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CASE REPORT

Rehabilitation results of patients with acute transverse myelitis

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Abstract: *Background:* In this study, we aimed to evaluate the efficacy of rehabilitation in patients with acute transverse myelitis (ATM).
Method: The patients were included in rehabilitation program in the rehabilitation unit. Spasticity of the patients was evaluated by modified Ashworth scale at baseline and at the end of treatment. The functional independence measurement (FIM), Barthel index and functional ambulatory scale (FAS) values were as well evaluated at baseline and at the end of the treatment, and the results were compared to evaluate the efficacy of the rehabilitation program.
Results: A total of 13 patients (6 males, 7 females) with transverse myelitis were included in the study. The mean±SD of age of the patients was 14.30±3.14. The mean±SD of duration of disease was 4.5±1.85 weeks. There was statistically significant difference in modified Ashworth scale, FIM, and FAS values when the baseline and after treatment values were compared, which indicated improvement due to treatment ($p<0.05$).
Conclusions: We concluded that in patients with ATM, rehabilitation of patients contributes to clinical and functional improvement of the disease *(Tab. 2, Fig. 1, Ref. 23)*. Full Text in free PDF *www.bmj.sk.*
Key words: acute transverse myelitis, rehabilitation, function, treatment.

Acute transverse myelitis (ATM) is a neurologic syndrome caused by inflammation of the spinal cord. The first excellent description of the clinical picture is that of Gowers in 1886 (1). ATM is a rare syndrome with an incidence of between 1 and 8 new cases per million people per year (2). Most cases occur in children older than 5 years of age. ATM as either idiopathic or associated with a known inflammatory disease (3). There are many diseases that are associated with ATM: parainfectious causes, postvaccinal, systemic autoimmune diseases, multiple sclerosis, paraneoplastic syndrome, vascular disease and spinal arterio-venous malformation may also be the diseases causing ATM[4].

The symptoms of ATM are sudden back pain, numbness, and muscle weakness that starts from the feet and moves upward. ATM may be severe and result in paralysis. There may be loss of sensation, bladder and bowel control. The degree of disability depends on the level of spinal cord and severity of inflammation (2, 5–9). High doses of intravenous corticosteroids such as prednisone, cyclophosphamid, and plasma exchange are therapeutic options in the medical treatment of ATM (10, 11). On the other hand, many patients with TM will require rehabilitative care to prevent secondary complications of immobility and to improve their functional skills.

The aim of rehabilitation in ATM patients are: increasing the patient's strength and endurance, improving co-ordination, reducing spasticity and muscle wasting in paralysed limbs, and regaining greater control over bladder and bowel function. Regarding the prognosis of ATM, the more quickly symptoms develop, the better the chance of recovery. In ATM, recovery begins at 2 to 12 weeks, and continues for up to 2 years.

The aim of this study was to evaluate the efficacy of rehabilitation in patients with ATM. In this study, we demonstrated the rehabilitation results of acute transverse myelitis patients for the first time in the literature.

Methods

Subjects

Patients who were diagnosed as acute transverse myelitis by the Neurology department of Erciyes University Medical Faculty were included in the study. Mass-occupying lesions were ruled out by performing magnetic resonance imagings (MRI). MRI images were not equivocal, and there was no need to perform myelography. All of the patients underwent systemic corticosteroid therapy for a week and then tapered and stopped in Neurology clinic. No plasma exchange and cyclophophamide treatment was performed.

All of the patients with a diagnosis of ATM were included in the study regardless of age, sex, and the existence of comorbid diseases. However, there were no patients with accompanying chronic diseases. The patients all had functional disability and were referred to the Department of Physical Medicine and Rehabilitation of Erciyes University Medical School after the first evaluations were performed and the patients were in stable status.

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Tab. 1. Baseline and after treatment values for Ashworth scale, FAS, FIM, and Barthel Index.

	Ashworth scale		FAS		FIM		Barthel Index	
Patients	B*	A**	B	A	B	A	B	A
1	3	1	2	3	56	74	40	55
2	3	2	0	3	44	62	35	65
3	2	1	1	4	66	76	70	75
4	1	1	1	2	58	88	45	55
5	3	1	3	4	64	92	55	60
6	2	2	1	3	68	64	50	55
7	1	1	1	3	74	92	55	60
8	2	1	3	5	74	82	65	80
9	2	1	3	4	86	112	65	70
10	3	1	2	4	66	84	60	65
11	2	2	1	4	74	92	70	75
12	3	2	1	2	52	56	40	45
13	1	1	2	3	46	64	55	58

*Baseline **After treatment

Rehabilitation program

The rehabilitation program was one hour a day, 5 days in a week during 4 weeks. The therapeutic exercises were; passive and active range of motion, strengthening program for weaker muscles, and muscle strengthening and mobilisation exercises, and neuro-muscular facilitation exercises

Splinting or orthoses were performed when necessary. Ambulation devices and clean intermittent catheterisation (bladder dysfunction patients) were used when appropriate. In addition, baclofen and tizanidine were administerd to the patients in order to prevent spasticity.

The spasticity of the patients was evaluated by Ashworth scale before and after rehabilitation program (12). The functional status of the patients were both evaluated before and after rehabilitation by:

(1) Functional independent measure (FIM) (13).

(2) Barthel index (14).

(3) Functional ambulatory scale (FAS) (15).

The results were compared to evaluate the efficiency of the rehabilitation program.

Statistical analysis

Statistical Package for the Social Sciences for Windows (SPSS Inc., version 10.0, Chicago, IL, USA) for statistical analysis. The results were expressed as mean ± SD with range. The Wilxocin Signed Rank test was used for comparing the scores before and after the treatment. $p<0.05$ was considered to be significant.

Results

Thirteen patients (6 males, 7 females) were included in the study. The mean±SD age of the patients was 14.3±3.1 years (range 8–19). The duration of disease was 4.5±1.8 months (range 2–8). Clinical findings, laboratory test results, and MRI findings were recorded.

Tab. 2. The scores of Asworth scale, FAS, FIM, and Barthel Index at baseline and after treatment.

	Baseline	After rehabilitation	p values
Ashworth scale Median (min-max)	2 (1-3)	1 (1-2)	0.009
FAS Median (min-max)	1 (0-3)	3 (2-5)	0.001
FIM Mean (SD)	64.3± 12.9	79.2±15.8	0.004
Barthel index Mean (SD)	54.2± 11.6	62.9±9.9	0.001

In our case series of 13 idiopathic ATM cases, spinal MRI showed a cervical T2 signal abnormality in 5 cases and a thoracic T2 signal abnormality in 7 of cases, and a patient had multifocal lesions.

Splinting or orthoses were performed to two patients. Clean intermittent catheterisation was used for eight patients. Baclofen and tizanidine were administered to three patients in order to reduce spasticity.

The baseline and after treatment values for Ashworth scale, FIM, Barthel Index and FAS are presented at Table 1. There was a decrease in the median values of Asworth scale, which shows improvement, and the mean and median values of FIM, Barthel Index and FAS were increased, which also indicates clinical improvement.

There was statistically significant improvement after the rehabilitation program at Ashworth scale, FIM, Barthel Index and FAS ($p<0.05$) (Tab. 2.) The improvement at the mean and the median of the scores is shown at Figure 1.

The improvements at Ashworth scale, FIM, Barthel Index and FAS demonstrated the patients decreased spasticity and increased functional status.

Discussion

ATM is characterized by focal inflammation within the spinal cord. It is characterized clinically by acutely developing symptoms and signs of neurologic dysfunction in motor, sensory and autonomic nerves, and nerve tracts of the spinal cord. Weakness is described as a rapidly progressive paraparesis starting with the legs that occasionally progresses to involve the arms as well. Although the temporal course may vary, neurologic function usually progressively worsens during the acute phase from between 4 and 21 days (3).

The most common sensory level in adults is the midthoracic region, though children may have a higher frequency of cervical spinal cord involvement and a cervical sensory level (16). A spinal MRI often shows evidence of acute inflammation (17–19). In our case series of 13 ATM cases, spinal MRI showed a cervical T2 signal abnormality in 5 cases and a thoracic T2 signal abnormality in 7 of cases. And a patient had multifocal lesions.

Patients with ATM should be offered immunomodulatory treatment such as steroids and plasmapheresis, though there is

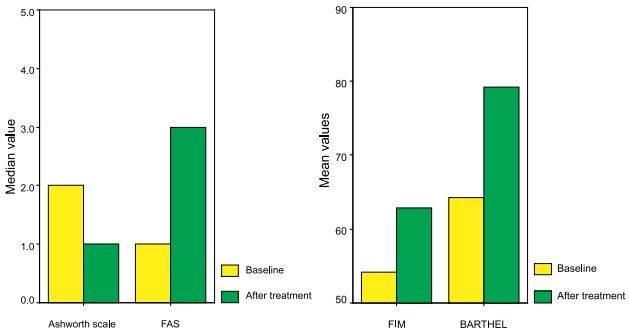

Fig. 1. The comparison of Asworth scale, FAS, FIM, and Barthel Index at baseline and after treatment.

yet no consensus as to the most appropriate strategy. Most TM patients have monophasic disease, while up to 20 % will have recurrent inflammatory episodes within the spinal cord (20, 21). All of the our patients had applied systemic corticosteroid therapy for a week and then tapered and stopped. We think that corticosteroid treatment may be useful for acute period treatment.

The principles of rehabilitation must be applied in the early and chronic phases after ATM. Family education is essential during the early recovery period to develop a strategic plan for dealing with the challenges to independence following return to the community. Physiatrists and physical therapists treat disabilities that result from motor and sensory impairments (22). In this study, we aimed to help patients increase their strength and endurance, improve coordination, reduce spasticity and muscle wasting in paralyzed limbs, and regain greater control over bladder function through various exercises.

Many patients with ATM will require rehabilitative care to prevent secondary complications of immobility and to improve their functional skills. It is important to begin occupational and physical therapies early during the course of recovery to prevent the inactivity related problems of skin breakdown and soft tissue contractures that lead to loss of range of motion. An appropriate strengthening program for the weaker of the spastic muscle acting on a joint and an aerobic conditioning regimen are also recommended. The therapeutic goal is to improve the function of the patient in performing specific activities of daily living (ie, feeding, dressing, bathing, hygiene, mobility) through improving the available joint range of motion, teaching effective compensatory strategies, and relieving pain (23). We evaluated the functional improvement by using three different scales (FÝM, FAS, Barthel index) and achieved statistically significant improvement after a rehabilitation program of four weeks ($p<0.05$).

We observed that this kind of approach to ATM patients was successful and contributes to clinical and functional improvement of the disease. Hovewer, Studies on rehabilitation of ATM could be performed with control patients and long term follow up data are necessary. There was no control group in our study. In addition, the patients were not followed for a long term. Studies on rehabilitation of ATM could be performed with control patients and long term follow up data are necessary.

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