

THE OUTCOME OF BIPOLAR RELEASE FOR CONGENITAL MUSCULAR TORTICOLLIS

Israr Ahmad, Khawar Kamran, Malik Javed Iqbal, Mohammad Arif Khan, Awal Hakim, Sana Ullah

Department of Orthopedics and Spine Surgery Hayatabad Medical Complex, Peshawar - Pakistan

ABSTRACT

Objectives: To know the outcome of Bipolar release for congenital muscular torticollis.

Material and Methods: It was a descriptive observational study utilizing consecutive non-probability sampling technique. Patients with CMT and age ranging from 05-12 years were included in the study. Bipolar release was performed in all and outcome was measured with scoring system of Lee et al.

Results: During the study period a total of 14 patients with congenital muscular torticollis (CMT) underwent bipolar release of the Sternocleidomastoid (SCM) muscle. The mean age at surgery was 07.92 ± 2.20 years (range = 05-12 years). Out of 14 patients excellent or good results were noted in 12 (85.71%). A score of 17-18 points was achieved in 09 patients (64.28%) accounting to excellent results whereas 03 patients (21.42%) were graded as good (15-16 points). Fair outcome was noted in one patient (07.14%). Similarly one patient had poor result in the study.

Conclusion: Bipolar release of the sternocleidomastoid is a safe and effective method for treating CMT. It has got few complications and it provides good cosmetic and functional results. It resolves the deformity and restores the neck range of motion.

Key Words: Congenital, muscular torticollis, bipolar release, outcome.

INTRODUCTION

Congenital muscular torticollis is the third most common musculoskeletal anomaly. It is characterized by shortening of the sternocleidomastoid muscle leading to tilting of head towards and chin to the opposite side. Physical therapy yields excellent results when diagnosed early. Surgery is indicated for late presentation or those with residual deformity after physical therapy. The word torticollis is derived from two Latin words; 'tortus' meaning twisted and 'Colum' meaning neck.¹ Congenital muscular torticollis (CMT) is characterized by shortening of the sternocleidomastoid muscle, consequently the head is tilted towards the affected side while the face and chin rotates to the opposite side. The typical presentation is a palpable mass in sternocleidomastoid muscle (SCM) on the affected side with characteristic deformity.² It is the third most common musculoskeletal anomaly preceded only by congenital hip dislocation and clubfoot. The overall incidence of CMT varies from 0.3% to 2.0% of live births.³

If diagnosed early, physical therapy yields excellent results with good neck range of motion and no residual deformity. Surgery is indicated for neglected

cases and those with residual deformity after physical therapy. The best time for surgery is considered to be between 01-04 years of age. Surgical outcome is less predictable after this age group owing to permanent craniofacial deformity.² There are different surgical techniques for treatment of CMT these include bipolar release, unipolar release, subperiosteal lengthening and endoscopic release of the SCM.⁴

Surgical outcome is less predictable in relatively older child so we embarked on studying the outcome of bipolar release in children above 05 years of age. This study would add to the previous knowledge as well as help address the controversies of surgical treatment of CMT in older age group. Late presentation of CMT is a common occurrence in our society so the importance of this current study cannot be over stated in this respect as well.

MATERIAL AND METHODS

It was a descriptive observational study utilizing consecutive non-probability sampling technique. The study was carried out in Orthopaedics unit of Hayatabad Medical Complex, Peshawar from September 2008 to January 2014. The study was conducted after approval from the hospital ethics committee. All the patients with CMT fulfilling the inclusion criterion were included in the study. Radiographs of the cervical spine were obtained in all patients to evaluate for any congenital anomalies of the cervical spine. Careful neurological examination was performed to rule out any spastic paralytic lesions. Only patients with idiopathic CMT with age ranging from

Address for Correspondence:

Dr. Israr Ahmad

Assistant Professor

Department of Orthopaedic,

Hayatabad Medical Complex, Peshawar - Pakistan

Cell: 0300-5948476

Email: israr-312@yahoo.com

05-12 years were included in this study. Patients with neurogenic torticollis and those with congenital cervical spine anomalies were excluded from the study. Pre-operative range of motion of the neck was documented in all patients.

Bipolar release was performed in all the patients under general anesthesia. Proximal incision was made behind the ear just distal to the tip of the mastoid process and the mastoid head of SCM muscle was released. A distal incision was made in line with the cervical skin creases one finger breadth proximal to the medial end of the clavicle and sternal notch. The clavicular head of SCM muscle was released while the sternal head was lengthened by Z-plasty. The required degree of correction was achieved by manipulating the head and neck during the release.

Post-operatively a cervical collar was applied in all cases. Neck range of movement exercises were initiated at six weeks post-operatively followed by strengthening exercises. Patients were followed at 02 weeks, 06 weeks, 03 months, 06 months and finally at 12 months interval. At each follow-up visit, patients were assessed by evaluating the following parameters: Deficits of lateral flexion and rotation of the head, craniofacial asymmetry, surgical scarring, residual contracture and degree of head tilt. The neck movement and lateral band were compared with the uninvolved side and the head tilt and surgical scar were evaluated by clinical observation. The outcome of surgery was analyzed and graded according to the scoring system of Lee et al which graded the outcome as excellent (17-18 points), good (15-16 points), fair (13-14 points) or poor (less than 12 points) on the basis of both function and cosmetic results. The data was collected and analyzed using SPSS version 16.

RESULTS

During the study period a total of 14 patients with CMT underwent bipolar release of the SCM muscle. Lee et al scoring system is shown in Table 1. The mean age at presentation was 07.92 ± 2.20 years (range = 05-12 years). Out of these 14 patients 08 were female (57.14%) while 06 were male patients (48.85%). Right

sided involvement was more common as compared to left. A total of 09 patients (64.28%) had right sided CMT as compared to 05 patients (35.71%) who had left sided involvement Table 2.

Facial asymmetry was noted in 04 patients (28.57%) whereas head tilt was present in all 14 patients. The outcome was graded according to Lee et al scoring system. Out of 14 patients excellent or good results were noted in 12 (85.71%). A score of 17-18 points was achieved in 09 patients (64.28%) accounting to excellent results whereas 03 patients (21.42%) were graded as good (15-16 points). Fair outcome was noted in one patient (07.14%). Similarly one patient had poor result in the study Table 3. Head tilt was corrected in all the patients. Full neck range of movement was achieved in 11 (78.57%) on the other hand 3 patients had less than 10 degrees limitation of rotation as assessed at the last follow up. Excellent cosmetic results were achieved in 13 patients with correction of head tilt and fine or slight scarring however one of our patients developed hypertrophic scar the same patient also had poor result in the study. The only complication noted in the study was the hypertrophic scarring in one patient apart from this no other surgery related complications occurred in any of the patients.

DISCUSSION

The etiology of CMT remains uncertain several theories have been suggested including intra-uterine mal positioning, trauma during difficult delivery, venous congestion and compartment syndrome in the SCM leading to fibrosis and hence the characteristic deformity.⁵ Patients with CMT can be classified into three clinical subgroups. Group 1 is the ones with SMC tumor, it consists of torticollis with a palpable pseudotumor in the body of SCM. This is a hard, movable mass within the substance of the SCM noted at birth, usually located in the middle to lower third of the sternal portion of SCM. The pseudotumor commonly increases in size after its first noted and then gradually resolves over a period of 05-21 months. This is the most common presentation and contributes to 28.2 to 47.2% of diagnosed cases of CMT in infants, Group 2, is muscular torticollis, consisting of torticollis with tightness of the SCM, but no

Table 1: Lee et al scoring system

Points	Neck movements	Head tilt	Scar	Loss of column	Lateral band	Facial asymmetry
3	Full	None	Fine	None	None	None
2	<10° LOR or side flexion	Mild	Slight	Slight	Slight	Slight
1	10-25° or side flexion	Moderate	Moderate	Obvious but cosmetically acceptable	Obvious but cosmetically acceptable	Moderate
0	>25° LOR or side flexion	Severe	Unacceptable	Unacceptable	Unacceptable	Severe

LOR: Limitation of rotation.

Table 2: Patients demographics

Variable	Number of patients & percentage
Gender:	
Male	06 (48.85%)
Female	08 (57.14%)
Site:	
Right	09 (64.28%)
Left	05 (35.71%)

Table 3: Outcome using Lee et al scoring system

Score	Outcome	Number Number of patients & percentage
17-18	Excellent	09 (64.28%)
15-16	Good	03 (21.42%)
13-14	Fair	01 (07.14%)
<12	Poor	01 (07.14%)

palpable tumor. The last group, Group 3 is a postural torticollis without a mass or tightness of the SCM.^{6,7} It is imperative to differentiate CMT from other forms of congenital and acquired torticollis, this requires diligent workup including detailed physical examination and cervical spine radiographs.⁸

If diagnosed early on CMT responds very well to conservative treatment consisting of passive stretching of the muscle. Conservative treatment is the gold standard for CMT in patients below 01 year of age. Surgical correction is recommended for late presentation or those in whom non-operative treatment is not successful.^{8,9} Among the different surgical techniques the bipolar release of SCM is a commonly employed one. In comparison to traditional surgical techniques relatively new treatment modalities such as endoscopic release has been increasingly used in dealing with CMT.¹⁰ More recently Castro et al reported the use of harmonic scalpel for bipolar release of CMT in a 35 year old women. They reported good cosmetic and functional results.¹¹

The bipolar release of SCM as described by Ferkel et al comprises of cutting the clavicular and mastoid attachments of the muscle and in addition performing Z-plasty of its sternal head.¹² This procedure yields excellent results. Ferkel et al in their original series documented 92% excellent/good results.¹² The effectiveness of bipolar release for CMT is well documented in 01-04 years of age and this is considered the best time for surgery.² The surgical outcome is less predictable in relatively older children so we selected the age group ranging from 05-12 years old. Even though the outcome of surgical release for CMT has been documented even in elderly patients, the age group that we selected has not been well studied in isolation. It is postulated that surgical outcome is less predictable above 04 years of

age since permanent craniofacial changes sets in with growing age.² Bheyn BV et al studied the late presentation of CMT between the age groups of 06 and 23 years.¹³ Their results showed significant improvement in neck range of motion and head tilt after bipolar release for CMT. They commented that surgical intervention is beneficial even above the age of 05 years.

In our study excellent/good results were obtained in 85.71% of the patients this is lower as compared to 92% as described by Ferkel et al.¹² We believe that the relatively older age group in our study could be the contributing factor towards the lower excellent/good results. Lee et al studied changes of craniofacial deformity after surgical release for CMT. They concluded that the results of surgery are better when it was performed before 05 years of age.¹⁴ In another study the authors assessed the surgical outcome of CMT in patients older than 08 years by dividing them into two groups; firstly those who were in growing phase and the other who had completed their growth at surgery. The results were statistically better in the first group who were still in growing phase.¹⁵ All of this evidence further emphasizes the importance of early recognition and timely intervention in CMT. However late presentation of CMT is common place in our set up so the current study helps address this issue as well. Ling and Low had previously stated that surgical release is of little value in older age group and results are even worse if done after puberty with higher complication rate as well. More recent evidence is of the contrary view as Lim et al reported that surgical release was beneficial for the treatment of neglected CMT in adults and was not associated with any serious complications, furthermore surgical treatment leads to cosmetic and functional improvements and relieved pain originating from the muscle imbalance brought about by the long-standing deformity.^{2,16} Furthermore 86% excellent/good results have been reported with bipolar release in skeletally mature patients with neglected CMT.¹⁶ Sudesh et al reported 14 patients older than 10 years of age with neglected CMT who underwent surgical release and showed 71% excellent/good results.¹⁷ Permanent craniofacial changes does alter the results of surgical release for CMT but the above data suggests that patients with neglected CMT can still benefit significantly from surgery. Arslan et al reported the use of frontal cephalometric analysis for assessment of facial asymmetry in bipolar release of patient above 06 years of age. They concluded that patients even above 06 years of age can benefit from bipolar release.¹⁸

In the end it is only prudent to discuss limitations of the current study. Firstly the smaller sample size was a major limitation but confining the age group to study the controversial 05-12 years age was its main reason. Secondly the follow up period was relatively low since the study measure craniofacial changes as a result of surgery so a longer follow up period would have been more appropriate.

CONCLUSION

Bipolar release of the sternocleidomastoid is a safe and effective method for treating CMT even in relatively older child. It has got few complications and it provides good cosmetic and functional results. It resolves the deformity and restores the neck range of motion.

REFERENCES

1. Seyhan N, Jasharllari L, Keskin M, Savacı N. Efficacy of bipolar release in neglected congenital muscular torticollis patients. *Musculoskelet Surg.* 2012; 96(1): 55-57.
2. Lim KS, Shim JS, Lee YS. Is sternocleidomastoid muscle release effective in adults with neglected congenital muscular torticollis? *Clin Orthop Relat Res.* 2014; 472(4): 1271-78.
3. Angoules AG, Boutsikari EC, Latanioti EP. Congenital muscular torticollis: An overview. *J Gen Pract.* 2013; 1: 105.
4. Das BK, Matin A, Roy RR, Islam MR, Islam R, Khan R. Congenital muscular torticollis: A descriptive study of 16 cases. *Bangladesh J Child Health.* 2010; 34(3): 92-98.
5. Do TT. Congenital muscular torticollis: Current concepts and review of treatment. *Curr Opin Pediatr.* 2006; 18(1): 26-29.
6. Nilesh K, Mukherji S. Congenital muscular torticollis. *Ann Maxillofac Surg.* 2013; 3(2): 198-200.
7. Cheng JC, Tang SP, Chen TM, Wong MW, Wong EM. The clinical presentation and outcome of treatment of congenital muscular torticollis in infants: A study of 1,086 cases. *J Pediatr Surg.* 2000; 35(7): 1091-96.
8. Macdonald D. Sternomastoid tumour and muscular torticollis. *J Bone Joint Surg Br.* 1969; 51(3): 432-43.
9. Canale ST, Griffin DW, Hubbard CN. Congenital muscular torticollis: A long term follow up. *J Bone Joint Surg Am.* 1982; 64(6): 810-16.
10. Lee TG, Rah DK, Kim YO. Endoscopic-assisted surgical correction for congenital muscular torticollis. *J Craniofac Surg.* 2012; 23(6): 1832-34.
11. Castro MP, Rey RL, Mahía IV, Cembranos JL. Congenital muscular torticollis in adult patients: literature review and a case report using a harmonic scalpel. *J Oral Maxillofac Surg.* 2014; 72(2): 396-401.
12. Ferkel RD, Westin GW, Dawson EG, Oppenheim WL. Muscular torticollis: A modified surgical approach. *J Bone Joint Surg Am.* 1983; 65(7): 894-900.
13. Bhuyan BK. Outcome of bipolar release of the sternocleidomastoid muscle in neglected congenital muscular torticollis. *Medical Journal of Dr. D.Y. Patil University.* 2014; 7(5): 584-88.
14. Lee JK, Moon HJ, Park MS, Yoo WJ, Choi IH, Cho TJ. Change of craniofacial deformity after sternocleidomastoid muscle release in pediatric patients with congenital muscular torticollis. *J Bone Joint Surg Am.* 2012; 94(13): 93-97.
15. Shim JS, Noh KC, Park SJ. Treatment of congenital muscular torticollis in patients older than 8 years. *J Pediatr Orthop.* 2004 24(6): 683-88.
16. Omidi-Kashani F, Hasankhani EG, Sharifi R, Mazlumi M. Is surgery recommended in adults with neglected congenital muscular torticollis? A prospective study. *BMC Musculoskelet Disord.* 2008 26(9): 158-62.
17. Sudesh P, Bali K, Mootha AK, Dhillion MS. Results of bipolar release in the treatment of congenital muscular torticollis in patients older than 10 years of age. *J Child Orthop.* 2010; 4(3): 227-32.
18. Arslan H, Gündüz S, Subaşı M, Kesemenli C, Necmioğlu S. Frontal cephalometric analysis in the evaluation of facial asymmetry in torticollis, and outcomes of bipolar release in patients over 6 years of age. *Arch Orthop Trauma Surg.* 2002; 122: (9) 489-93.

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

- Ahmad I:** Concept and operating surgeon.
Kamran K: Data collection.
Iqbal MJ: Overall supervision.
Khan MA: Manuscript writing.
Hakim A: Operating surgeon.
Ullah S: Bibliography and statistics.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.