CHANGES IN HEAD CIRCUMFERENCE AND GAGGING AND PLANTAR GRASP REFLEXES AFTER CONCOMITANT CHIROPRACTIC CARE OF A PAEDIATRIC PATIENT WITH HYDROCEPHALY: A CASE REPORT

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ABSTRACT

Objective: To describe the concomitant chiropractic care of an infant with hydrocephaly.

Clinical Features: The parents of a 14-week-old infant presented their child for chiropractic care with a history of hydrocephalus.

Intervention and Outcome: The infant was cared for with cranial release work and Modified Diversified Technique involving a sustained light touch and hold technique at the C1 vertebral body on the right and left sacrum. Improvements we noted in all of the patients presenting complaints from the initial examination in the first visit The patient received 10 weeks of care and is continuing their care further.

Conclusion: This case report documents the benefits that concomitant chiropractic care in a child with hydrocephaly. We support further research in the care of similar patients. (Chiropr J Australia 2017;45:131-137)

Key Indexing Terms: Hydrocephaly; Chiropractic; Pediatrics

INTRODUCTION

According to Tully and Dobyns. hydrocephaly is “an active distension of the ventricular system due to inadequate circulation of cerebrospinal fluid within the cerebral ventricles into the systemic circulation.” (1,2) The altered fluid dynamics results in loss of brain substance and enlargement of cerebrospinal fluid (CSF) spaces resulting in increase in head circumference or an unusually large head size as well as the infant demonstrating vomiting, sleepiness, irritability, downward deviation of the eyes (also called "sun setting") and seizures.(3) Prevalence estimates place the disorder as ranging between 1 and 32 per 10,000 births, depending on the definition used and the population studied.(1)

Depending on the cause (i.e., congenital or acquired), medical treatment options for hydrocephaly include shunt and endoscopic approaches. In the realm of alternative care approaches, chiropractic is popular among parents and children.(4,5) Specific to

pediatric neurology; of the practitioner-based alternative therapies, chiropractic is the most popular.(6,7)
Despite the popularity of chiropractic for infants and children with neurological problems (8), the literature is scarce in documenting the chiropractic care of children with hydrocephaly. To inform clinical practice and research, we describe this case report.

CASE REPORT

A 14-week-old European, female infant with hydrocephalus was brought by her parents for chiropractic consultation and possible care. Chiropractic referral was made through a family member who suggested care for the infant. It is important to note here that at 34 weeks gestation the infant suffered a brain bleed that self-resolved. The infant was delivered by C-section at 39.4 weeks and was diagnosed with hydrocephalus shortly thereafter. By the age of 14 weeks she had a head circumference of 53 centimetres, 14 centimetres above the expected normal head circumference for her age. For a child of this age and gender the head circumference should not normally exceed 39 centimetres. (9) The infant was described by her parents as not able to turn her head in either direction or bring her legs up towards her chest. In addition, she was experiencing sleep disturbances and had a sensitive gag response. The infant was scheduled for shunt surgery 1 week after her initial chiropractic examination. The infant was concomitantly being managed and monitored by a paediatrician specialising in paediatric neurology.

During the physical examination the infant was distressed while in the prone position for her evaluation. She was left hand dominant and her right eye diverged. In addition, she had a constantly maintained (hyperactive) Palmar grasp reflex, had a hyperactive gag response and had a bald spot on the posterior left occiput indicating a favoured side of head rotation. A significant increase in cranial vault size was noted to 53 cm in circumference, as confirmed by prior measurement by a paediatric nurse. The attending chiropractor noted a decrease in motion at the C1 vertebral body to the right with decreased global cervical spine rotation to the right.

Patient Management

Chiropractic care began 1 week after the infant had the shunt insertion at 15 weeks old. Over a period of 6 weeks the infant came for care a total of 6 times. The care provided included cranial release work and modified diversified sustained light touch and hold technique to address subluxations indicated at C1 on the right and sacrum on the left on all visits except for the 6th visit. On the 6th visit only cranial release work was performed.

Chiropractic care was concurrent with the care of her paediatrician; however, both worked in separation as there was no direct interaction or communication between the chiropractor and pediatrician. The mother of the infant acted as the liaison. The parents stated that the pediatrician was supportive of the chiropractic care.

Results

At the infant's 2nd visit, the parents reported she slept well following her last visit. The infant began turning her head both directions and began bringing her legs up toward her head. While the C1 subluxation was still present, the severity of the subluxation had reduced significantly. By the 4th visit, her parents reported overall improvement in the infant's demeanour and a decrease in cranial circumference from 53 cm to 48 cm. A further reduction of cranium size (to 43 cm) was measured at the 5th visit, and a hard palate touch-and-hold release was performed in addition to the aforementioned chiropractic techniques. At the time of the 6th visit, cranial size was maintained (i.e., 43 cm) and the parents reported the infant had been gagging less frequently compared to t the initial visit when her palate was being examined. The parents noted that the infant was also gagging less frequently at home during the time she was receiving chiropractic care.

In addition, her hyperactive Palmar grasp reflex had diminished. During the 6th visit her Palmar grasp reflex had decreased to normal for her age. There were no adverse effects experienced by the infant as reported by her parents and the attending chiropractor throughout her chiropractic care.

DISCUSSION

CSF is produced by the choroid plexi that are located within the lateral, third, and fourth ventricles. Unidirectionally, CSF flows through the ventricular system, exits the fourth ventricle into the subarachnoid space, and is absorbed into the venous sinuses and systemic circulation via arachnoid granulations. Physical or functional obstruction within the ventricular system, the subarachnoid space, or the venous sinuses can result in hydrocephaly. Externally, inflammation and scarring of the subarachnoid space, or elevated pressures within the venous sinuses, can impair flow of CSF into the systemic circulation. In addition to the unidirectional flow of CSF, the flow has been found to be pulsatile in relation to the cardiac cycle. Alteration of this pulsatile flow in animal models results in hydrocephalus.(10-12)

In terms of its pathophysiology, hydrocephaly has been classified as *acquired* (i.e., hemorrhage, neoplasm and infection and medication use during pregnancy such as misoprostol metronidazole and antidepressants) or *developmental* (i.e., genetic syndromes such as neural tube defects or syndromes associated with intracranial cysts.(1)

Chiropractic Care

As a further context to our discussions, we performed a systematic review of the literature on hydrocephaly and chiropractic. Using the search terms "chiropractic AND

hydrocephaly," we cosulted MANTIS (1980-2016), the Index to Chiropractic Literature (1980-2016) and Pubmed (1966-2016). Inclusion criteria for our review included both peer-reviewed and non-peer-reviewed articles. Our review found a paucity of literature, revealing 1 abstract from a conference proceedings (13) and 3 case reports.(14-16) However, only 2 case reports involved infants with hydrocephaly and are discussed below.

Davies (14) described the care of a 12-week-old infant with undiagnosed hydrocephalus and presenting with colicky, irritable-type symptoms (i.e., continued worsening and prolonged paroxysms of crying accompanied by fisting and "pulling the legs up" that made breastfeeding difficult). The case highlighted the need for clinicians to recognize the signs of progressive hydrocephalus and make the appropriate referral for reinvestigation as early in the course of the condition as possible. The infant's symptoms ultimately proved to be unrelated to the raised intracranial pressure and were ameliorated by the application of a single chiropractic adjustment directed at the C1/C2 vertebral bodies using a Toggle Recoil procedure without the mechanical assistance of a drop headpiece. Davies advised clinicians engaged in the care of children to perform serial measurements of the head circumference, height, weight and anterior fontanelle and to recognize the fact that alterations of the symptomatic state by a trial of therapy is an unreliable indicator of positive clinical progress.

Dauphine (15) described the care of a 10-month-old male infant who was born 5 weeks premature by C-section, at 6 pounds 5 ounces and diagnosed with hydrocephaly. The patient underwent applied kinesiology care at 13 months of age. Cranial fault corrections to the occiput and frontal bones, adjustments to a fixated sacrum, and the T5 vertebrae were made. Tapping at Triple Heater 23 (an acupuncture point), and adjustment to the right fibula were also given. These adjustments produced an immediate calming effect, and the hand-head banging and the infant's fear and tension ceased. Several days later the overseeing pediatric neurosurgeon re-measured the skull at 51.25 centimeters, down from 52 centimeters three weeks previous. At 28 months, the skull measurement remained at 52 centimeters which was in the 95th percentile of head sizes.

The case I describe here adds to the scarce literature on the chiropractic care of children and adults presenting with hydrocephalus. This report has some differences from the earlier reports. The child here received chiropractic care in the form of cranial work and modified diversified technique. In addition, this report specifically notes the issue of safety as well as the somewhat collaborative approach between chiropractor and the child's pediatric neurologist. With continuing popularity of complementary therapies for children and chiropractic in particular, there needs to be collaborative efforts between allopathic and alternative practitioners. Coulter et al (17) defined integrative medicine as incorporating alternative therapies with conventional medicine involving shared management and guided by common values and goals (i.e., holistic approach to care). Here, this integrative medicine approach is more collaborative rather than integrative. As Coulter pointed out, whole integration requires collaborations, but collaboration does not necessarily involve integration. (18)

The value and purpose of case reports is to describe the clinical encounter between patient and clinician. Such efforts highlight our clinical expertise and provide a vehicle for clinical education. Given the number of confounding factors in case reports, it is difficult to make cause and effect inferences. However, the clinical observations provided in this case report allow us to theorize about the possible effect of chiropractic for an infant with hydrocephaly. Toward these efforts, we point the reader to the excellent review by Fanagan (19) on the role of the craniocervical junction (CCJ) in craniospinal hydrodynamics and neurodegenerative conditions. It is beyond the scope of this paper to review the large body of literature on the role of the CCJ as a potential choke point for craniospinal hydrodynamics and whether it plays a causative or contributory role in the pathogenesis and progression of neurodegenerative diseases. We posit that correction of misalignment (i.e., atlas subluxation) at the CCJ may have improved the faulty craniospinal hydrodynamics associated with hydrocephaly.

CONCLUSION

In closing we wish to provide to the reader the traditional caveats regarding case report. Case reports lack generalizability due to many confounders, such as the effects of placebo, natural history, subjective validation, and expectations for clinical resolution on the part of the parents in the case reported. In addition we cannot discount the benefits of a shunt being surgically implanted during the child's chiropractic care. At best, it is safe to comment that possible synergistic effects may have occurred with chiropractic and medical care here. Case reports can provide guidance where other forms of evidence are lacking. Case reports provide an understanding of the external clinical experiences of clinicians and their patients and may lead to increasing conviction on an approach for chiropractic care in similar patients.

This case report documents the benefits of concomitant chiropractic care in a child with hydrocephaly. We encourage further documentation in the care of similar patients so as to inform clinical practice and future higher-level research designs.

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