reilly A. Resolution of GERD in an infant following chiropractic care: A case report and selective review of the literature. J Pediatr Matern & Fam Health - Chiropr. 2016;2016(2):46-49.
5. Biehl ER Gerken D. Resolution of gastroesophageal reflux disorder in an infant with vertebral subluxation: A case report and selective review of literature. J Pediatr Matern & Fam Health - Chiropr. 2014;2014(2):21-26.
6. Vandenplas Y, Rudolph CD, Di Lorenzo C, Hassall E, Liptak G, Mazur L, Sondheimer J, Staiano A, Thomson M, Veereman-Wauters G, Wenzl TG, North American Society for Pediatric Gastroenterology Hepatology and Nutrition, European Society for Pediatric Gastroenterology Hepatology and Nutrition. Pediatric gastroesophageal reflux clinical practice guidelines: joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). J Pediatr Gastroenterol Nutr. 2009;49(4):498-547.
7. Rosen R, Vandenplas Y, Singendonk M, Cabana M, DiLorenzo C, Gottrand F, Gupta S, Langendam M, Staiano A, Thapar N, Tipnis N, Tabbers M. Pediatric gastroesophageal reflux clinical practice guidelines: Joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. J Pediatr Gastroenterol Nutr. 2018;66(3):516-554.
8. Chung EY, Yardley J. Are there risks associated with empiric acid suppression treatment of infants and children suspected of having gastroesophageal reflux disease? Hosp Pediatr. 2013;3(1):16-23.
9. Cohen S, Bueno de Mesquita M, Mimouni FB. Adverse effects reported in the use of gastroesophageal reflux disease treatments in children: a 10 years literature review. Br J Clin Pharmacol. 2015; 80(2):200-208.
10. Rasquin A, Di Lorenzo C, Forbes D, Guiraldes E, Hyams JS, Staiano A, et al. Childhood functional gastrointestinal disorders: child/adolescent. Gastroenterology. 2006;130:1527–1537.
11. Benninga MA, Voskuijl WP, Taminiau JA. Childhood constipation: is there new light in the tunnel? J Pediatr Gastroenterol Nutr. 2004; 39(5):448-464.
12. DiPalma JA, Cleveland MV, McGowan J, Herrera JL. A randomized, multicenter, placebo-controlled trial of polyethylene glycol laxative for chronic treatment of chronic constipation. Am J Gastroenterol. 2007;102:1436–1441.
13. Pashankar DS, Loening-Baucke V, Bishop WP. Safety of polyethyleneglycol 3350 for the treatment of chronic constipation in children. Arch Pediatr Adolesc Med. 2003;157:661-664.
14. Kuizenga-Wessel S, Benninga MA, Tabbers MM. Reporting outcome measures of functional constipation in children from 0 to 4 years of age. J Pediatr Gastroenterol Nutr. 2015;60(4):446-456.
15. van der Wulp MY, Derrien M, Stellaard F, Wolters H, Kleerebezem M, Dekker J, Rings EH, Groen AK, Verkade HJ. Laxative treatment with polyethylene glycol decreases microbial primary bile salt dehydroxylation and lipid metabolism in the intestine of rats. Am J Physiol Gastrointest Liver Physiol. 2013; 305(7):G474-G482.
16. Gorkiewicz G, Thallinger GG, Trajanoski S, Lackner S, Stocker G, Hinterleitner T, Gülly C, Högenauer C. Alterations in the colonic microbiota in response to osmotic diarrhea. PLoS One. 2013;8(2):e55817.
17. Cuperus FJ, Iemhoff AA, van der Wulp MY, Havinga R, Verkade HJ. Acceleration of the gastrointestinal transit by polyethylene glycol effectively treats unconjugated hyperbilirubinemia in Gunn rats. Gut. 2010;59:373-380.
18. Egan A, Alantara J. Chiropractic Care of an Infant with acid reflux since birth. J Ped, Matern & Fam Health – Chiropr [Submitted for Publication]).
19. Barnes TA. Chiropractic adjustments plus massage and kinesio taping in the care of an infant with gastroesophageal reflux J Clin Chiropr Pediatr. 2008;9(1):572-575.
20. Rollette D Monroe C. Improvement in infant colic and reflux following chiropractic care: A case report and selective review of the literature. J Pediatr Matern & Fam Health - Chiropr. 2012;2012(2): 43-48.
21. Alcantara J, Alcantara JD, Alcantara J. An integrative review of the literature on the chiropractic care of infants with constipation. Complement Ther Clin Pract. 2014;20(1):32-36.
22. Wilson J, Duncan J. Resolution of chronic constipation in a 5-year-old female following chiropractic care: A case study and review of the literature. J Pediatr Matern & Fam Health - Chiropr. 2017;2017(3):141-146.
23. Varni JW, Bendo CB, Denham J, Shulman RJ, Self MM, Neigut DA, Nurko S, Patel AS, Franciosi JP, Saps M, Yeckes A, Langseder A, Saeed S, Pohl JF. PedsQL™ Gastrointestinal Symptoms Scales and Gastrointestinal Worry Scales in pediatric patients with functional and organic gastrointestinal diseases in comparison to healthy controls. Qual Life Res. 2015;24(2):363-378.
24. Cordeiro JABL, Gualberto SM, Brasil VV, de Oliveira GB, Silva AMTC. Difficulties faced by parents of children with gastroesophageal reflux disease. Acta Paul Enferm. 2014; 27(3):255-259.
25. Omari T. Gastroesophageal reflux in infants: can a simple left side positioning strategy help this diagnostic and therapeutic conundrum? Minerva Pediatr. 2008;60(2):193-200.
26. Crossan F. Research philosophy: towards an understanding. Nurse Res. 2003;11(1):46-55.
27. Mollard E. Exploring paradigms in postpartum depression research: the need for feminist pragmatism. Health Care Women Int. 2015;36(4):378-391.
28. Sackett DL, Rosenberg W, McGray JA, Haynes RB, Richardson WS. Evidence- based medicine: what it is and what it isn't. BMJ. 1996;312:71-72.