Students' Corner

Characteristics of acute transverse myelitis at Aga Khan University Hospital, Karachi

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Abstract

Objective: To determine the presenting features and etiological classification of acute transverse myelitis (ATM) at Aga Khan University Hospital, a tertiary care hospital in Pakistan.

Methods: Twenty consecutive patients of ATM (1990-2003) fulfilling a preset criterion were analyzed for demographic features, clinical presentation, laboratory investigations and neuro-imaging.

Results: Half of the patients were males and their median age was 29 years (range 6-73 years). Fever, paraparesis, quadri-paresis and bladder dysfunction were the most common presentations. Median score on disability rating scale (DRS) was twelve. Sixty percent of the patients were classified as Idiopathic-ATM while 30% and 10% as Para infectious associated-ATM and Multiple sclerosis associated-ATM respectively.

Conclusion: Idiopathic acute transverse myelitis is the most common type of ATM in the studied population. Our data suggested that the severity of motor impairment is greater in our population than that reported in western literature which might hint to different genetic or environmental etiological factors involved in the pathogenesis of acute transverse myelitis (JPMA 57:215;2007).

Introduction

Acute transverse myelitis (ATM) is a patho-genetically heterogeneous inflammatory disorder characterized by focal inflammation of spinal cord and resultant neuronal injury.[1,2] It has a spectrum of etiologies from infectious to immune and from vascular to idiopathic causes,[1,3] though exact immuno-pathogenesis still remains unknown.[2] Clinical symptoms of ATM are diverse[4] and usually evolve acutely or sub acutely over hours or days as para- or quadri-paresis, a sensory level, or sphincter dysfunction depending upon the level and number of spinal segments involved.[1] It may occur as an isolated entity or may occur in the context of a multi-focal or even multi-system disease.[2] The most important differential diagnoses are Multiple sclerosis, Guillain-barre syndrome and its variants, Infarction of spinal cord and Spinal tuberculosis.[5,6] Accurate differentiation between these conditions is important in terms of therapy and prognosis.[7] The annual incidence of ATM is reported to be as low as 1.34 to 4.6 per million in general population with no significant difference between European-American and Afro-Asian populations.[8,9] This low incidence of ATM makes it a difficult entity to be studied at a large scale.

Studies comparing clinical, laboratory and radiological profiles of the ATM patients are scarce, especially from the developing countries. Thus, this study was conducted to review the characteristics of presentation and etiological classification of acute transverse myelitis at Aga Khan University Hospital, a tertiary care university hospital in Karachi, Pakistan.

Patients and Methods

This study was a retrospective case-series reviewing all the patients of ATM presenting over a period of 14 years (1990-2003) at Aga Khan University Hospital (AKUH), Karachi. All the cases with the principal diagnosis of acute transverse myelitis occurring in the mentioned time period were studied. Only those patients who fulfilled the criteria set by Transverse Myelitis Consortium Working Group were selected as the patient population.[10] Table 1 shows the inclusion and exclusion criteria for the study.

Patient demographics, presenting symptoms, clinical manifestations and investigation were recorded on data entry forms. The investigations included white blood cell (WBC) counts, erythrocyte sedimentation rate (ESR), cerebrospinal fluid (CSF) analysis (for WBC counts, glucose and proteins) and neuro-imaging in the form of computed tomography and magnetic resonance imaging features (involving spinal cord segments in T2-weighted images and gadolinium 64-enhanced lesions on T1-weighted images). As it was a retrospective study, diagnostic procedures could not be standardized for all patients. All the patients were scored for disability on Disability Rating Scale (DRS) according to Rappaport et al.[11] and for power on standard UK system as set by Medical Research Council.[12]

The data entry and analysis was done using Statistical Package for Social Sciences (SPSS) version 10.0 and frequencies were obtained.

Results

Twenty patients were found to fulfill the criteria with male to female ratio of 1:1. Overall mean age was 34 years (Standard Deviation=17.49) with two patients fallings in the paediatric age group (<18 years), both of whom were males. Mean age among males was 35.4 years and that among females was 33 years. No specific trend was observed among the study group in terms of their demographics, which have been described in the Table 2.

The major presenting complaints of the patients were fever, para-paresis, quadri-paresis and bladder dysfunction. Out of the twelve patients presenting with fever, eight had it for more than 5 days. Eleven out of nineteen patients presenting with para-paresis had it for more than 5 days. Similarly, two of five patients with quadri-paresis had it for more than 5 days. Eighteen (90%) patients also had bladder dysfunction as their presentation. In all patients upper limbs were less frequently and severely affected in terms of power. Bladder dysfunction was seen in all patients with quadri-paresis and 94% patients with para-paresis. Altered position sense or proprioception was present in 25% of the patients. Median DRS score was 12 (severe level of disability) with a range of 3-23. The most commonly involved sensory level on spinal cord was T8, occurring in 28% of the cases. Collectively, thoracic spinal cord segments were most commonly involved (72% cases).

On investigation raised white blood cell counts (>10.0x10^9/L) were seen in 35% ranging from 5.7-17.0x10^9/L and raised erythrocyte sedimentation rate (>20 mm/hour) was seen in 83% cases. Cerebrospinal fluid (CSF) pleocytosis was seen in 66% ranging from 2-180 cells (Mean=43 cells). Glucose was normal in 67% of the CSF specimen while proteins were elevated in 44%. Out of 18 patients in which neuro-imaging was performed, 7 (39%) showed signal abnormalities on Magnetic Resonance Imaging. Contrast enhancing lesions were demonstrated in two (11%) patients while three (17%) patients demonstrated edema. No radiological abnormality could be detected in 3 (17%) patients.

Based upon the above-mentioned clinical presentation and investigations, patients were classified according to their etiologies. In 60% of the cases, the principal diagnosis of Idiopathic ATM (Id-ATM) was made while 30% were Para-infectious associated-ATM (PIA-ATM) and 10% Multiple sclerosis associated-ATM (MSA-ATM).

Table 1. Criteria for acute transverse myelitis for study subjects.[10]

Inclusion Criteria	
1.	Development of sensory, motor or autonomic dysfunction attributed to spinal cord
2.	Bilateral signs and symptoms
3.	Clearly defined sensory level,
4.	Exclusion of extra-axial compressive etiology by neuro-imaging
5.	Inflammation within the spinal cord demonstrated by Cerebrospinal fluid (CSF) abnormalities
6.	Progression to nadir between 4 hours and 21 days following the onset of symptoms
Exclusion Criteria	
1.	History of previous radiation of the spinal cord within past 10 years
2.	Neurological deficits consistent with thrombosis of the
3	anterior spinal artery
.	Evidence of connective tissue disease
4.	Arterio-venous malformation
5.	Central nervous system (CNS) infections

*All of the features of the inclusion criteria should be present. Any one of the exclusion criteria is sufficient to rule out the subject.

Table 2. Presenting features of patients with acute transverse myelitis (ATM).

	Cases (%)
Presentation	
Fever	12 (60%)
Para-paresis	19 (95%)
Quadri-paresis	5 (25%)
Bladder Dysfunction	18 (90%)
Etiology	
Idiopathic	12 (60%)
Para-infectious	6 (30%)
MS associated	2 (10%)
Sensory Levels Involved	
Cervical	4 (22%)
Thoracic	13 (72%)
Lumbar	3 (17%)
Altered Position/Proprioception	5 (25%)
Upper Limb Power	9 (45%)
5	6 (30%)
4	4 (20%)
3	1 (5%)
2	
Lower Limb Power	
4	1 (5%)
3	2 (10%)
2	7 (35%)
1	5 (25%)
0	5 (25%)

Discussion

In our series, the most common presenting symptoms were fever, para-paresis, quadri-paresis and bladder dysfunction. Majority of the patients studied suffered from para-paresis and bladder dysfunction. Similar results have been obtained from an Indian study in which all patients had bladder dysfunction and lower limb weakness of grade 2 or less.[13] Thus, the impairment of motor function in the region of Indo-Pak subcontinent seems to be more severe than that reported in the west. Harzheim et al. have also reported para-paresis of the lower extremities as a common finding occurring in only 18% of the patients.[1] Similar results have been reported by other western authors as well.[9,14,15] The severity of ATM in this region might suggest some difference in the underlying genetic or environmental etiological agent. This severity of disease in our part of the world has a worse prognostic implication as combination of severity of weakness and electromyogram has a predicting power of 90.3% about the outcome of ATM.[16]

Another notable difference was in the etiological classification of the ATM. In our study, Idiopathic-ATM and Para infectious associated-ATM were the two most common principal diagnoses. Results from India are in coherence with our findings, reporting the occurrence of Idiopathic-ATM and Para infectious associated-ATM to be 70% and 30% respectively.[13] Reports from the western countries show a relatively lower proportion of Id-ATM and a higher proportion of Para infectious associated-ATM and Multiple sclerosis associated-ATM.[1,8,9,15] This again hints to a different spectrum of genetic or environmental factors involved in the etiology of ATM. Another plausible explanation for this finding can be the lower incidence of multiple sclerosis in Southeast Asia leading to relatively lower proportion of Multiple sclerosis associated-ATM.[17]

Some previous studies have suggested that among all types of acute transverse myelitis, Para Infectious Associated-ATM leads to the greatest impairment of motor functioning.[9] As discussed in the results, impairment was equally worse in both Id-ATM and PIA-ATM in our case series. This might mainly be due to the more severe disease over here as described above, manifesting in both types of ATM.

Magnetic resonance imaging has been considered to be the modality of choice for diagnosis. Despite its high sensitivity, about 40% of ATM remains undemonstrated.[18] The specific value of MRI is to exclude other lesions that can cause para-paresis. Regarding etiology, no clearly different and specific patterns have been found in MRIs. In our study, all the contrast enhancing lesions were seen in the PIA-ATM. Two of three images showing swelling of the spinal cord also belonged to PIA-ATM, the remaining one belonging to Id-ATM. Five out of seven signal abnormalities belonged to the Id-ATM. Besides, all three normal images also belonged to the Id-ATM.

In conclusion, our study suggested that majority of ATM in our population is of Idiopathic type. In terms of presentation, acute transverse myelitis in Indian subcontinent seems to be more severe than that in western countries. This might be due to different environmental or genetic factors playing in this geographical location.

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