Diagnosis and management of a complex milk protein intolerance with chiropractic care: a case report.

By Anne-Michèle Bérubé, DC [1]

1. Private practitioner, Clinique Chiropratique, Cacouna, Québec, Canada.
Email : amberube.dc@gmail.com

ABSTRACT

Objective: To discuss the chiropractic diagnosis and management of a non-neuromusculoskeletal condition such as neonatal milk intolerance. **Presenting concerns:** A six-day old girl presented with a gastrointestinal disorder, difficulty falling asleep, frequent crying periods and feeding abnormalities. Chiropractic spinal manipulation was the initial treatment. **Intervention and outcomes:** The patient received four treatments consisting of chiropractic spinal manipulation over a period of one month. After these treatments, she slept for longer periods of time, her stool was easier to pass, suckling improved but appetite remained variable. She required dietary changes in order to restore a normal feeding pattern and to gain weight. **Conclusion:** This case demonstrates the difficulty in differentiating gastrointestinal disorder in neonates. Chiropractic appears to be a supportive treatment to gastrointestinal disorder in facilitating neuromusculoskeletal function.

Key Words: food protein intolerance, colic, gastroesophageal reflux, chiropractic, spinal manipulation, pediatric.

Introduction

Parents are on a constant learning curve when they have a newborn and the well-being of the new family member becomes their priority. During the first months of life, 15% to 40% of all newborns will show signs of irritability and distress for a variety of reasons.[1] One of these may be food allergies or intolerance. A food protein allergy or intolerance can be the cause of persistent discomfort.[1] The diagnosis of milk intolerance is widely used to describe many symptoms seen in infants who are fed commercial formula. This broad term includes lactose intolerance (LI), cow's milk allergies (CMA) and cow's milk protein intolerance (CMPI).[2] Lactose intolerance can be congenital, in rare cases, and of primary origin (reduction in the production of the enzyme lactase) or secondary (disruption in normal gut flora after the use of antibiotics for example). Symptoms are located in the gastrointestinal tract only.[2] Cow's milk protein intolerance is seen in 1.8% to 7.5% of the pediatric population, depending on the criteria used. Intolerance often refers to non-IgE mediated reaction unlike allergies, which are IgE mediated and involve multisystemic reactions.[2]

The incidence of CMA is 2.5%. Occurrence in breastfed infants is 2.1%.[3] If gastrointestinal symptoms appear shortly after milk ingestion, suspicion of intolerance arises. The diagnosis of CMA is made when hydrolysed milk is provided to the baby or if all cow's milk products are excluded from the mother's diet and digestion normalizes.[4] Prior to investigation of this hypothesis, gastrointestinal symptoms may be confused with other frequent neonatal conditions such as gastroesophageal reflux (GER) and colic which demonstrate a similar symptomatology such as gas, difficulty sleeping, discomfort, excessive crying, and disrupted feeding patterns. In severe cases, dehydration, vomiting, electrolyte abnormalities and failure to thrive have been observed.[2] Medication might be the first intervention in an attempt to relieve the neonate's discomfort, with relative but variable success. Dietary changes are another option. In both cases, if the neonate is breastfed, it is recommended that the mother eliminate cow's protein from her diet. For formula fed babies, a transition to hydrolyzed protein formula is recommended.

Parents might also chose a trial of complementary and alternative medicine (CAM), including chiropractic care, to find a solution to their child's discomfort. A limited search of the literature (*Pub Med* and *Science Direct*) using the terms "chiropractic and food intolerance" and "chiropractic and milk protein intolerance" and "spinal manipulative therapy" was performed. Chiropractic literature on food allergies is limited. Jamison and Davies[5] did a therapeutic trial based on the sleep patterns of cow's milk intolerant infants. They noted improvement of sleep patterns in 14 of the 19 infants when manipulation consisting of a sustained light pressure for 8 to 10 seconds followed by low-amplitude, high-acceleration thrusts were combined with dietary changes. According to case reports on GER and colic, chiropractic can help, but needs to be confirmed by further research (for colic especially) because benefits are shown in case reports, small cohort studies that tend to use poor methodology.[6]

This case report is an attempt to add information on the

diagnosis, treatment and outcomes of an infant showing gastro intestinal difficulty who received chiropractic care.

Presenting concerns
A six-day-old Caucasian female was seen in a chiropractic clinic with symptoms of digestive disorder that began at four-days-old. Her appetite was variable, both when fed by bottle or when breastfed. She showed difficulty with eructation, taking several minutes to elicit, longer during the day versus at night. She was also having trouble eliminating stool, which had an inconsistent texture, sometimes liquid and sometimes solid, and was accompanied by crying. She did not pass a significant amount of intestinal gas and it did not seem to relieve her when she did. When her parents laid her supine, she would start crying immediately. Nothing seemed to relieve her discomfort, except being held in the arms of her parents.

Clinical findings
The patient was delivered by a scheduled Caesarean section at 39 weeks gestation (there was no spontaneous onset of labor before the scheduled date of surgery). The fetus was in a vertex presentation. The pregnancy itself was unremarkable. The neonate weighed 8 pounds and 2 ounces. Her APGAR score was 10/10. The results of the pediatric exam conducted at the hospital at birth were normal. The systems review revealed that she was breastfed from birth and received supplemental commercial formula. She took from 1 to 4 ounces by bottle but did not latch efficiently with milk leaking from either side of her mouth at every meal (even if breastfed) indicating a poor seal. Regurgitation happened occasionally in small quantities; parents noted that on occasions, these were in larger quantities. She slept uninterrupted for two to three hours at night and four to five hours during the day with no preferred position and would sleep for a longer period of time when in her parents' arms. She was taking a vitamin D supplement twice a day. She was scheduled for her first medical appointment with a family doctor in four weeks. No interventions were employed by the parents in an attempt to relieve the neonate's discomfort. They had sought chiropractic care with their first daughter and wanted to try the same for their second.

The physical exam found that posture was normal. The head shape and position were normal. The neurological evaluation showed that her rooting reflex was absent on the left. Suckling was present but only for a few seconds. Plantar-Flexor test was elicited normally. Both plantar and palmar grasp reflexes were present. Moro, vertical suspension and placing responses were normal. Orthopedic tests such as Ortolani and Barlow were negative. The gluteal crease check was vertical. Temperomandibular joint exam was normal, including absence of abnormal movement, tongue tie or lip tie. Spinal palpation showed restricted motion at vertebral level L1 and T4 in flexion and C1 in right rotation. Based on the clinical presentation and physical exam, the diagnosis made was digestive disorder of somato-visceral origin associated with subluxation of L1, T4 and C1. Differential diagnoses included colic, gastroesophageal reflux and constipation.

After parents gave informed consent, spinal manipulation therapy (SMT) was performed following the exam using diversified techniques and modified for gestational age and size using low force. The baby was scheduled to be seen once a week, for four weeks. Parents were instructed on how to exercise her lower extremities to help with elimination and to gently stimulate the cheeks frequently to promote a secure seal when feeding. They were also asked to keep a journal of her symptoms to assess if her symptoms had any correlation with the mother's diet.

Follow-up and outcomes
Over the course of the four treatments in one month, sleep positioning and pattern improved. The baby was sleeping five to six hours at night. Parents changed her diet from two periods of breastfeeding a day to commercial formula only because they saw that it limited regurgitation. Stooling became easier although the liquid texture was still a concern. The rooting reflex on the left side appeared after the third visit. The neonate's appetite remained variable and she still had trouble gaining weight. At the third visit, spinal palpation revealed no restriction but appetite problems persisted. The chiropractor advised the parents to experiment with another commercial formula, a hydrolyzed protein formula possibly being easier to digest, with hypothesis of possible milk protein intolerance. Hydrolyzed Protein milk (Nutramigen®A+®) was tried once but discontinued because the parents felt the baby disliked the taste.

After the fourth visit, parents took their daughter to the emergency room one night after an intense crying period and 6 hours not feeding. She was seen by two pediatricians. One administered a proton pump inhibitor (Prevacid®) on the diagnosis of GER. Because they stayed overnight under observation, they met another pediatrician the next morning. He recommended an amino acid-derived formula (Puramino™ A+®), suspecting a severe protein intolerance.

The child presented for chiropractic revaluation one week later. Spinal palpation showed restricted movement at L1 in flexion and C1 in right rotation. Stool now had a constant consistency. She had gained weight, regurgitation was rare, appetite was good and the milk intake was increasing daily. Sleep was from six to seven hours at night. Evolution of symptoms and adjustments are documented in Table 1.

Parents decided to formula feed exclusively after the first treatment. They observed that regurgitation was less frequent when formula fed compared to breastmilk. Conse-

Table 1. Evolution of symptoms and adjustments

Date	Symptoms	Spinal restriction / Intervention
May 05th, 2015	Exam	L1flexion , D4 flexion, C1 right rotation
May 08th, 2015	Can lay on back Stool easier, less uncomfortable, diarrhea type Latch better, still variable Appetite better Vomit 1x 2 days ago Sleep 6 hours night	L1 flexion, C1 right rotation
May 13th, 2015	Appetite diminished, better since last 2 days. Stool stable, diarrhea appearance Regurgitations occasional Eructation takes several minutes Latch efficiently Rooting present both sides	No adjustment Trial with another formula
May 20th, 2015	Appetite variable Stool once liquid, otherwise stable Sleep 8 hours night Eructation ok	L1 flexion, C1 right rotation
May 21st, 2015	Visit to ER, Puramino™ A+® and Prevacid® are prescribed	
May 29th, 2015	Re-evaluation Stool has constant consistency Gained weight Regurgitation rare Appetite is good; formula intake increase daily sleep from six to seven hours at night	L1 flexion, C1 right rotation

quently, the mother was not compliant with maintaining the dietary journal associated with the newborn's symptoms, nor was there an attempt to eliminate cow's milk products from her diet. Otherwise, no adverse event due to chiropractic manipulation was reported by the parent.

Discussion

Breastfeeding is recognized to be the optimal milk source for infants from a nutritional, immunological, protective and linking aspect. It is unknown in this case, due to the parent's choice to use a commercial formula, whether removing all cow's milk protein products from the mother's diet would have resulted in improved tolerance of human breastmilk.

Infant formulas are a substitute that may be palliative when there is an inability to provide maternal milk.[7] The key is the composition and its ability to mimic breast milk composition. As the main focus is protein, when allergic reactions are observed, a diet with extensively hydrolyzed protein or an amino acid mixture diet is recommended.[8] Hydrolyzed protein milk is considered as pre-digested casein or whey which provides nitrogen from peptide and amino acids. Two options are available: partially or extensively hydrolyzed. HPF is partially hydrolyzed peptides and contains lactose and eHPF has smaller peptide without lactose.[3] The latter could be misnamed as hypoallergenic, but the reduction of the high molecule weight is not always optimal for every formula.[9] They are prescribed as a first alternative to resolve the adverse reaction to formula. Every milk protein has an allergic potential and depending on the formula used, the infant may experience discomfort if the hydrolysed protein is still large enough to cause a reaction because of the ultrafiltration technique used in the final process of making hydrolyzed protein formula or does not remove the one to which they are sensitive.[10] The hypothesis is that the intolerance to larger peptide fragments in the enzymatic hydrolysate is the mechanism for persistent intolerance. In fact, studies have demonstrated traces of Þ-lactoalbumine, ß-lactoglobuline and casein in such formulas.[10] An allergy to those formulas will induce gastrointestinal symptoms similar to CMA.[3] Fussiness, irritability, loose stool and vomiting can still occur before changing to another amino acid based formula. These symptoms are still common in infants and

often misdiagnosed as gastroesophageal reflux or infantile colic.[11] Such food intolerances are transient in the child's life. In a Danish study where children were followed for three years it was discovered that at the age of one year, 56% of children had recovered from their cow's milk allergy, 77% had recovered at 2 years and 87% at 3 years of age.

Cases become more complex when comorbid diagnoses are treated simultaneously. In this particular case, GER was also treated. Treatment of this condition is not significantly different from the treatment for protein intolerance, in both cases, there is a potential to use extensive hydrolysed protein formula.[13] A two to four weeks trial on formula helps differentiate protein intolerance from GER if the formula doesn't help to reduce the symptoms.[14] The use of pump proton inhibitors is questionable. A systematic review suggests that the risks (respiratory and gastrointestinal infections) outweigh the benefits[15] except in the treatment of more complicated case such as erosive esophagitis, neurological dysfunction, respiratory complications or Barrett's oesophagus.[14] This class of medication is increasingly prescribed to help irritability and crying in infants.[16] Otherwise, in simple GER, reassurance and explanation of head positions, frequency of feed and the use of thickening agents are recommended.[15] The condition should self resolve by the time the child reaches one year of age.

Colic is also a diagnosis to consider. The classic definition comes from Wessel's rule of three: crying at least three hours per day on at least three days for at least three weeks.[6] Other definitions emphasize the digestive problems, flexed position or intensity and length of crying. As with GER, colic is self limiting and improvement is usually seen by the age of four months. Etiology is unknown. Because there is no consensus on definition, efficient medical management and treatment, new trends are appearing in the nutritional field. Dietary approaches range from the avoidance of cow's milk proteins in breast-feeding mothers and bottle-fed infants to an increase in the use of new specialized substitute formulas. Many of these, such as partially hydrolyzed proteins and low lactose with prebiotics or probiotics added are under investigation. Proper intestine microbiota balance promotes motility and normalizes gas production.[17] In a systematic review in 2013, authors found conflicting results regarding diet and colic symptoms management.[18]

Chiropractic manipulations modified for a neonate's gestational age and size range from non or low-force (press and hold technique) to diversified osseous techniques (usually low-amplitude high-velocity movements) performed manually, but may be performed utilizing a low force percussive instrument. The safety of such procedures regarding pediatric care has been demonstrated. The literature shows that there are no reports of serious or catastrophic adverse effects in any clinical trials or systematic reviews using pediatric manual therapy.[19] Adjustment force, velocity and amplitude are adapted to each patient's body size and weight.

Digestive spectrum evaluation might not be considered in the scope of chiropractic. The objective of the manipulation is in fact to restore optimal neuromusculoskeletal function. In this case, cervical dysfunction may impair the exit and tracking of the vagus nerve.[20] In this study, the neonate also showed signs of neurological issues with the absence of rooting reflex and poor swallowing control which involve cranial nerve V, VII, IX, X, XII.[21] Autonomic dysregulation (an imbalance between sympathetic and parasympathetic tone) can also cause digestive and intestinal problems by the neurophysiologic component of the spinal dysfunction.[21] Studies are investigating why sensory input from paraspinal tissues can evoke visceral reflexes affecting the sympathetic nervous system and may alter end-organ function, which is observed clinically in chiropractic offices.[22]

Chiropractic can play a supportive role in digestive conditions, both diagnostically and therapeutically. Very few studies are available on food intolerance and CAM. However, keeping in mind that food protein intolerance, colic and GER share similar symptoms and have unclear definitions and criteria of evaluation especially with infants, research in these three areas might lead to better comprehension. This is true of GER where some case reports are listed, but for older children. Literature review is favorable in the chiropractic treatment of infantile colic, with few adverse reports, and no aggravation of symptoms.[23] Two RCTs are available. One concludes that spinal manipulations appear to be more effective compared to over the counter medication.[24] The other states that chiropractic spinal manipulations are no more effective than placebo.[25] The Kingston systematic review was unable to confirm a relationship between chiropractic subluxations and colic symptoms.[26]

Limitations of this case report include the short period of time and small number of spinal manipulation that were performed. The numerous medical interventions created an additional challenge in directly correlating the interventions to outcomes. Precise information regarding crying, burping or sleeping time from the parents was also a challenge to obtain considering their subjective bias and the effect of a demanding newborn on the family. Fortunately, the mother was present at all consultations which reduces the difference between mother and father report of symptoms.

Conclusion

This case report adds information regarding diagnosis and management of milk protein intolerance of a newborn. Challenges lie in making a diagnosis and evaluating the possibilities to improve newborn and family quality of life. Because of the wide variety of gastro intestinal symptoms

and the overlap between condition and treatment, chiropractic can be considered in order to promote optimal neuromusculoskeletal function. Even if it has its limits regarding chiropractic scope of practice addressing neuromusculoskeletal conditions, this case observed changes in some aspects of the patient's symptomatology. In addition, in the current healthcare system, chiropractors are privileged to meet new family members at the beginning of their lives, to follow them closely and to earn parent trust. In pursuit of that goal, better definitions and clear diagnostic criteria should continue to be refined in research on neonatal conditions and their management.

References

1. Hill JD, Heine RG, Cameron JSD, Cairo-Smith AG, Chow CW, Francis DE, Hosking CS. Role of food protein intolerance in infants with persistent distress attributed to reflux oesophagitis. *J Pediatr*. 2000;136:641-7.

2. Wilson J. Milk intolerance: lactose intolerance and cow's milk protein allergy, newborn and infant. *Int Nurs Rev*. 2005;5(4):203—207.

3. Moneret-Vautrin D-A, Hatahet R, Kanny G. Hydrolysats de protéines : laits hypoallergéniques et formules extensivement hydrolysées. Bases immunoallergologiques de leur utilisation dans la prévention et le traitement de l'allergie au lait. *Arch Pediatr*. 2001;8:1348-57.

4. Bahna SL. Cow's milk allergy versus cow milk intolerance. *Ann. Allergy Asthma Immunol*. 2002;89:56-60.

5. Jamison JR, Davies NJ. Chiropractic management of cow's milk protein intolerance in infants with sleep dysfunction syndrome: a therapeutic trial. *J Manipulative Physiol Ther*. 2006;29 (6):469-74.

6. Alcantara J, Alcantara JD, Alcantara J. The chiropractic care of infants with colic: a systematic review of the literature. *Explore*. 2011;7(3): 168-174.

7. Traves D. Understanding infant formula, *Paediatr. Child Health*. 2015.

8. Allesa MS, Scholtensa PAMJ, Bindelsb JG. Current trends in the composition of infant milk formulas, *Current Paediatrics*. 2004;14:51—63.

9. Isolauri E, Sotas Y, Mäkinen-Kiljunen S, Oja SS, Isosomppi R, Turjanmaa K. Efficacy and safety of hydrolyzed cow milk and amino acid-derived formulas in infants with cow milk allergy. *J Pediatr*. 1995;127(4):550-557.

10. Van Beresteijn EC, Mejer RJ, Schmidt DG. Residual antigenicity of hypoallergenic infant formulas and the occurrence of milk-specific IgE antibodies in patients with clinical allergy. *J. Allergy Clin. Immunol*. 1995;96:365—74.

11. Vanderhoof JA, Murray ND, Kaufman SS, Mack DR, Antonson DL, Corking MR, et al. Intolerance to protein hydrolysate formulas: an underrecognized cause of gastrointestinal symptoms in infants. *J Pediatr*. 1997;131:741-744.

12. Madsen C. Prevalence of food allergy/intolerance in Europe, *Environ. Toxicol. Pharmacol*. 1997; 4: 163—167.

13. Corvaglia L, Mariani E, Aceti A, Galletti S, Faldella G. Extensively hydrolyzed protein formula reduces acid gastro-esophageal reflux in symptomatic preterm infants. *Early Hum. Dev*. 2013;89:453-455.

14. Willmotta A, Murphy MS. Gastro-oesophageal reflux. *Current Paediatrics*. 2004;14:586—592.

15. Gieruszczak-Bialek D, Konarska Z, Skorka A, Vandenplas Y, Szajewska H. No effect of proton pump inhibitors on crying and irritability in infants: systematic review of randomized controlled trials. *J Pediatr*. 2015; 166:767-770.

16. Smith CH, Israel DM, Schreiber R, Goldman RD. Proton pump inhibitors for irritable infants, *Cam Fam Physician*. 2013. 59(2):153-156.

17. Savino F, Ceratto S, De Marco A, Cordero di Montezemolo L. Looking for new treatments of infantile colic. *Ital J Pediatr*. 2014;40:53.

18. Miller J, Hellstenius SW. Is infant colic an allergic response to cow's milk? What is the evidence? *J Clin Chiropr Pediatr*. 2013; 14(1):1097-1101.

19. Humphries KB. Possible adverse events in children treated by manual therapy: a review. *Chiropr Osteopat*. 2010; 18(12):1—11.

20. Hipperson AJ. Chiropractic management of infantile colic. *Clin Chiropr*. 2004;7:180–186.

21. Fysh P. Chiropractic care for the pediatric patient, International Chiropractic Association Council on Chiropractic Pediatrics second edition, Virginia, 2010.

22. Pickar JG. Neurophysiological effects of spinal manipulation. *Spine*. 2002;2:357—371.

23. Angus K, Asgharifar S, Gleberzon B. What effect does chiropractic treatment have on gastrointestinal (GI) disorders: a narrative review of the literature, *J Can Chiropr Assoc*. 2015; 59(2):122-133.

24. Wiberg J, Nordsteen J, Nilsson N. The short-term effect of spinal manipulation in the treatment of infantile colic: a randomized controlled clinical trial with a blinded observer. *J Manip Physiol Ther*. 1999;22(8):517-522.14

25. Olafsdottir E, Forshei S, Fluge G, Markestad T. Randomised controlled trial of infantile colic treated with chiropractic spinal manipulation. *Arch Dis Child*. 2001;84:138-141.13

26. Kingston H. Effectiveness of chiropractic treatment for infantile colic. *Paediatric Nursing*. 2007;19(8):26.