Posterior Rib Fractures in a Young Infant Who Received Chiropractic Care

abstract

We report on a 21-day-old infant with healing posterior rib fractures that were noted after a chiropractic visit for colic. Chiropractors are the third largest group of health care professionals in the United States, and colic is the leading complaint for pediatric chiropractic care. Rib fractures, specifically when posterior, are traditionally considered to be secondary to nonaccidental trauma. Thorough investigation is necessary to rule out bone fragility and genetic disorders, but patient history is key when evaluating unexplained fractures. Pediatrics 2012;130:e1359–e1362

AUTHORS: Paria Majd Wilson, MD,a Mary V. Greiner, MD,b and Elena M. Duma, MDc

aPediatric Residency Program, bMayerson Center for Safe & Healthy Children, and cDivision of Pediatric Emergency Medicine, Cincinnati Children’s Hospital Medical Center, Cincinnati, Ohio

KEY WORDS
alternative medicine, child safety, colic, fractures

ABBREVIATIONS
AAI—Activator adjusting instrument
CAM—complementary and alternative medicine
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Address correspondence to Paria M. Wilson, MD, Cincinnati Children’s Hospital Medical Center, Pediatric Residency Program, MLC 5018, 3333 Burnet Ave, Cincinnati, OH 45229. E-mail: paria.wilson@cchmc.org

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The role of complementary and alternative medicine (CAM) is increasing in today’s society. Although there is limited evidence regarding the benefits of chiropractic care in pediatrics, there is increasing use for the treatment of non-musculoskeletal ailments such as infantile colic, otitis media, asthma, enuresis, and cancer.\(^1\) The central tenet of chiropractic care is the belief that diseases are caused by articular changes, or subluxations, of the vertebrae, which lead to an interruption of nervous impulses from the spinal cord. It is believed that the adjustment of the spine allows the body to stimulate the innate recuperative power of the nervous system and allow for natural healing.\(^2\) We report a case of an infant who underwent chiropractic care with attributable adverse effects leading to an extensive child abuse workup.

**PATIENT PRESENTATION**

A 21-day-old female patient presented to her primary care pediatrician’s office with concern regarding an abnormality of her back. On day of presentation, the mother reported that while the patient was lying against her chest, she felt a crackling sensation when she touched the infant’s back. The patient was born term via repeat cesarean delivery with no complications. The mother gave a history that the patient had experienced difficulty with bowel movements since birth. She had taken the patient to a chiropractor at 16 days of life due to fussiness and crying consistent with colic. On evaluation by the pediatrician, the finding of crepitus was confirmed and a chest radiograph was obtained, which revealed acute fractures of the seventh and eighth ribs posteriorly on the left side. The pediatrician referred the patient to the emergency department for further evaluation.

On initial presentation in the emergency department, the patient was noted to have edema and crepitus of the lower back with no bruising, appropriate mental status with flat anterior fontanelle, intact frenula, and normal female genitalia. The parents reported several formula changes due to fussiness and gas but stated there had been adequate weight gain. The parents reported personal histories of back and neck injuries for which they saw a chiropractor; and when the patient’s older brother developed recurrent otitis media, they had brought him to the same chiropractor. There was no family history of easy fractures, hearing problems, poor dentition, or renal problems.

In the emergency department, the child abuse team was consulted and recommended obtaining a skeletal survey, which confirmed the previously known fractures but found no additional fractures. Computed tomography of the head was normal, as were the complete blood cell count and liver function test results. Due to the finding of posterior rib fractures, a report was made to children’s services. Examination of the patient’s 3-year-old brother was also performed and was normal.

On day of life 23, the patient was seen in the child abuse center for follow-up. On further questioning about the chiropractic visit, the mother described that the chiropractor initially held the patient upside down by the hips, wrapping his hands around her hips and lower ribs. Next, he applied pressure along her spine with his fingertips. Finally he used a “spring-activated device” on the patient’s back while she was lying down on her mother’s chest, in the same location the fractures were later found. The patient cried immediately after the procedure and then fell asleep. She continued to be fussy after the maneuver. The case was discussed with the chiropractor, who confirmed the mechanism of treatment that was described by the patient’s mother.

Bone laboratory tests, including calcium, phosphorus, vitamin D 25-hydroxylase, alkaline phosphatase, magnesium, and parathyroid hormone, were obtained; the results were normal. A repeat skeletal survey was obtained at 35 days of life, which showed healing of the known rib fractures and no new fractures. With this information, the child abuse team determined that although child abuse could not be definitively ruled out, the chiropractic manipulations were a plausible explanation for the posterior rib fractures. The children’s services investigation found no social concerns with the family, and the case was closed. No criminal charges were filed.

**DISCUSSION**

Formal pediatric education in chiropractic schools is limited to postgraduate seminars, journals, and conferences.\(^3\) and studies have therefore shown that the pediatric care provided by chiropractors can be inconsistent with medical recommendations.\(^4\) Studies regarding the benefits and safety of manipulations are limited; some chiropractors do not believe in the validity of controlled clinical trials in their practice\(^5\) and rely on anecdotal evidence instead.

The patient in this case was initially evaluated for colic, a common chief complaint at chiropractor offices. Chiropractic studies on infantile colic, such as that done by Wiberg et al.,\(^6\) are limited by the small number of participants and study design. Improvements in the mean hours of colicky behavior are noted after 2 weeks of spinal manipulation compared with use of dimethicone, but parents who provided that subjective data were not blinded to the treatments. Also, infants who were not improving with dimethicone (placebo) dropped out of the study due to worsening symptoms, thus increasing the power of the treatment group. Arguably the best study on the topic was done by Olafsdottir et al.\(^7\) in Norway, with strict entry criteria, appropriate study population...
size, and decreased risk of bias. This study found no difference in crying time between placebo treatment of holding and spinal manipulation over 3 visits. Interestingly, attempts to distinguish colic from the peak of the natural crying pattern could not explain the outcome of improvement in subjectively defined mean crying time in infants with chiropractic manipulation.

Reports of the safety profile of chiropractic manipulation in pediatrics are also inadequate. Many studies have shown transient complications such as headaches, minor pain, or fatigue, but severe complications have been reported in adults. The Canadian Stroke Consortium reported that ∼25% of all traumatic dissections from vertebrobasilar accidents were associated with neck manipulations, and 1 such case report was of a 7-year-old child. The exact estimates of complications are difficult to ascertain because the symptoms of such accidents can be challenging to recognize and report in a timely manner. In addition to direct complications, a recent Canadian study demonstrated delay of medical diagnosis and treatment secondary to the use of CAM.

The chiropractor involved in the care of the infant in this case used the Activator adjusting instrument (Activator Methods International, Ltd, Phoenix, AZ) to perform his manipulation (Fig 1). A project funded by the National Institutes of Health in 1985 showed that the device delivers no more than 0.3 J/pulse of energy via a spring-loaded mechanism, which is enough to produce movement in vertebrae but not enough to cause injury to an adult. The majority of chiropractic schools in the United States teach how to use this device after the chiropractor has checked for leg length inequity, which the chiropractor in this case performed by holding the child upside down by her hips. Thirteen case reports of use of the AAI have been published, only 1 of which involved a pediatric patient who received the intervention for acute otitis media. Multiple randomized controlled trials have been performed with regard to the efficacy and clinical utility of AAI, but the lack of reproducibility and small sample sizes limit its full acceptance.

The use of CAM, including chiropractic care, is increasing in the pediatric population. Many parents are concerned about the adverse effects of conventional treatments and others are hoping to obtain a second opinion regarding their child’s chronic illness. Parents may consider pursuing management in the form of CAM, but pediatricians should advise parents that the evidence regarding its use in infants is incomplete. Less than 50% of parents voluntarily disclose their use of alternative medicine to their pediatricians. Poor physician–patient communication may lead to lack of timely recognition of a chronic disease or worsening of an acute injury secondary to manipulation. When a child presents with an unexplained injury, the medical care provider must be diligent in obtaining a detailed history that includes CAM.


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