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TETHERED CORD SYNDROME : A STUDY OF CLINICAL MANIFESTATIONS AND THEIR SURGICAL OUTCOME

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ABSTRACT **Aims and objectives:** This study aims to analyse the complete profile of patients diagnosed and treated as Tethered cord syndrome (TCS). The factors studied include age, sex, clinical presentations, results, complications and associated congenital anomalies. **Materials and method:** It is a hospital based prospective study conducted over a period of two years at a tertiary care center. The primary cause of TCS was identified and analysed. Patient were followed up for six moths after surgery. Data collected throughout preoperative and postoperative examination and investigations were analyzed and submitted to statistical procedures. **Results and analysis:** A total of 72 patients with TCS were included in our study. The mal female ratio was 2:1 with maximum cases presenting in less than 6 months of age. Predominant presenting complaint was swelling over the backfollowed by neurological deficits. The most frequent spinal dysraphism associated with TCS was lipomeningomyelocele. 8.33% developed postoperative complications of csf leak from wound and superficial skin infection. Associated features like hydrocephalus and syringomyelia were also seen. After 6 months follow-up, there were significant improvements in children compared to adults regarding paraesthesia, lower limb weakness, urinary abnormalities, and bowel abnormalities. **Summary and Conclusion:** TCS is a complex congenital condition which comprises of variety of spinal cord anomalies. It can present at any age group from birth to adulthood. Lipomyelomeningocele was found to be the commonest cause followed by myelomeningocoele. Patients who presented early with minimal deficits were having excellent post op recovery with minimal complications.

KEYWORDS :

INTRODUCTION

Tethered cord syndrome (TCS) is a stretch-induced functional disorder of the spinal cord with its caudal part anchored by an inelastic structure. The clinical presentation results from progressive neurological deficits due to restraint of spinal cord movement and traction due to either anatomical or physiological reasons. Fixation of the spinal cord can be present congenitally or it can occur post-surgery or post traumatic. Most cases are related to spinal dysraphism [1].

The symptoms related to a congenital tethered cord occur most commonly in childhood. The presentation may also differ according to the underlying pathology, with back and leg pain, sensory symptoms, muscle weakness, urinary dysfunction, and neurological deficits being the most common. [2].

Once the diagnosis is established, the neurosurgeon is required to choose among treatment alternatives that will help patients to maintain normal lives while minimizing surgical risks [3]. Since it is a progressive disease, prophylactic surgery is suggested even if patient is asymptomatic to prevent future deterioration. In this work, we presented a study of 72 patients with tethered cord syndrome to evaluate the clinical presentation, imaging findings of such cases, and results of surgical treatment.

AIMS AND OBJECTIVES

This study aims to analyse the complete profile of patients diagnosed and treated as tethered cord syndrome. The factors studied include age, sex, clinical presentations, results, complications and associated congenital anomalies.

MATERIAL AND METHODS

This prospective study was conducted for two years between jan 2020 to December 2021. The patients were diagnosed based on clinical manifestations and radiological features. The primary cause of TCS was identified and analysed. Patient underwent surgery and were followed up for six months. The postoperative features and relative improvement in clinical features after procedures (Urodynamic studies) were analysed. All patients were advised regarding positional change, wound care, physiotherapy, Bowel bladder exercises and nutrition.

Data collected throughout preoperative and postoperative examination and investigations were analyzed and submitted to statistical procedures using statistical packages for social science (SPSS) software. P value was set at < 0.05 for significant results.

A total of 72 patients with TCS were included with 48 males and 24 females, giving a ratio of 2:1. The patients' ages ranged from 9days to 27 years majority being between 0 to 6 months (33.33%)

Majority 43%(n= 31) presented to us with swelling over back, 25% (n= 18) were having urinary symptoms in the form of increased frequency, incontinence, dribbling of urine, 9% (n=6)patients had trophic ulcer. Other patients were having lower limb weakness in 18% (n=13) , numbness in 15% (n=11) and progressive neurological deterioration in 15% (n=11).

The most frequent spinal dysraphism associated with TCS was lipomeningomyelocele (Figure 1) in patients 34.3%(n= 24).The other types of spinal dysraphism that were associated with TCS in the current study are listed in Table 1.

Table 1: Types of spinal dysraphism associated with tethered cord syndrome (TCS).

Type of spinal dysraphism	No. of patients	Percentage
Lipomyelomeningocele	24	34
TCS secondary to myelomeningocele	18	25
Dermal Sinus	8	11
Diastematomyelia	6	8
Meningocele	14	19.4
Spinal cord lipoma	2	2.7

13 (54 %) patients with TCS secondary to myelomeningocele presented with neurogenic bladder ; 6 (25%) had progressive lower limb weakness and 5(21%) presented with difficulty in walking. The patients with diastematomyelia (n=6) had mild symptoms, and TCS was diagnosed in 66% of them, when they were even less than 6 months of age and 25% (n=2) of the 8 patients with dermal sinus manifested neurological deficits.

4 out of 72 patients (8.33%) developed postoperative complications. 3 had csf leak from wound, one had superficial skin infection, all were managed conservatively. The study founded that 18% (n=13) no of patients had associated features like hydrocephalus (n=10) and syringomyelia (n=3).

Urodynamic studies were done in all patients but only patients with urinary complaints showed abnormal reports (Table no.3). Microscopic untethering was done for all patients under general anesthesia (table no.2) Intraoperative adhesions were found in 48 (66%) patients and released in all patients. Thickened filum terminale was found in all patients and required sectioning. After 6 months follow-up, there were significant improvements in children compared

to adults regarding paraesthesia, lower limb weakness, urinary abnormalities, and bowel abnormalities.

Urodynamic study improvements were noted in 13/18 (72.22%) patients, lipoma size decreased in all affected patients, and conus location changed in only 7% patients at 1 year follow-up. 64 of our patients had good recovery (88.88%) of symptoms, 4 (5.5%) had residual deficits and 4(5.5%) had no recovery post operatively.

Table 2: Surgical procedures underwent with pathology

Spine	Number of patients	Percentage
Laminoplasty	16	22.22
Laminectomy	56	77.77
No widening	0	0
Lipoma		
Total removal	2	100
Subtotal	0	0
Dermoid (total removal)	0	0
Filum		
Sectioned	72	100
Not	0	0
Dural adhesion release	40	55.55
Skin primary repair	72	100

Table no 3.: Urodynamic abnormalities

Urodynamic abnormality	No. of patients	Percentage
Hyper-reflexia	10	66.66
Dys-synergy	6	40
Decrease sensation	--	--
Decrease compliance	--	--
Decrease contractility	9	60

DISCUSSION

In our study, 72 patients with TCS were included with 48 males and 24 females, giving a ratio of 2:1, with age group ranging from 9 days to 27 years. In a study done by Wael Elmesallany et al (2019) there were 43 cases, with male female ratio of 2:1 and age group ranging from 2 years to 23 years. Similarly in study by Ved Prakash maurya et al (2016), there were 21 cases, with male female ratio of 1:2 with patients ranging from 1.5 years to 30 years , while Ai jia shang et al Study (2019) had male female ratio of 1.5:1. . In Garg, Tandon etal study, (2014) there were 24 cases with 11 males and 13 females, with ratio of approximately 1:1.

The presenting symptoms in our study were swelling over back (43%), urinary symptoms (25%), lower limb weakness (18%), numbness (15%),progressive neurological deterioration(15%) and trophic ulcer(9%). In Ai-Jia shang etal study (2019), the symptoms were swelling over back (27.38%), urinary symptoms (36%) , bowel abnormalities (11.38%), limb weakness (15.47%), numbness (10.71%),trophic ulcers (4.76%). In contrast Wael Elmesallany etal study (2019) had pain (92%), paraesthesia (80%), weakness of lower limbs (80%), lump (84%), urinary symptoms (80%), and bowel symptoms (72%). Whereas Ved Prakash Maurya etal study (2016) had 6 patients with dermal sinus and fatty filum each ,i.e. 29% cases. In Garg, Tandon etal study, (2014) lower backache was the most common presentation (66.7%), followed by bladder incontinence in 50% cases.

In our study, 3 out of 72 (4.16%) developed postoperative csf leak from wound , whereas in Ai-Jia shang etal study (2019), csf leak was seen postoperatively in 7 cases (2.14%), in Wael Elmesallany etal study (2019) 7 out of 43 (16.27%) developed csf leak, whereas in Ved Prakash maurya etal study (2016) 1 out of 21 cases (4.76%) had csf leak.In Garg, Tandon etal study, (2014) there were no post operative complications. Thus it can be concluded that complication rate post TCS surgery is very low.

Microscopic untethering was done for all patients under general anesthesia. Intraoperative adhesions were found in 48 (66%) patients and released in all patients. Thickened filum terminale was found in all patients and required sectioning.

After 6 months follow-up, there were significant improvements in children compared to adults regarding parathesia, lower limb weakness, urinary abnormalities, and bowel abnormalities.

Urodynamic study improvements were noted in 13 out of 18 (72.22%) patients,in our study .In contrast, 73% patients(11 out of 15), showed improvement after surgery in Wael Elmesallany etal (2019) study. Similarly Ved Prakash Maurya etal study (2016) showed improvement in 60% patients (13 out of 21) , Ai Jia Shang etal study (2019) showed improvement in 62% cases (202 out of 326) whereas In Garg, Tandon etal study, (2014) improvement was seen in 50% cases (12 out of 24).

Thus we conclude that our study showed at par results, comparable with other studies done on Tethered cord syndrome patients.TCS is a complex congenital condition which comprises of variety of spinal cord anomalies. It can present at any age group from birth to adulthood.

Majority of patients were having associated meningocoele or meningomyelocoele. Patients who presented early with minimal deficits were having excellent post op recovery. Only Two patients required re exploration with duroplasty for csf leak from wound.

REFERENCES

1. N. K. Venkataramana. Spinal dysraphism. J Pediatr Neurosci. 2011 Oct; 6(Suppl1): S31–S40.
2. Mukesh Shukla, Jayesh Sardhara. Adult Versus Pediatric Tethered Cord Syndrome: Clinicoradiological Differences and its Management. Asian J Neurosurg. 2018 Apr-Jun; 13(2): 264–270.
3. Wael Elmesallamy, Atef AbdAlwanis & Sami Mohamed . Tethered cord syndrome: surgical outcome of 43 cases and review of literatures. Egyptian Journal of Neurosurgery volume 34, Article number: 4 (2019).
4. Ved Prakash Maurya1 Medha Rajappa2 Vaibhav Wadwekar3 Sunil K. Narayan3 Deepak Barathi4 Venkatesh S. Madhugiri1. Tethered Cord Syndrome–A Study of the Short-Term Effects of Surgical Detethering on Markers of Neuronal Injury and Electrophysiologic Parameters. World Neurosurgery,Volume 94, October 2016, 239-247
5. Ai-Jia Shang, MD,1,*# Chang-Hao Yang,1,# Cheng Cheng,1,# Ben-Zhang Tao,1 Yuan-Zheng Zhang,2 Hai-Hao Gao,1 and Shao-Cong Bai1. Microsurgical efficacy in 326 children with tethered cord syndrome: a retrospective analysis; Neural Regen Res. 2019 Jan; 14(1): 149–155.
6. Kawaljeet garg, Vivek Tandon,Rajinder Kumar,Bhawanishankar Sharma,Ashok kumar Mahapatra,dept of neurosurgery, AIIMS,Newdelhi and AIIMS , Bhuvaneshwar Management of adult tethered cord syndrome, our experience and review of literature; Neurology India: year 2014;vol 62;issue 2;pg 137-143.