

Original Article

Congenital muscular torticollis: Early and intensive treatment is critical. A prospective study

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Abstract

Background: Although the success of conservative management of congenital muscular torticollis has been well documented, relatively little is known about the determinants of this outcome, such as treatment duration and exercise frequency. The aim of the present study was to define factors related to treatment duration, to compare different frequencies and intensities of home treatment programs and their effect on the speed of recovery.

Methods: The present study was a prospective study of 45 infants (26 male, 19 female) with congenital muscular torticollis referred to the pediatric surgical outpatient during a 1 year period. Following a standardized initial assessment, parents were taught our intensive home treatment protocol, consisting of passive stretching exercises repeated every 3 h.

Results: The mean age at initial assessment was 38.6 days (range 15–120 days). Mean treatment duration was found to be 3.2 ± 1.3 months. All patients were treated by use of our intensive protocol of passive stretching exercises (100% success). No surgery was necessary.

Conclusions: In patients with early treated congenital muscular torticollis, there is no place for surgical treatment. This group of patients can be successfully treated using an intensive protocol of passive stretching exercises. In addition, this treatment protocol has a very short treatment duration compared with other standardized protocols. A successful outcome depends primarily on good cooperation with the parents, especially in developing countries.

Key words

congenital muscular torticollis, passive stretching exercises, sternomastoid tumor of infancy.

Congenital muscular torticollis (CMT) is an idiopathic condition that begins in infancy as a rotation and flexion deformity of the neck caused by sternocleidomastoid muscle shortening.

Sternocleidomastoid muscle fibrosis has been recognized for centuries, but its pathogenesis and treatment protocol remain controversial. A number of authors have attempted to explain the development of fibrosis. The most common theories include intrauterine mechanical factors, birth injury, infections, vascular injury, hereditary^{1–4} and compartment syndrome.⁵

Although the success of conservative management of CMT has been well documented, relatively little is known about the determinants of outcome, such as treatment

duration and frequency. Passive stretching exercises (PSE) are different and some observers have been unconvinced of their treatment value.⁶ To characterize the determinants of treatment outcome, a prospective study was designed and a specific intensive exercise program has been undertaken for babies with CMT to compare different frequencies and intensities with other reported home-treatment programs.

Methods

The study consisted of 45 infants (26 male, 19 female) with a clinical diagnosis of CMT who presented at less than 4 months of age. Approximately 25 000 births per year occur in the Zeynep Kamil Maternal and Child Hospital. There was no physical therapist at the hospital during the study period, so the study was performed only in the pediatric surgical polyclinic.

A standardized assessment form was completed at the initial exam to ensure inclusion of essential data. During the first exam, a history was taken which included sex, laterality,

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initial assessment age, birth order, difficult delivery, birth position, type of delivery, parental relationship, family history, previous therapy, associated musculoskeletal anomalies and additional pathology. Physical examinations were completed. The diagnosis of CMT was made clinically by documenting a limitation in passive neck rotation associated with facial asymmetry and plagiocephaly and mass or sternomastoid thickening (band). Facial photographs from anterior and cervical radiographs were also obtained.

Following an initial assessment, parents were advised of the intensive home-treatment protocol. This exercise protocol consists of three components of neck stretching (anterior flexion–extension of the neck, lateral flexion to right–left sides and rotation of the neck to right–left sides). The baby was held supine on the examination table with the shoulders fixed by one person, while the head was supported over the edge of the table by another person’s hands. The three types of exercises are repeated 10 times each in turn and the position is maintained for 10 s. All exercises are repeated prior to each feed or up to eight times a day. Infants were reassessed at 4 weekly intervals until full neck rotation was achieved. To ensure that the range of motion was not lost after the program was stopped, the child was re-examined 1 month after the stretching program was discontinued. In addition to the passive exercises described,

treatment also included educating parents about positioning and handling skills that promoted active neck rotation towards the affected side and discouraged the child from tilting his/her head towards the affected side. Parents were advised that the child should sleep in different positions (left lateral, right lateral and prone). Treatment duration was defined as the time between initiation of treatment and achievement of full passive neck range of motion.

Results

All 45 infants with CMT were treated with PSE. The clinical features of the total group of children who successfully completed treatment (*n* = 45) are summarized in Table 1. The mean delivery weight of these babies was 3575 g. The mean age at initial assessment was 38.6 ± 26.6 days (range 15–120 days). In the initial assessment of patients, there were 26 with facial asymmetry (60%), five with plagiocephaly (11.1%) and 14 with asymmetry and plagiocephaly (31%). All babies had limited rotation of the neck (100%). All families complied with PSE treatment and mean treatment duration was 3.2 ± 1.3 months (range 1–4 months; 9 months in only one patient). One patient had obstruction of the lacrimal canal that needed surgery, during which time PSE was interrupted. Therefore, this child’s treatment program had to be continued until the child was 10 months of age. The mean follow-up time was 50.2 months (range 44–56 months) until January 1999.

The incidence of complicated labor and delivery (four breech, two vacuum, two twins, three Cesarean sections, five deliveries at home) in this population was 42.2% (19 patients). Three patients also had clavicle fractures. The parents were related in 13 cases (28%). A family history of torticollis was found in four patients (8.8%; one sister, two cousins, one grandmother and cousin).

There were insufficient therapy attempts in 10 patients (22%) prior to admission to our outpatient clinic.

In all patients, full recovery was achieved after this treatment protocol. Results of PSE treatment for early CMT are summarized in Table 2. None of the patients required

Table 1 Clinical features of children

	No. patients (%)
Gender	
No. males	26 (57.7)
No. females	19 (42.3)
Side	
Left	21 (46.6)
Right	24 (53.3)
Exam	
Mass	41 (91.1)
Band	4 (8.8)

Table 2 Results of passive stretch exercises in the present series

	Results			
	Excellent	Good	Fair	Poor
Asymmetry	–	+ /–	+	NI
Limitation of rotation	–	– / +	+	NI
No. patients	36	9/0	0	0

There was no asymmetry and limited rotation in 36 patients. There was mild asymmetry in nine patients. Excellent, full rotation and no asymmetry; good, full rotation and mild asymmetry/mild limitation of rotation and no asymmetry; fair, mild limitation of rotation and mild asymmetry; poor, no improvement (NI).

Table 3 Comparison of medical treatment protocols of congenital muscular torticollis from different studies

Reference	Period	n	PSE /day	Duration	Results
7	29 years Retrospective	126	10 × (1 stretch) × 2	9 months	92% (< 3 months) 45% surgery (> 3 months)
9	3 years Prospective	101	5 × (2 stretches) × 2	4.7 months	100% success 0% surgery
Present study	1 year Prospective	45	10 × (3 stretches) × 7–8	3.8 months	100% success 0% surgery

PSE, passive stretching exercise; 1 stretch, lateral rotation of the neck to each side; 2 stretches, lateral flexion to each side and lateral rotation of the neck to each side; 3 stretches, lateral flexion and lateral rotation and anterior flexion–extension of the neck.

surgery and there were no poor results. All infants achieved full passive neck rotation.

Discussion

Congenital muscular torticollis occurs in only 0.4% of births³ and is associated with variable degrees of fibrosis affecting the sternocleidomastoid muscle. The etiology of CMT is unclear. Although a causal relationship has not been established, the mothers of many of these children describe a difficult labor and delivery.^{1–5} Difficult labor and delivery were found in 42.2% of the present group, which is a higher rate compared with previous reports.^{1–5} Additionally, in contrast with publications in the literature, no other musculoskeletal anomalies were found in patients in the present series.

In the present study the need for surgical intervention in children who started a passive stretching program before the age of 4 months was not encountered. However, it should be noted that no patient was admitted to the unit who was older than 4 months of age. Good and excellent results were demonstrated in children treated with PSE in this age range. Cameron *et al.*⁷ have reported excellent, good and fair results in 65, 27 and 8% of patients, respectively, in whom treatment was initiated prior to 3 months of age. For children in whom treatment was initiated later than 3 months of age, 45% needed surgery.⁷

Morrison and MacEwen have reported good to excellent results in all children treated with conservative measures before 1 year of age.⁸ According to Bredenkamp *et al.*,¹ non-operative therapy is mandated for infants younger than 1 year of age, unless there is progressive deformity with treatment. Emery⁹ also used an orthotic collar for children whose head tilt persisted.

Passive stretching exercises are widely used, but there is a lack of consensus about their application and some observers have been unconvinced of their value. The stretching techniques used in some other studies^{1,8} were not

described. In some studies, only one stretch in the lateral rotation of the neck^{2–4,7} or two stretches in rotation and flexion of the neck⁹ were used for treatment. Comparisons of different studies are summarized in Table 3.

On the basis of the results of the present study, prompt diagnosis and early treatment of CMT with concise passive stretching exercises can reverse the deformity in a very short period. Although other investigators^{3,7} have suggested that age at initiation of treatment is a key predictor of outcome, they did not examine the relationship of concise exercises. The more severe the limitation in rotation, the longer treatment duration is necessary.

In conclusion, in patients with CMT treated early, there is no place for surgical intervention. This group of patients can be successfully treated using a very concise protocol of PSE (100% success). In addition, the concise treatment protocol has a very short treatment duration. In developing countries, where no special physical therapist may be available, the success of treatment mainly depends on good cooperation between the pediatric surgeon and the parents.

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