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ORIGINAL ARTICLE

Efficacy of bipolar release in neglected congenital muscular torticollis patients

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Abstract Surgical correction of the congenital muscular torticollis (CMT) is recommended for patients with unsuccessful conservative treatment. The aim of this study is to evaluate the efficacy of surgical release of congenital muscular torticollis in neglected cases. We retrospectively evaluated the data of our patients in terms of age, sex, clinical presentation, localization of the lesion, diagnostic tests, and additional abnormalities. The age at operation ranged from 6 to 23 years. Complete muscular release as determined by pre-operative and postoperative range of motion measurements was achieved in all of the patients by bipolar release. In this study, neck motion and head tilt showed marked improvement with surgical treatment in cases with CMT who were admitted to the hospital lately. Congenital muscular torticollis patients can benefit from surgical intervention above the age of 5. Bipolar release is an adequate and complication-free method.

Keywords Congenital muscular torticollis · Bipolar release

Introduction

The word torticollis is derived from two Latin roots, 'tortus' meaning twisted and 'colum' meaning neck [1]. At first, Tubby in 1912 defined it as a deformity, congenital or acquired, characterized by lateral inclination of the head to the shoulder, with torsion of the neck and deviation of the face. The congenital muscular torticollis (CMT) is a neck deformity primarily involving shortening of the sternocleidomastoid muscle, which leads the head to turn toward the affected side and the chin to point to the opposite side [2]. The incidence of CMT is 0.3–1.9% [3]. It is the third most common musculoskeletal anomaly after dislocation of the hip and clubfoot [4]. There appears to be a slight male predominance with a relative ratio of approximately 3:2 [5]. Bilateral involvement is very rarely seen [6].

The key for successful treatment is early diagnosis and physical therapy. There is no need to surgical intervention in 80–97% of the infants with CMT [7]. Although most infants with torticollis resolve spontaneously or with physical therapy, a small proportion has persistent sternocleidomastoid muscle (SCM) fibrosis. Surgical treatment must be performed in cases resistant to conservative measures because congenital muscular torticollis, if untreated, may result in significant permanent craniofacial deformities.

In this article, we report our clinical experience with delayed CMT and evaluate the efficacy of surgery in neglected cases.

Patients and methods

From January 2007 to December 2010, 11 patients were surgically treated for neglected congenital muscular torticollis. Bipolar release technique was performed in all patients. The indications for surgery were a persistent head tilt, deficits of passive rotation, and lateral bending of the neck > 15. The anteroposterior and lateral cervical

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Fig. 1 Torticollis brace used by patients after surgery

radiography were taken in all patients pre- and postoperatively. Under general anesthesia, the involved side was placed under tension by hyperextending the neck and rotating the head toward the shoulder on the unaffected side. The sternal and clavicular attachments were dissected and divided by electrocautery through a 2–3-cm transverse incision placed over the sternal and clavicular heads. A third incision was placed over the site of its mastoid insertion, and these attachments were also divided. Postoperatively, a neck exercise program including active and passive movements was started and immobilization with a torticollis brace (Fig. 1) was applied for 3 months. The neck movement and lateral band were compared with the uninvolved side; the head tilt and operative scar were evaluated by clinical observation and patient satisfaction.

Results

The age at operation ranged from 6 to 23 years. The mean age was 14.6. The left side was involved in 7 patients and right side in 4. None of the patients presented with an additional congenital anomaly. The most encountered complaint at application was the restriction of neck motion. The mean follow-up time was 1 year. There were no recurrences.

Complete muscular release as determined by pre-operative and postoperative range of motion measurements was achieved in all of the patients. An average range of motion of 10° improved to an average of 25° after surgery. There was no infection, hematoma, or loss of neck contour. No injuries to major blood vessels or nerves were encountered. Only one patient, who was a 23-year-old man, showed no improvement of facial asymmetry. All incisions healed without scar hypertrophy. All of the patients were pleased with the result (Fig. 2a, b).

Discussion

Congenital muscular torticollis is due to fibrosis of one or both the heads of sternocleidomastoid muscle. This may also involve the platysma, scalene muscles, and the carotid sheath and may be associated with cervical scoliosis. It is a painless condition, usually presenting during infancy. Intrauterine abnormal position of the fetus and bleeding in sternocleidomastoid muscle due to birth trauma and subsequent hematoma and fibrosis are the factors that are blamed in etiology [8]. Clinical presentation includes a tight SCM muscle, facial asymmetry, limited neck motion, head tilt, and elevation of the ipsilateral shoulder. Most cases of CMT resolve completely either spontaneously or with conservative measures.

A regimen of stretching exercises is the initial form of treatment with positive outcomes for over 90% of the identified cases in children before 1 year of age. Botilinum toxin A has been recommended in recalcitrant cases of idiopathic torticollis to facilitate correction by physiotherapy. Surgical release of the sternocleidomastoid muscle is recommended for patients who fail to respond to physical therapy. Optimum period for surgical therapy is 1–4 years of age to achieve the best result [9]. After the age of five, the form and efficacy of treatment are controversial. Ling have stated that operative treatment is of little value after

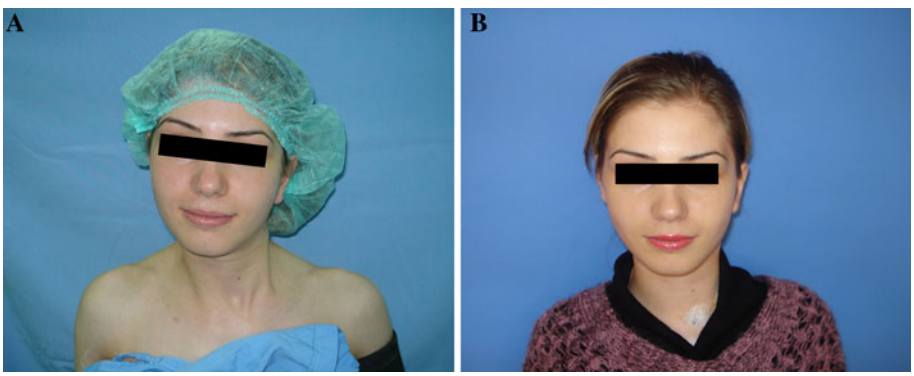

Fig. 2 **a** View of a 19-year-old female patient presented with congenital muscular tortikollis before the operation. **b** The same patient 10 days after the surgery

this age and the results are even worst after puberty [10]. Lee et al. and Minamitani et al. reported that late release of SCM muscle for the patients more than 6 years of age could yield acceptable results [11, 12].

Surgical procedures include unipolar release, bipolar release, release with Z-plasty, post-auricular or transaxillary endoscopic release, and partial or complete muscle resection. Recurrence rates are high (7%) in unipolar release. Z-lengthening can preserve the neck line, but it is difficult to estimate the extent of lengthening intraoperatively [13]. Burnstein and Cohen described an endoscopic approach to division of the SCM using a retroauricular endoscopic access point. This approach, however, places the spinal accessory and greater auricular nerves at risk for injury [14]. Recently, endoscopic transaxillary techniques have been introduced to literature [15–17]. However, these techniques need expensive equipment and extra expertise. The other disadvantage of the endoscopic techniques is that they lengthen the operation time. Regardless of the choice of approach, either open or endoscopic, extensive surgical release of the tight cervical fascia is the key to improved results. Once the SCM tendon has been divided, the contracted structures including the platysma, deep cervical fascia, and the carotid sheath must be fully released, especially in severe cases of CMT

Bipolar release is usually used in older patients with severe deformity. Chen and Ko recommend to perform bipolar release in patients with persistent deformities depending on their experience of 18 delayed cases [18]. Wirth et al. also recommended bipolar release in children 3–5 years old unresponsive to conservative therapy [19]. Kashani et al. reported satisfactory results in a series of adult patients who have been operated by bipolar release [20].

Although it has been thought that the surgical results are not good after the age of 10, we suggest that surgery helps to improve neck motions and correcting the head tilt. Bipolar release is technically simple and clinically effective. Congenital muscular torticollis patients can benefit from surgical intervention above the age of 5. The surgery restores the range of neck motion and resolves the head tilt, and therefore improves the quality of life. Bipolar release is an adequate and complication-free method and must be considered in surgical treatment of neglected cases.

Conflicts of interest All authors hereby declare that they have no conflicts of interest to disclose.

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