

Out Come of Surgical Management of Tethered Cord Syndrome

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ABSTRACT

Objective: To determine neurological outcome after surgical management of tethered cord syndrome.

Material and Methods: This descriptive study was conducted in the department of Neurosurgery, Lahore General Hospital Lahore. Over a period of Three Years From 2012 to 2014. Study Comprised of Fifty Patients after fulfilling the inclusion and exclusion criteria.

Results: The mean age of the patients was 36 ± 10 Years There were 30 (60.0%) male and 20 (40.0%) female patients. There was improvement in neurological status. The distribution of improvement in neurological status, revealed 35 (70.0%) patients had improvement in back pain, 18 (36.0%) improved motor function and 17 (34.0%) improved urinary incontinence.

Conclusion: It is concluded from this study that back pain, motor function and urinary incontinence improve postoperatively in the majority of patients. The rate of symptomatic improvement was greatest for back pain, followed by motor, and then urinary improvement.

Key Words: Tethered cord syndrome, neurological outcome, back pain, motor function, urinary incontinence.

Abbreviations: TCS: Tethered Cord Syndrome. ATCS: Adult Tethered Cord Syndrome.

INTRODUCTION

Tethered cord is a terminology commonly used in literature, which refers to a **short, thickened, and tight filum terminale**, as well as any pathology, which prevents the spinal cord from physiological ascent. It could be **primary** as in the case of spinal dysraphism, or **secondary**, following repair of the myelomeningocele. In the **primary** case, tethering may be result from an inelastic structure anchoring the caudal end of the cord as a short and thick filum terminale, while secondary tethering is produced by a **Tethered cord syndrome (TCS)** consists of **solid adhesion** of the distal spinal cord to adjacent structures, resulting in repetitive spinal cord traction during truncal movements. Clinical signs of TCS include sphincter disturbances, lumbosacral pain sensorimotor deficits and orthopaedic deformity. The aim of the study is to assess the neurological outcome of surgical treatment of TCS.²

Tethered cord syndrome, usually discovered in

childhood, is a development abnormality impairing the longitudinal movement of the spinal cord that can be combined with various forms of spinal dysraphism. Adult onset tethered cord syndrome (ATCS) seems not as rare as once thought, however, low susceptibility in adulthood commonly leads to a delay in diagnosis and therapy.³

Surgical untethering aims the restoration of cranio-caudal mobility of the spinal cord in order to prevent the further progression of symptoms, to restore neurological function, and to improve pain.⁴ Untethering should be performed immediately once the patient shows evidence of symptomatic lumbosacral cord tethering, irrespective of age.

Untethering can interrupt progression of symptoms, but sphincter dysfunction and muscle weakness are more likely to improve or resolve.

Benefits can be seen in all patients, but young children (before 2 years old) have a higher chance to gain favorable outcome. Retethering is a main concern

during follow-up, particularly for the more complicated. lipomyelomeningoceles. Investigations using electrophysiologic and urodynamic studies are helpful for early detection of subtle symptomatic cord tethering or retethering.⁵ After primary repair of a myelomeningocele or a lipomyelomeningocele, patients can present with symptoms of **secondary** tethered cord syndrome.³

In most studies pain was first symptom to improve followed by **motor** symptoms and **urinary** dysfunction.⁶ Most patients had stability of function postoperatively. At 6 month postoperatively, motor function and weakness improved in 10% and of back pain 75% had improved in symptoms.⁴ According to Graces – Ambrossi et al, at 18 months postoperatively, 47% (assumed 30% at 6 months follow up) of patients had improved urinary symptoms, 69% (assumed 40% at 6 months follow up) had improved lower extremity weakness and gait, and 79% had painful dyesthesias. Median time to symptomatic improvement was least for pain (1 month) then motor (2 – 3 months), and then urinary symptoms (4.3 months, $p = 0.04$).⁶

Although there is considerable evidence that surgical release of the spinal cord in patients with adult TCS can result in a high incidence of neurological improvement, there are controversies in postoperative recover and clinical course of improvement of pain, weakness and urinary incontinence. It is needed to be clarified which clinical signs are more favourable to improve and which are resistant to improve. It is also less clear that which are parameters associated with better or poor outcome. So, aim of my study is to evaluate improvement in pain, weakness and urinary incontinence and their pattern of improvement after surgical management of tethered cord syndrome. Outcome of my study will help in better understanding of indication of surgery and prognosis of patient.

MATERIAL AND METHODS

This descriptive study was conducted in the department of Neurosurgery, Lahore General Hospital Lahore. Over a period of Three Years From 2012 to 2014. Study Comprised of Fifty Patients after fulfilling the inclusion and exclusion criteria.

All data was entered and analyzed by using SPSS version 14.0. Chi Square test was applied post stratification with $P \leq 0.05$ as significant.

RESULTS

The mean age of the patients was 36.6 ± 10.7 years. There were 7 (14.0%) patients in the age range of 10 – 20 years, 10 (20.0%) patients in the age range of 21 – 30 years, 16 (32.0%) patients in the age range of 31 – 40 years and 17 (34.0%) patients in the age range of 41 – 50 years (Table 1). In the distribution of patients by gender, there were 30 (60.0%) male and 20 (40.0%) female patients (Table 2).

Table 1: *Distribution of patients by age (n = 50).*

Age (Years)	No. of Patients	Percentage
10 – 20	7	14.0
21 – 30	10	20.0
31 – 40	16	32.0
41 – 50	17	34.0
Mean \pm SD	36.6 ± 10.7	

Table 2: *Distribution of patients by Sex (n = 50).*

Sex	No. of Patients	Percentage
Male	30	60.0
Female	20	40.0
Total	50	100.0

At preoperative visit there were 50 (100.0%) patients had severe back pain and on postoperative visit there were 50 (100.0%) patients had moderate pain (Table 3).

Table 3: *Distribution of patients by preoperative and postoperative back pain (n = 50).*

Back pain	Preoperative		Postoperative	
	No.	Percentage	No.	Percentage
Mild pain	0	0	0	0
Moderate pain	0	0	50	100.0
Severe pain	50	100.0	0	0
Total	50	100.0	50	100.0

At preoperative visit there were 12 (24.0%) patients of Grade – 1 motor function and 38 (76.0%)

patients of Grade-2 motor function. On postoperative visit there were 5 (10.0%) patients of Grade-3 motor function, 20 (40.0%) patients of Grade-4 motor function and 25 (50.0%) patients of Grade-5 motor function (Table 4).

At preoperative visit there were 50 (100.0%) patients had urinary incontinence and on postoperative

Table 4: Distribution of patients by preoperative and postoperative motor function (n = 50).

Motor Function (MRC Scale)	Preoperative		Postoperative	
	No.	Percentage	No.	Percentage
Grade – 0	0	0	0	0
Grade – 1	12	34.0	0	0
Grade – 2	38	76.0	0	0
Grade – 3	0	0	5	10.0
Grade – 4	0	0	20	40.0
Grade – 5	0	0	25	50.0
Total	50	100.0	50	100.0

Table 5: Distribution of patients by preoperative and postoperative urinary incontinence (n = 50).

Urinary Incontinence	Preoperative		Postoperative	
	No.	Percentage	No.	Percentage
Yes	50	100.0	19	38.0
No	0	0	31	62.0
Total	50	100.0	50	100.0

Table 6: Distribution of patients by improvement in neurological status after six month follow up (n = 50).

Neurological Status	Yes		No	
	No.	Percentage	No.	Percentage
Improvement in back pain	35	70.0	15	30.0
Improvement in motor function	18	36.0	32	64.0
Improvement in urinary incontinence	17	34.0	33	66.0

visit there were 33 (66.0%) patients had urinary incontinence and 17 (34.0%) patients had no urinary incontinence (Table 5).

In the distribution of improvement in neurological status, there were 35 (70.0%) patients had improvement in back pain, 18 (36.0%) patients had improvement in motor function and 17 (34.0%) patients had improvement in urinary incontinence (Table 6).

DISCUSSION

The management of tethered cord syndrome with onset of symptomatology occurring in adulthood remains controversial, although the necessity of early surgery in the pediatric tethered cord syndrome population is well established. Tethered spinal cord syndrome in adults is an uncommon entity that can become symptomatic. Although surgery in adults involves greater risk of neurological injury than in children, it is a low-risk procedure with encouraging results. Because neurological deficits are generally irreversible, early surgery is recommended.⁸²

Although postsurgical neurological outcomes in patients with tethered cord syndrome (TCS) are well known, the rate and development of neurological improvement after first – time tethered cord release is incompletely understood. The authors reviewed their institutional experience with the surgical management of adult TCS to assess the time course of symptomatic improvement, and to identify the patient subgroups most likely to experience improvement of motor symptoms. Clinical symptoms of pain and motor and urinary dysfunction were evaluated at 1 and 3 months after surgery, and then every 6 months thereafter. Rates of improvement in pain and motor or urinary dysfunction over time were identified, and presenting factors associated with improvement of motor symptoms were assessed.⁶

Surgical untethering aims the restoration of cranio-caudal mobility of the spinal cord in order to prevent the further progression of symptoms, to restore neurological function, and to improve pain.⁴ Untethering should be performed immediately once the patient shows evidence of symptomatic lumbosacral cord tethering, irrespective of age. Untethering can interrupt progression of symptoms, but sphincter dysfunction and muscle weakness are more likely to improve or resolve. Benefits can be seen in all patients, but young children (before 2 years old) have a higher chance to gain favorable outcome. Retethering is a main concern during follow-up, particularly for the more compli-

cated lipomyelomeningoceles. Investigations using electrophysiologic and urodynamic studies are helpful for early detection of subtle symptomatic cord tethering or retethering.⁵ After primary repair of a myelomeningocele or a lipomyelomeningocele, patients can present with symptoms of secondary tethered cord syndrome.³

In our study the mean age of the patients was 36.6 ± 10.7 years with age range 10 – 50 years. As compared with the study of Garces – Ambrossi et al⁶ the mean age of the patients was 38 ± 13 years, which is comparable with our study.

In our study there were 60% male and 40% female patients. As compared with the study of Aufschnaiter et al⁸³ there were 48% male and 52% female patients, which is comparable with our study.

In our study 70.0% patients had improvement in back pain after 6 months follow up. As compared with the study of Garces – Ambrossi et al⁶ there were 79% patients had improvement in back pain. In another study conducted by Al-Holou et al⁴ 75% patients had improvement in back pain at 6 month follow up, which is comparable with our study. In our study 36.0% patients had improvement in motor function after 6 months follow up. As compared with the study of Garces – Ambrossi et al⁶ there were 40% patients had improvement in motor function at 6 months follow up, which is comparable with our study.

In our study 34.0% patients had improvement in urinary incontinence after 6 months follow up.

As compared with the study of Garces – Ambrossi et al⁶ there were 30% patients had improvement in urinary incontinence at 6 months follow up, which is comparable with our study.

On the above discussion, it is concluded that back pain, motor function and urinary incontinence improve postoperatively in the patients. The rate of symptomatic improvement was greatest for back pain, followed by motor, and then urinary improvement. Patients who experienced improvement in any symptom had done so by 6 months after tethered cord release.

CONCLUSION

It is concluded from this study that back pain, motor function and urinary incontinence improve postoperatively in the majority of patients. The rate of symptomatic improvement was greatest for back pain, followed by motor, and then urinary improvement. Patients who experienced improvement in any symptom had done so by 6 months after tethered cord release.

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