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Factors Correlating Outcome in Young Infants With Congenital Muscular Torticollis

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Abstract

Purpose: No previous study using follow-up ultrasonography for evaluating the factors associated with the successful regression of congenital muscular torticollis in young infants has been published. This study aimed to assess clinical factors and sonographic features potentially influencing regression in patients with congenital muscular torticollis.
Methods: From January 2010 to December 2012, 80 infants underwent neck ultrasonography because of clinical suspicion of congenital muscular torticollis. We statistically analysed the correlation between complete resolution and clinicosonographic findings when complete resolution was defined as no visible lesion on follow-up ultrasonography.
Results: Of the 80 infants, 61 had congenital muscular torticollis and all were followed up by ultrasonography: 1) 34 underwent physiotherapy, and 27 of them (79.4%) revealed complete resolution in follow-up; 2) 27 did not undergo physiotherapy, and 15 of them (55.6%) showed complete resolution. A statistically significant correlation was found between physiotherapy and complete resolution, but not between complete resolution and patient sex; size, volume, and echogenicity of the lesion; and thickness ratio.
Conclusions: Physiotherapy was the only factor influencing complete resolution in young infants with congenital muscular torticollis.

Résumé

Objet : Aucune étude n'avait encore été publiée sur le recours à une échographie de suivi pour évaluer les facteurs favorisant la régression du torticolis musculaire congénital chez les nourrissons. L'étude visait à analyser les facteurs cliniques et les caractéristiques échographiques susceptibles d'induire une régression chez les patients présentant un torticolis musculaire congénital.
Méthodes : De janvier 2010 à décembre 2012, 80 nourrissons ont subi une échographie cervicale en raison d'une suspicion clinique de torticolis musculaire congénital. La corrélation entre la résolution de l'affection et les résultats clinico-échographiques observés, dans les cas où cette résolution était définie par l'absence de lésion visible à l'échographie de suivi, a fait l'objet d'une analyse statistique.
Résultats : 61 des 80 nourrissons présentaient un torticolis musculaire congénital. Tous ont fait l'objet d'un suivi par échographie. Le suivi a révélé 1) une résolution de l'affection chez 27 (79,4 %) des 34 nourrissons qui ont entrepris un programme de physiothérapie et 2) une résolution de l'affection chez 15 (55,6 %) des 27 nourrissons qui n'ont pas suivi de programme de physiothérapie. Nous avons observé une corrélation statistiquement significative entre la physiothérapie et la résolution de l'affection. Toutefois, aucune corrélation n'a été observée entre la résolution de l'affection et a) le sexe du patient, b) la taille, le volume et l'échogénicité de la lésion ou c) le ratio d'épaisseur.
Conclusion : La physiothérapie s'est avérée être le seul facteur à favoriser la résolution du torticolis musculaire congénital chez les nourrissons.

Key Words: Congenital; Neck; Sternocleidomastoid; Torticollis; Ultrasonography

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Congenital muscular torticollis (CMT) is a common disorder involving the sternocleidomastoid muscle (SCMM) and occurs at an incidence ranging from 0.3%-1.9% [1,2]. Neonates or infants with CMT present as a postural neck abnormality, with the head typically tilted towards the lesion side of the neck with the affected SCMM but rotated towards the opposite side of the neck [3,4]. The traditional diagnostic tool for CMT is physical examination [5], but ultrasonography (US), computed tomography, and magnetic resonance imaging are also used to evaluate CMT [6]. In particular, neck US can easily detect CMT and is the imaging modality of choice for the imaging-based evaluation of this condition [7]. A localized or diffuse enlargement of the SCMM, ranging from 8-16 mm in the largest transverse diameter, is a common finding in CMT with neck US [8].

CMT shows uniformly good results if the diagnosis is made early and treatment instituted [4,9–13], whereas most patients show a reduction in the size of the SCMM lesion spontaneously [14,15]. To our knowledge, a few quantitative studies on the clinical outcome in CMT patients have been found [2,3,5,9], but there is no previous study using follow-up US for evaluating the associated factors in complete resolution of CMT. In infants who are clinically suspected of CMT, US is not only a valuable diagnostic tool but also a useful indicator for the treatment [14]. The aim of this study was to assess clinical factors or sonographic findings influencing the outcome in CMT patients, using follow-up US findings as the reference standard and dividing 2 groups according to the application or nonapplication of physiotherapy.

Materials and Methods

Patients

This retrospective study was approved by the Institutional Review Board, which waived the requirement for informed consent. From January 2010 to December 2012, 89 infants (36 girls and 53 boys; age range, 0-5 months; mean age, 1.3 months) with clinical suspicion of CMT (with neck tilt and/or a palpable neck mass) underwent neck US with consent from their parents/guardians. Inclusion criteria were as follows: 1) clinical suspicion of CMT; 2) neck US performed by a radiologist who has 12 years of experience in the sonographic detection of CMT and other neck lesions; and 3) at least 1 follow-up US exam after the initial US. Exclusion criteria were as follows: 1) postural or spasmodic torticollis; and 2) absence of follow-up US. Ultimately, 80 infants (31 girls and 49 boys; age range, 0-5 months; mean age, 1.3 months) fits the criteria for the study.

Neck Ultrasonography

Neck US was performed using a high-resolution ultrasound instrument (iU 22; Philips Healthcare, Andover, MA USA) equipped with a 5-12 MHz linear probe. A single radiologist who had an experience of $\geq$1000 cases/year over 12 years performed the neck US. Sonographic criteria of CMT were as follows: 1) localized or diffuse enlargement of the SCMM in comparison with the adjacent normal portion of the ipsilateral SCMM or contralateral normal SCMM; 2) the absence of a neoplasm or vascular lesion.

The location, anteroposterior and transverse diameter, length, echogenicity, and volume of CMT and the thickness ratio of the SCMM were recorded. The highest values for the anteroposterior and transverse diameters and the length were measured directly. The echogenicity of CMT was classified as isoechogenicity, low echogenicity, and high echogenicity in comparison with the echogenicity of the adjacent normal SCMM. The CMT volume was calculated using an ellipsoid formula according to the shape of the lesion (width $\times$ length $\times$ height $\times$ 0.52). The thickness ratio of the SCMM was defined as the ratio of the thickness of the involved SCMM to the thickness of the normal SCMM.

Physiotherapy

When the parents or guardians of CMT infants required physiotherapy, CMT infants immediately underwent a standard physiotherapy program that involved manual stretching for 30 minutes 3 times per week [2]. Manual stretching followed a standardized protocol: 3 repetitions of 15 manual stretches of the tight muscle with sustained force for 1 second and a rest period of 10 seconds between each stretch. Manual stretching therapy for CMT infants was performed by a physiotherapist who was trained in pediatric neuromuscular disorders. However, the parents or guardians of the infants were taught to carry out a home program of active positioning and passive stretching, regardless of the application or nonapplication of physiotherapy.

Follow-up Ultrasonography

The same high-resolution US instrument (Philips iU 22) was used after physiotherapy in the follow-up of the CMT lesion by the same radiologist. All the CMT patients had the different time interval between physiotherapy and follow-up US, whereas they underwent at least 1 follow-up US exam after termination of physiotherapy. On follow-up US, the interval sonographic change of the previous CMT lesion was investigated, and was used as a criterion for determining whether the successful or failed resolution of the CMT had occurred. The outcome of CMT was classified as follows: no change (remaining muscular lesion of the known CMT), incomplete resolution (decrease but not complete disappearance of the lesion), or complete resolution (complete disappearance of the known CMT, regardless of muscular echogenicity). The cases with complete resolution were classified as successful category, while those with no change and incomplete resolution were classified as failed category (called nonresolution).