

Improvement of gastroesophageal reflux disease (GERD) in an infant following chiropractic care: a case report

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ABSTRACT

Objective: This case report discusses the evolution of an infant with gastroesophageal reflux disease (GERD) under chiropractic care. It is the hope of the author to encourage more research about the role of chiropractic as a safe alternative in the resolution of GERD in infants. **Method:** A literature search on Google Scholar and PubMed was done to find recent and relevant papers using the keywords infant, GERD, regurgitation and chiropractic. **Clinical features:** A 4-month-old female presented for chiropractic care for recurrent regurgitation after feeding. The infant was exclusively breastfed. She was averse to being carried and her complaints included frequent post prandial regurgitation, difficult eructation, interrupted sleep, choking and rumination, wheezing during sleep, fussiness, distended stomach and excessive intestinal gas. No medication was taken by the infant or the mother and lifestyle changes were made before consulting a chiropractor. **Intervention and outcomes:** The infant was treated with chiropractic manipulation using craniosacral therapy, myofascial therapy and Diversified adjusting technique. The treatment consisted of 17 visits over a 20-week period using a full spine protocol adapted for the pediatric patient based on size and gestational age. The original diagnosis of GERD improved to physiologic gastroesophageal reflux (GER) after 14 visits and then totally resolved at the 17th visit. **Conclusion:** Since current evidence fails to support traditional medicinal methods to treat GERD in infants, chiropractic care merits investigation as a safe alternative that might prove more efficient than medication and with fewer side effects. This case report constitutes an addition to the scientific literature regarding chiropractic care of infants suffering from GERD.

Key words: GERD, regurgitation, infant, pediatric, chiropractic.

Introduction

Since current evidence fails to support traditional pharmaceutical methods to treat gastroesophageal reflux disease (GERD) in infants, there is a great need for a safe alternative approach that might prove more effective than medication and with fewer side effects. Indeed, peer-reviewed literature on traditional treatment for GERD in infants has shown that medication in those cases is not effective enough to be recommended and is usually not approved by guidelines for use in infants younger than 1 year of age.^{1,2,3} During a double-blind randomized placebo-controlled trial in infants with reflux, even the medication that is most often regarded as the most effective for the treatment of GERD, the Proton Pump Inhibitor (PPI), has not demonstrated superiority over placebo for reduction in irritability.^{4,5,6}

Although a large number of chiropractors treating infants will attest that the symptoms of many of their patients with GERD were reduced or resolved with chiropractic care, up until now, only a few studies have been conducted on the relationship between GERD in infants and chiropractic care.^{7,8,9,10,11,12,13,14} It is therefore even more important to properly document each case found to enhance the quantity and quality of supportive literature on this subject.

The purpose of this report is to describe the case of a four-month-old female under chiropractic care whose condition improved from GERD to physiologic gastroesophageal reflux (GER) and finally complete resolution.

Method

A literature search was done using the search engines Google Scholar and PubMed by using the key words infant, GERD, regurgitation and chiropractic. Papers were selected based on the date of publication and their relevance to non-medical avenues of treatment. Only a few case reports were published on the relationship of infant with GERD and chiropractic care.

Patient information

A 4-month-old female presented for chiropractic care for recurrent regurgitation after feeding. She was exclusively breastfed. The infant was averse to being carried and her symptoms included frequent post prandial regurgitation, difficult eructation, interrupted sleep, choking and rumination, wheezing during sleep, fussiness, distended stomach and excessive intestinal gas.

Clinical findings

RELEVANT HISTORY, COMORBIDITIES AND INTERVENTIONS

A full term female infant presented to the office at 12-days old. The mother reported these complaints: at the age of 2 days, her daughter's sleep was interrupted by choking followed by rumination and crying. To complicate the problem, it seemed that her daughter was more comfortable sleeping in a prone position on her breast or in a more vertical position on her mother's lap on the couch. After a few nights, to avoid regurgitation that she would have after almost every feed, the baby was put to sleep supine on an inclined changing mat. The regurgitation did not seem to hurt or bother the baby but the quantity of gastric content was enough to change the baby's clothes frequently. The vomit was nonbilious with no suggestion of hematemesis. The infant regurgitated almost every time she raised her legs or when her diaper was changed after a feed. To avoid regurgitation, the mother needed to change her diaper before feeding her. When carried, the infant would cry, arch her back and neck while pushing away from the person holding her.

Also, the infant was wheezing during her sleep, was experiencing difficult eructation, had frequent hiccups during the day, frequent stomach distention and excessive intestinal gas. When she was fussy, her parents were able to calm her by carrying her while she was lying prone on their forearms. This was the parent's third child and none of their two older boys had similar symptoms at the same age.

The infant did not have a pediatrician before she was 9 weeks old. The mother did not want to consult with him about the regurgitation because she did not want to administer medication to her baby. However, the pediatrician noted that her stomach was distended by intestinal gas and diagnosed a light cervical torticollis and a sinusitis.

The infant was born in a birth pool, at home, through vaginal delivery. No complications during the pregnancy or birth were noted and the infant had been exclusively breastfed. The mother did not drink milk. She ate cheese or ice cream three to four times a week. The baby and the mother were not taking any medication. The weight of the patient was around 70% percentile. The mother had not consulted other professionals regarding her baby's condition.

The mother tried to minimize her baby's symptoms by feeding her more frequently, one breast per feeding and in an inclined position. She kept the baby in an upright position for about 30 minutes after feeding to help with burping.

PHYSICAL EXAMINATION FINDINGS

The initial physical examination included visual postural

evaluation, vital signs, primitive reflex testing, neurological testing, active and passive range of motion of the spine, palpation of the abdomen, static and dynamic palpation of all spinal segments and evaluation of the cranium.

The posture was evaluated with the patient supine: the head was tilted to the right and slightly in right rotation. The thorax was also in right rotation.

The vital signs and the primitive reflex testing were within the normal limits for a 12-day old infant. Neurological testing was unremarkable.

All regional ranges of motion throughout the spine were within normal limits.

Palpation of the abdomen revealed a distention in the periumbilical area with mild spasms at the superior left region of the stomach and the diaphragm. Static and motion palpation of the cervical, thoracic, lumbar, pelvic region and general extremities were performed. Moderate muscle tension was found in the sub-occipital region bilaterally and at the right SCM. There was reduced mobility of C1 in right lateral flexion. In the thoracic spine, mild muscle tension was palpated in the paraspinal muscles bilaterally from T4-T6

Table 1. Timeline

Age	Milestone
2-days old	Interrupted sleep with choking followed by rumination and crying.
3-days old	Sleep in a prone position on the mother or in a more vertical position on the mother's lap on the couch.
4-days old	Sleep in a supine position on an inclined changing mat to avoid regurgitation after feeds.
4-days old	Lifestyle changes.
12-days old	Start of chiropractic care: 17 visits in 4 months.
9 weeks old	1st visit to the pediatrician: he noticed a distended stomach full of intestinal gas and diagnosed a light cervical torticollis and a sinusitis.
13 weeks old	2nd visit to the pediatrician to see the evolution of the torticollis: resolution of the torticollis and stomach less distended. Sinusitis remains unchanged.
14 weeks old	Improvement of GERD into GER. No more Sandifer syndrome.
20 weeks old	No more signs and symptoms of GER. Total resolution of GERD.

with an extension restriction of T5. The infant also had an extension restriction of L1 and the left sacroiliac joint was misaligned posteriorly. In the extremities, restrictions of the left hip, the right elbow and both shoulders were noted.

During the evaluation of the cranium, the fontanelles were within normal limits. Following examination through craniocaudal technique procedures,¹⁵ cranial distortions of the left frontal, parietal and temporal with the occipital bones were observed. (See Table 1. Timeline).

Diagnostic assessment

It is very important to recognize the difference between GER from GERD. By definition, GER is the passage of gastric contents into the esophagus with or without regurgitations and vomiting. Due to the immature lower esophageal sphincter which prohibits the gastric content to exit from the stomach, GER is a physiologic process occurring several times per day in healthy infants.^{1,16,17,18,19} Regurgitation is the most visible symptom of GER and it is reported to occur daily in 50% of all infants younger than 3-months old.^{1,19,20,21} GER is the topic of discussion with pediatricians of one-quarter of all routine 6-month old infant visits.^{22,23,24} In infants, GER typically peaks between the first and the fourth months of age¹⁹ and resolves spontaneously in most healthy infants by 12 to 18 months old.^{1,21,22,25,26,27}

GERD should be defined when adverse symptoms or complications are the results of GER. These associated symptoms or conditions are classified into esophageal and extra-esophageal^{1, 3, 19, 28, 29} (See Table 2).

In infants, the most common presenting symptoms of GERD are: feeding refusal, recurrent vomiting, poor gain weight, irritability, sleep disturbance and respiratory symptoms.¹⁹ The incidence of GERD in the pediatric population is approximately one in 300 children.³⁰ Then GERD can be further classified after an endoscopic examination by erosive disease (ERD) and non-erosive disease (NERD).³¹

The diagnosis of GERD in infants is often made based on signs and symptoms subjectively described by the parents during history.³² The history allows the practitioner to rule out warning signals requiring investigation and also define a list of differential diagnosis. However, symptoms and signs associated with GERD are nonspecific and unreliable when the child is younger than 8-years-old, and in some cases, 12-years-old.¹ The symptoms and the signs that may be associated with GERD are listed in Table 3.¹

Since no exact diagnostic protocols exist to accurately diagnose GERD in infants, the definitive diagnosis of GERD in the pediatric population is determined by several means.³³ In this case, there were four of the symptoms (recurrent regurgitation, irritability, rumination and wheezing) and one significant sign (Sandifer syndrome) of GERD in the history. The spasmodic dystonia with arching of the neck and the back as a discomfort reaction, called Sandifer syndrome, is an uncommon but specific manifestation of GERD.^{34,35,36} The fact that the patient had sleep interruptions and sinusitis were further indications of complications of GER and led to the diagnosis of GERD.

Table 2. Esophageal and extraesophageal symptoms associated with GERD

Esophageal symptoms	Extraesophageal symptoms
Regurgitation or Vomiting	Recurrent otitis media
Poor weight gain	Dental erosions
Dysphagia	Pharyngitis
Abdominal or substernal/retrosternal pain	Sinusitis
Esophagitis	Respiratory symptoms (cough, laryngitis, wheezing, etc.)

Table 3. Symptoms and signs that may be associated with GERD

Symptoms	Signs
Hoarseness	Apparent life-threatening events
Weight loss or poor weight gain	Esophagitis
Irritability in infants	Esophageal stricture
Ruminative behavior	Barrett esophagus
Heartburn or chest pain	Laryngeal/pharyngeal inflammation
Dysphagia, odynophagia	Recurrent pneumonia
Wheezing	Dental erosion
Stridor	Feeding refusal
Cough	Apnea spells
Hematemesis	Anemia
Recurrent regurgitation with or without vomiting	Dystonic neck posturing (Sandifer syndrome)

Therapeutic intervention

At the start of the treatment, the recommended frequency of care was twice a week. This recommendation was based on the patient's initial complaints and the chiropractic evaluation findings. However, because of the distance needed to travel to the clinic, the patient was treated once a week for 14 visits. The signs and symptoms of GERD and subluxations had improved by then and the recommendation was changed to once every two weeks for three visits. There was resolution of the regurgitation after these three visits. Currently, the patient is being seen once a month. In total, the infant received 17 chiropractic adjustments over a 20 week period using craniosacral technique and Diversified adjusting technique. The patient received full spine adjustments at the level of C1, T5, L1 and the left sacroiliac joint using high velocity low amplitude adjustments with a force adapted for a pediatric patient. During each adjustment, the chiropractor applied a light thrust to the spinal segment being addressed in the direction of the line of correction with a specific contact point using the tip of the little fingers to better adapt to the size of the infant's spine. Cranial adjustments were performed where the distortions and restrictions were revealed during the examination, in particular the left frontal, parietal, temporal and the occipital bones. Also, a myofascial treatment was performed on the right SCM, on both sub-occipital muscles, on the abdomen in particular the left upper quadrant and diaphragm.¹⁰

The mother was asked to continue their lifestyle changes to help manage the condition:

- Continue breastfeeding her baby and keep the consumption of bovine milk protein as low as possible. Breastfed infants with regurgitation may benefit from withdrawal of cow's milk and eggs from the maternal diet.^{1,37,38} For some infants who may be allergic to bovine milk protein, the elimination of that type of protein from the diet decreases significantly vomiting frequency within 2 weeks.^{1,39,40}
- Continue to give one breast at a time, with more frequent feedings, because small feeding volume seemed to decrease reflux frequency.^{1,41}
- Continue to position her baby vertically:
 - o Breastfeed her baby in an almost seated position.
 - o Carry the baby in a prone position with the head elevated on their forearms. There is evidence that infants placed prone with head elevated have less reflux than those kept prone but flat.^{1,42,43,44,45,46}
 - o Keep the baby in the upright position for about 30 minutes after feeding.
 - o Put the baby to sleep in a supine position on a changing mat inclined at about a 15-degree angle. Even if the amount of reflux in supine infants with head

elevated is equal to or greater than in infants supine and flat.^{1,42,44,47,48} the mother was persuaded that it helped prevent the frequency and the volume of the regurgitation. We saw no reason for her to discontinue that habit.

In addition, "tummy time" was also suggested therapeutically where the baby would be put in the prone position for gradually increasing periods of time, depending on the baby's tolerance.

Follow-up and outcomes

The improvement was progressive and continuous during the 20-week period. After the first two adjustments, the mother noticed that the frequency of hiccups had decreased and her baby was regurgitating less frequently, about half of the time compared to almost all the time.

The first condition to resolve was the torticollis after 13 visits.

After the 14th visit, the mother saw significant changes: the infant was able to sleep supine flat without regurgitation; there was no more Sandifer syndrome and the baby was able to be relaxed on their shoulder when she was carried; there was no more wheezing during her sleep; there was no more distended stomach full of intestinal gas. At this time, the patient still had difficulty to eructate and had only a few episodes of reflux during the day and only a small volume each time, about a teaspoon. The GERD from the beginning of care was now improved to a physiologic GER. Considering the positive response to care, the frequency of treatment was reduced to once every two weeks.

After the 17th visit, the patient had a complete resolution in postprandial regurgitation and the vertebral subluxation and cranial indications also showed significant improvement over the course of care.

No adverse effects were reported while receiving chiropractic care.

As for the tummy time, it was always difficult for the baby. The infant was only able to do it for 30 seconds to 2 minutes at a time. The mother said that her baby was complaining "as soon as she put her on her belly" and that she would let her cry until she became so upset that she finally had to pick her up. The mother tried several times with several different strategies to put her baby supine: after changing diapers, during play time with her daughter or when she needed to put her baby down. She did tummy time on different surfaces: on her breasts, on the floor, on the bed, on a gym ball, on her tibias when lying back and on the changing mattress. Sometimes, she also carried the baby with her abdomen supported on her forearm. The baby was about 7

months old when she was able to tolerate five minutes of tummy time without complaining.

Discussion

As it is hard to diagnose GERD in infants because there is no single test that can rule it in or out, the author suggests that the use of the validated questionnaire developed by Kleinman et al.^{19,49} or by Orenstein et al.^{50,51} for documentation and monitoring the parent-reported GERD symptoms would be a good standard point in research.

Some of the weaknesses or limitations of this case report might be the distance between the parent's home and the treating chiropractor's office that did not allow for a more intensive frequency of care. This might mean that more treatments were given to get these results than would otherwise be needed.

Also, as in all case studies, it is difficult to infer similar widespread results in other infant GERD chiropractic cases. However, since the type of chiropractic care used does not allow for a Placebo been given or randomised controlled tests, the best method to validate the efficiency of this type of care is through epidemiology studies. Positive case studies are generally the first steps in gathering interest in such research.

As stated in the guidelines, a physiologic GER usually tends to resolve naturally after the first year of life. It is possible that the improvement seen in the patient's symptoms are reflective of a natural healing process and that the intervention had therefore minimal effect on the patient's outcome. However, since there is usually a peak of GER at the age when these improvements occurred and considering the speed of the recovery, this possibility is unlikely in our opinion. Furthermore, GERD does not necessarily resolve after the first year of life like GER does.

One of the strengths of this report is that, considering the prevalence of medication in GERD cases, and even in the general pediatric population, it is oftentimes difficult to find a case where neither the patient nor the mother has taken any kind of medication, let alone where the mother has also a very low intake of bovine milk. Since there were no notable changes in lifestyle and the ones recommended by the treating chiropractor had already been implemented, and since the mother was not able to implement the tummy time as recommended, the contribution of the chiropractic care in the explanation of the positive outcome of the patient is more likely.

Recommendations

This case and others that have had similar results pave the way for a more controlled research. As stated above, the best approach would be an epidemiology study where the

same protocol and technique would be used on all cases. The number of cases should be enough to account for the variations in personal differences from one practitioner to another. To avoid bias or Placebo effects, the children would be examined before and after a fixed amount of time by a blind examiner who would not know if the children were in the group receiving chiropractic care or in the control group.

Since parents with GERD infants are more likely to consult a medical doctor rather than a chiropractor for that condition, this kind of study would benefit greatly from a partnership with the medical field to increase the number of cases available.

Considering the lack of evidence to support medication for infants with GERD, the possible serious adverse effects of the medication itself and the invasiveness of the current diagnostic and intervention methods, it is imperative that alternative avenues of treatment be more thoroughly researched. The clinical results shown in this case indicate that chiropractic should be considered as one of those avenues.

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