# ORIGINAL ARTICLE

## PRESENT SCENARIO OF NON TRAUMATIC QUADRIPARESIS IN A TEACHING HOSPITAL

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**ABSTRACT: AIMS & OBJECTIVES:** Patients presenting with acute quadriparesis may pose therapeutic challenge to the treating physician especially the development of bulbar palsy and respiratory paralysis and require intensive monitoring and treatment in acute clinical and respiratory care units. So this study was conducted to know the etiology of cases of non-traumatic Quadriparesis and its outcome. **MATERIALS AND METHODS:** 50 adult patients admitted in medical and neurology wards with non-traumatic quadriparesis were prospectively studied between October '2012 to September '2014at Government General Hospital, Kakinada, a teaching hospital with rural referrals. **OBSERVATIONS AND RESULTS:** In the study cohort of 50 cases the age of patients ranged from 13 to 80 years with more number of male patients. 29 patients (58%) presented with flaccid and 21 cases (42%) with spastic quadriparesis. Guillian barre syndrome with 18 (36%) cases was the most common cause of quadriparesis followed by Spondylotic myelopathy 11 cases (22%) and Hypokalemic periodic paralysis in 8 cases (16%). Transverse Myelitis. Caries spine. Secondaries cervical spine, spinal epidural abscess were in other cases.7 (14%) patients had cranial nerve dysfunction. 4(8%) patients had facial nerve palsy. **CONCLUSION:** Guillian barre syndrome constituted the most common cause of nontraumatic quadriparesis, followed by Spondylotic myelopathy, Transverse Myelitis. Caries spine. Secondaries cervical spine, spinal epidural abscess. AIDP and Hypokalemic periodic paralysis were the most frequent causes of flaccid quadriparesis while Spondylotic myelopathy was the most common cause of spastic quadriparesis. M.R.I was the most useful and appropriate investigation. Severity of paralysis and need for ventilator support were associated with poor prognosis in patients with acute flaccid quadriparesis. Decompressive surgery in spondylotic myelopathy had good recovery after surgery. Patient recovery was complete in majority of cases in AIDP, transverse myelitis, hypokalemic periodic paralysis. Patients with axonal and mixed pattern of neuropathy had only partial recovery.

**KEYWORDS:** Nontraumatic quadriparesis, AIDP, Hypokalemic paralysis, Spondyloticmylopathy.

**INTRODUCTION:** Quadriparesis implies weakness of all the four limbs. It is one of the common clinical problems encountered in clinical practice. Etiology may vary and may reside in brain stem, spinal cord, motor roots, peripheral nerves, neuromuscular junction or muscles. In clinical practice it is essential to establish etiopathogenesis as early as possible to administer appropriate treatment and to have better outcome and hence the need for proper clinical evaluation and to carry out relevant investigations to arrive at exact diagnosis.

Patients presenting with acute quadriparesis may also pose therapeutic challenge to the treating physician especially the development of bulbar palsy and respiratory paralysis and require intensive monitoring and treatment in acute clinical and respiratory care units.

'There are only few studies on non-traumatic quadriparesis such as Etiological Spectrum of Non traumatic Myelopathies: Experience from a Tertiary Care Centre by RN Chaurasia,[1] A Verma, D Joshi, S Misra et al, Hypokalaemic Periodic Paralysis by AN Joshi, AD Bhatt, AP Jain et al,[2] Clinical Profile of Guillain Barre Syndrome. Shubhangi Vithal Dhadke, Vithal Narayan Dhadke, Sachin S Bangar, Milind B Korade.[3]

Those presenting with compressive myelopathy can now be identified early with latest neuro imaging techniques and taken up for early neurosurgical intervention which may result in satisfactory and good recovery.

Hence the present study is taken up to evaluate the methods of early diagnosis and appropriate management modalities and also to address the other problems cited above.

**MATERIALS AND METHODS:** 50 adult patients admitted in medical and neurology wards with non-traumatic quadriparesis were prospectively studied between October '2012 to September '2014at Government General Hospital, Kakinada, a teaching hospital with rural referrals.

**OBSERVATIONS AND RESULTS**: In the study cohort of 50 hospitalized patients the age of patients ranged from 13 to 80 years with maximum number of patients (74%) between the ages of 21 & 50 years. 32 patients were males and 18 patients were females. (TABLE 1 & 2)

| Age | No. of Patients | Percent |
|---|---|---|
| 11-20 | 3 | 6% |
| 21-30 | 14 | 28% |
| 31-40 | 8 | 16% |
| 41-50 | 16 | 32% |
| 51-60 | 5 | 10% |
| 61-70 | 3 | 6% |
| 71-80 | 1 | 2% |

Table 1: Age Distribution

| Sex | No. of Patients | Percent |
|---|---|---|
| Male | 32 | 64% |
| Female | 18 | 36% |

Table 2: Sex Distribution

Guillian barre syndrome diagnosed in 18(36%) cases, was the most common cause of quadrparesis followed by Spondylotic myelopathy in 11 cases (22%),. 8 patients (16%) were diagnosed as Hypokalemic periodic paralysis. 5 patients (10%) were diagnosed as Transverse Myelitis. 3 patients (6%) were diagnosed as Caries spine. 3 patients (6%) were diagnosed as

secondaries cervical spine. One patient (2%) was diagnosed as having intramedullary tumour in cervical spine. Another one patient (2%) was diagnosed as having spinal epidural abscess. (TABLE 3)

| ETIOLOGY | No. of Patients | Percent |
|---|---|---|
| AIDP | 18 | 36% |
| Spondylotic Myelopathy | 11 | 22% |
| Hypokalemic Periodic Paralysis | 8 | 16% |
| T.M | 5 | 10% |
| Caries Spine | 3 | 6% |
| Secondaries cervical Spine | 3 | 6% |
| Spinal epidural abscess | 1 | 2% |
| Intramedullary Cervical Spine tumor | 1 | 2% |

Table 3: Etiology of non-traumatic quadriparesis

Quadriparesis was sudden in onset in 31 patients, all of them presented with flaccid quadriparesis, 13 patients were presented with insidious onset. 6 patients were presented with subacute onset. A short pyrexia, mild respiratory illness and diarrhea were noted in 15 (48.38%) patients of acute flaccid quadriparesis and in the remaining, 16(51.65%) patients no preceeding illness was noted. Among these 15 patients, with antecedent events, 12 patients were clinically diagnosed as AIDP and 1 patient was diagnosed as transverse myelitis and 2 patients were diagnosed as hypokalemic periodic paralysis.

Flaccid quadriparesis was diagnosed in 31(62%) cases and Spastic quadriparesis in 19 (38%) cases. Ascending paralysis started as paraparesis and ascended to upper limbs was observed in 14(28%) patients. All were clinically diagnosed as AIDP, Descending paralysis was observed in 7(14%) patients. All of them were diagnosed as either AIDP or transverse myelitis. Simultaneous involvement of all 4 limbs was observed in 10(20%) patients. 2 were diagnosed as transverse myelitis and 8 were diagnosed as hypokalemic periodic paralysis. Asymmetric involvement was observed in 19 (38%) patients. All were diagnosed as spastic quadriparesis.

In the present study 7(14%) patients had cranial nerve dysfunction. 4(8%) patients had facial nerve palsy among which 2(4%) patients had bilateral facial nerve palsy. Total external opthalmoplegia was observed in 1(2%) patient. 2(4%) patients had bulbar cranial nerve palsy. All the above patients were diagnosed as AIDP.

Paraesthesias were noted in 36(72%) patients. Objective sensory loss was seen in 20(40%) patients. Root pains were present in 12(24%) patients. Only 8(16%) patients were presented with pure motor system involvement and all of them were diagnosed as hypokalemic periodic paralysis.

In the present study of 50 cases, M.R.I studies were done in 24 patients. In all 24 cases M.R.I was abnormal. Out of the 24 patients 11 patients were diagnosed as having spondylotic myelopathy. All cases had radiological changes such as degenerative changes in cervical disc, osteophytes, reduced disc space, thickening of ligamentum flavum, root compression in neural

foramina, disc protrusion and variable degree of cord compression on MRI. In 3 cases M.R.I showed features of infective spondylosis (caries spine). In 5 cases M.R.I showed features of transverse myelitis. In 3 cases MRI showed vertebral metastasis. In one case M.R.I showed epidural abscess in cervical spine. MRI was helpful in diagnosing 1 case as intramedullary cervical spine tumor. In patients of AIDP and Hypokalemic periodic paralysis MRI was not done**.** (FIG. 1-4)

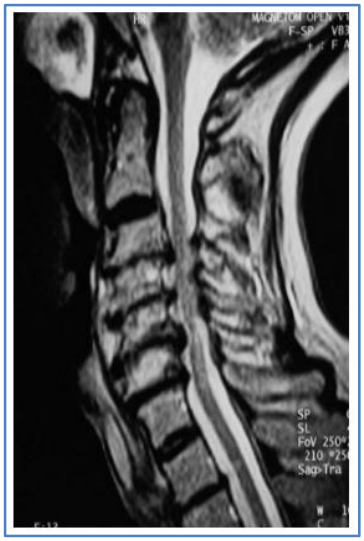

**Fig. 1: Cervical Spondylotic Myelopathy**

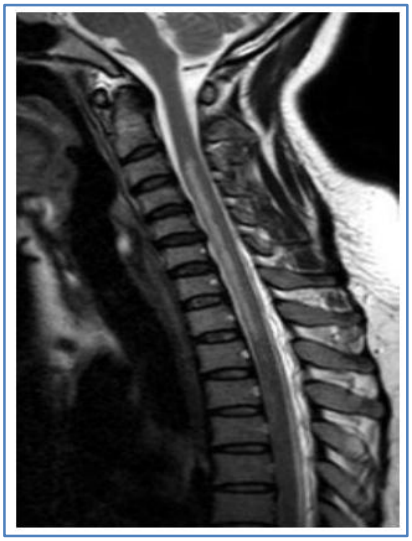

**Fig. 2: Transverse Myelitis**

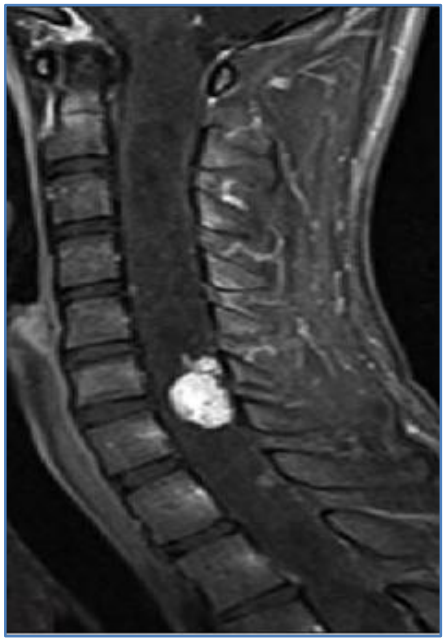

**Fig. 3: Intra Medullary Tumor**

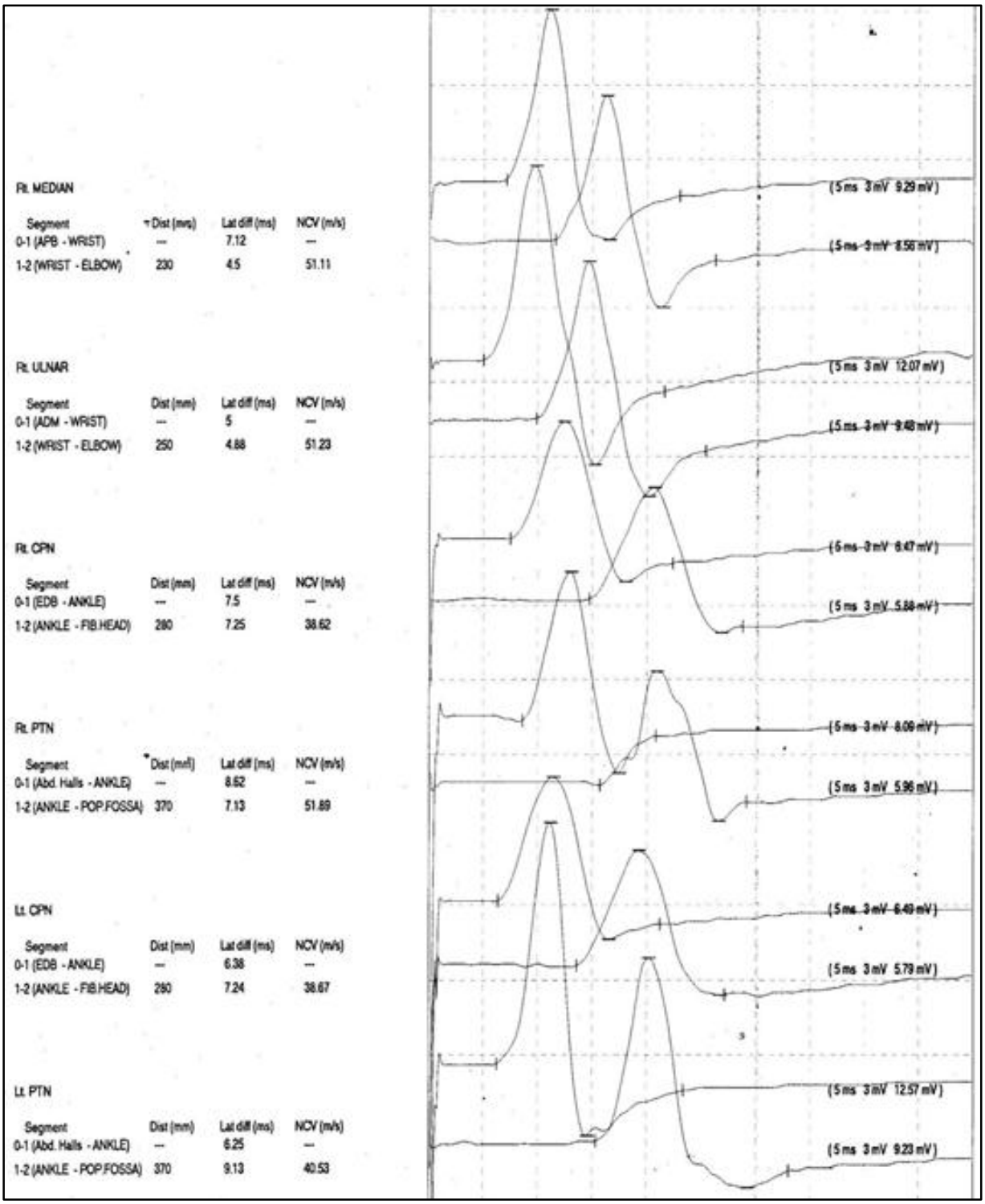


**Fig. 4: nerve conduction study suggestive of demylination**

Autonomic dysfunction was detected in 4(8%) and all 4 patients clinically had features of AIDP. Sinus Tachycardia bradycardia, Postural hypotension Hypertension, excessive sweating.

Among 31 cases of acute flaccid quadriparesis in the present study, 7(22.58%) patients showed evidence of respiratory muscle paralysis. 6(19.35%) of them required mechanical ventilator support. <3.5 meq/lt.

Out of 8 patients of hypokalemic periodic paralysis Serum $K^+$ was <3.5 meq/lt in 50%. C.S.F. analysis was done in 18 patients of AIDP in the present study. Only 2(11.11%) patients were found to have classic albumino-cytological dissociation. Among 5 patients of T.M. in this study, 2(40%) patients showed mild elevation of C.S.F. protein upto 100 mg%.

In the present study all 31 patients presenting with flaccid quadriparesis were subjected to nerve conduction studies and flowing observations were noted. 9 patients were found to have reduced conduction velocities consistent with demyelinating neuropathy and all of them were diagnosed as AIDP. 3 patients were found to have decreased amplitude of action potentials consistent with axonal pattern of neuropathy. 2 patients had mixed pattern of neuropathy. The remaining 4 patients of AIDP had normal conduction velocities. (FIG. 5). In all the 8 patients with hypokalemic periodic paralysis and 5 patients of transverse myelitis, peripheral nerve conduction studies were normal

E.C.G of 4(7.40%) patients showed U waves with hypokalemic periodic paralysis**.**

Complications were noted in acute flaccid quadriparesis group comprising 31 patients in the form of respiratory muscle weakness in 7 patients (22.58%), urinary tract infection in 2 patients (6.45%), pneumonia in 1 patient (3.22%), autonomic disturbances in 4 patients (12.90%).

Severity of neurological involvement and recovery in acute flaccid quadriparesis (31 cases) with power grade 0-2, 17 patients with power grade 3-5. 4 patients with grade 0-2 showed poor outcome and the remaining 10 showed good outcome. All the 17 patients of 3-5 grade power showed good outcome.

3 patients of caries spine underwent decompressive surgery and spinal fixation and all of them regained good motor function. In 9 patients of spondylotic myelopathy, decompressive surgery with spinal fixation was done and 8 patients had good recovery, 1 patient had poor prognosis after surgery, and the remaining 2 patients were given supportive treatment. In one patient with Intra medullary tumor surgery was done and she regained good motor function after surgery. In one patient with spinal epidural abscess emergency surgical decompression was done and the patient had good recovery. One patient with secondaries cervical spine underwent C7 correction and spinal fixation and the remaining 2 patients were transferred to the radiotherapy unit.

**DISCUSSION:** A total of 50 adult patients presenting with non-traumatic quadriparesis admitted in Government General Hospital, Kakinada were studied. A detailed history and clinical examination was done. The investigations were done and treated according to the etiological diagnosis. Where surgical intervention required, cases were referred to neurosurgical unit and followed.

Out of 50 patients, 32(64%) were males and 18(36%) were females. Maximum number of patients in our present study was between the ages of 21 to 50 years. Minimum age of 13 years and maximum age of 80 years was noted in this study.

Out of 50 cases, 31 patients (62%) were presented with flaccid quadriparesis and 19 patients (38%) were presented with spastic quadriparesis. Out of 31 patients of acute flaccid quadriparesis, 18 patients (58.06%) were diagnosed as AIDP which constitute the most common cause of acute flaccid quadriparesis followed by Hypokalemic periodic paralysis 8 cases (25.80%).

This incidence correlates with similar incidence of AIDP greatly out numbering in all other causes of acute flaccid quadriparesis in Australian surveillance. Out of 31 patients of acute flaccid quadriparesis, 5 patients (16.12%) were diagnosed as transverse myelitis.

Out of 19 patients of spastic quadriparesis in the present study, 11 patients (57.89%) were diagnosed as spondylotic myelopathy which was the most common cause of spastic quadriparesis. 3 patients (15.78%) were diagnosed as secondaries spine. 3 patients (15.78%) were diagnosed as caries cervical spine. 1 patient (5.26%) was diagnosed as having intramedullary tumor in cervical spine. 1 patient (5.26%) was diagnosed as spinal epidural abscess.

| Aetiology | Total No. of Patients | Recovered Completely | Recovered Partially | Mortality |
|---|---|---|---|---|
| AIDP | 18 | 10 | 5 | 3 |
| Hypokalemic periodic paralysis | 8 | 8 | - | - |
| Transverse myelitis | 5 | 4 | - | 1 |
| Caries cervical spine | 3 | - | 3 | - |
| Spondylotic myelopathy | 11 | 8 | 3 | - |
| Cervical cord tumors | 1 | 1 | - | - |
| Spinal epidural abscess | 1 | 1 | - | - |
| Secondaries spine | 3 | - | 3 | - |

Table 4: Outcome in 50 Cases of Non Traumatic quadriparesis

A study done by Shubhangi Vithal Dhadke, Vithal Narayan Dhadke,[3] Sachin S Bangar, Milind B Korade et al on Clinical Profile of Guillain Barre Syndrome in 40 patients with higher incidence of cranial nerve involvement and respiratory paralysis, ventilatory support than in our study (table 5).

| Clinical profile | Shubhangi Vithal D[3] hadke[1] et al (n=40) | Present study (n=18) |
|---|---|---|
| Male: female ratio | 1.5:1 | 1:0.8 |
| Antecedent illness | 55% | 66.66% |
| Cranial nerve involvement | 62.5% | 38.88% |
| Respiratory paralysis | 32.5% | 16.66% |
| Sensory symptoms | 32.52% | 88.88% |

| | | |
|---|---|---|
| Sensory signs | 0% | 0% |
| Ventilatory support | 27.5% | 16.66% |
| No.of patients i.v igs given | 35% | 11.11% |
| Mortality | 20% | 16.66% |

Table 5: Comparative study of Clinical Profile of Guillain Barre Syndrome

Loeffel, Rossi et al[4] have quoted 50 % incidence of cranial nerve palsies in GBS in which facial nerve was the commonest.

Winer et al[5] reported that 30-50% of the patients had definitive antecedent illness among GBS patients. Ropper et al[6,7] reported high incidence of 73%. DM Hadden, RAC Hughes et al[8] have mentioned that two third of the patients of GBS will develop the neurological signs and symptoms within one to two weeks from the antecedent illness. One third of these are form of respiratory infection, One fourth have diarrhoea (usually campylobacter jejuni) and one fourth have influenza – like illness[9] The present study correlated with the study done by winer et[5] al regarding the incidence of antecedent illness in GBS patients.

In the present study 2 patients of 18 cases of AIDP were known HIV positive and are on regular Anti -retroviral therapy, both of them presented with diarrhoea.

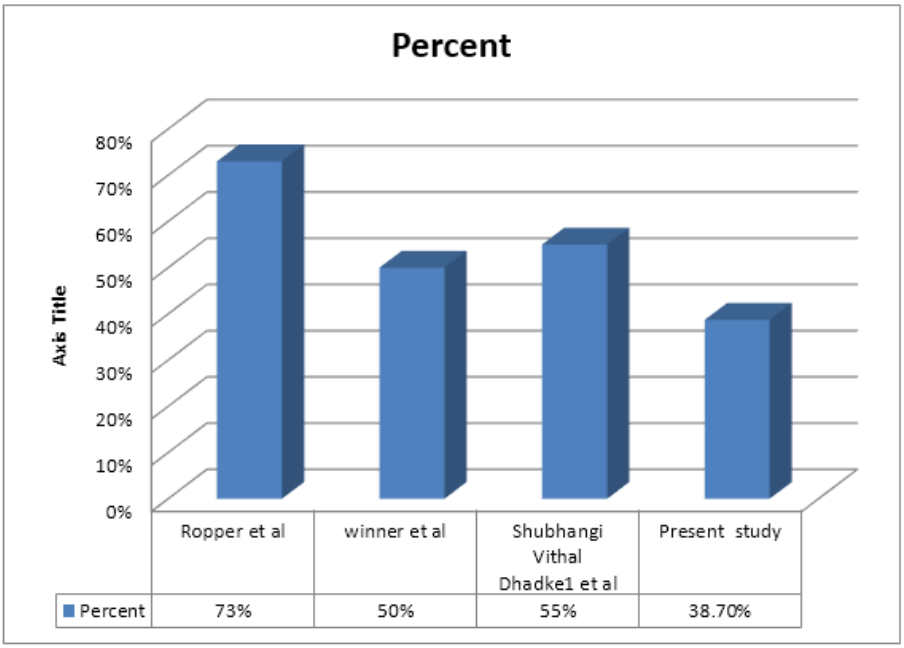


**Fig. 6: Comparative study of antecedent illness**

In the present study, 7 patients of AIDP (38.88%) had cranial nerve involvement. A total of 4 patients (22.22%) had either unilateral or bilateral L.M.N. Facial nerve palsy and is the most frequent cranial nerve involved in the present study. 1 patient (5.55%) had ophthalmoplegia but did not show other features of miller fisher variant. 2 patients (11.11%) had bulbar cranial nerve

palsy (IX to XII cranial nerves) and both of them recovered. This correlated with the study done by Shubhangi Vithal Dhadke et al,[3] Loeffel, Rossi et al[4]

In the present study, autonomic disturbances occurred in 4 (22.22%) patients of AIDP. Transient sphincter disturbances in the form of urinary retention were seen in 5 patients of transverse myelitis.

Respiratory muscle weakness was present in 7 patients (22.58%) of acute flaccid quadriparesis. 3 patients were AIDP (16.66%) 3 patients were transverse myelilitis and 1 patient with Hypokalemic periodic paralysis. All of them were given mechanical ventilatory support.

3 patients of AIDP (16.66%). and 1 patient of transverse myelitis expired inspite of ventilatory support. 1 patient of Hypokalemic periodic paralysis had good recovery after mechanical ventilatory support.

The present study had correlated with the above studies in the incidence of respiratory failure among AIDP patients.In our present study, out of 31 patients of acute flaccid quadriparesis, all the patients with grade 3-4 power at the time of presentation showed good recovery. 10 patients (71.4%) of the 14 patients with grade 0-2 power showed good recovery.

CSF analysis showed albumino-cytological dissociation in 2 patients (11.11%) diagnosed as AIDP.

Good nursing care with Intravenous Immunoglobulins or plasmapheresis is considered as effective mode of treatment of GBS by many studies RDM Hadden et[8] a Rostami A Metal, [10] Ranfala H et al,. IVIG is considered as treatment of choice in GBS in the dose of 400 mg/kg/day for five days by RDM Hadden et al.[8]

Electrophysiological studies were conducted in 31 patients of flaccid quadriparesis. Out of 1 patients of AIDP, 9 patients (50%) showed demyelinating pattern, 3(16.66%) showed axonal pattern, 2 (11.11%) patients showed mixed pattern of neuropathy. Remaining 4(22.22%) patients had normal nerve conduction studies. (Figure 6)

In the study done by Shubhangi Vithal Dhadke1 et al[3] 82.5% of patients had demyelinating pattern of nerve conduction studies which was the most common neuropathy seen. In the study done by Ines Gonzalez Suarez et al[11] demyelinating pattern was found in 58% of patients, Axonal pattern in 7% of patients and normal nerve conduction studies in 2% of patients.

In the present study 50% of the patients had demyelinating pattern of nerve conduction studies which is the most common neuropathy and the present study correlated with above study.

In the present study patients with mixed and axonal pattern of neuropathy showed poor prognosis when compared to patients having demyelinating and normal nerve conduction studies. In the study done by Ines Gonzalez Suarez et al[11] poor prognosis was seen in patients with axonal pattern of neuropathy. All patients diagnosed as Hypokalemic periodic paralysis and transverse myelitis had normal nerve conduction studies.

Many authors[5,6] found to have a normal nerve conductions studies in 9-20% of patients and was higher in first few weeks of the illness. This finding has been explained as due to The patchy nature of pathology of acute inflammatory demyelinating polyneuropathy which means that studies confined to 1 or more nerves may miss abnormal findings and maximum conduction

velocities may conceal abnormalities since conduction can occur normally in some fibres which being partially blocked in others.

Out of 8 patients who presented with motor weakness of both upper and lower limbs simultaneously, clinically diagnosed as Hypokalemic periodic paralysis, only 4 patients (50%) were found to have serum potassium levels <3.5 meq/l. This could be due to inappropriate timing of electrolyte estimation or due to prior treatment before they reached the hospital. E.C.G showed U waves in 4 patients (50%).

In a study conducted by Ahlawat SK, Sachedev [12]et al, 85.8% patients showed u waves in E.C.G. mean serum potassium was 2.3 meq/ lt. There was no occulopharyngeal involvement. 81% were corrected with oral potassium chloride solutions and 19% required I.V potassium chloride.

In the present study there was no occulophoryggeal involvement. 6 patients were treated with oral potassium chloride. 2 patients were treated with i.v potassium chloride.one patient developed respiratory muscle paralysis and mechanical ventilatory support was given and the patient recovered. All the patients were recovered completely.

A study conducted by AN Joshi, AD Butt, AP Jain etal[13]on Hypokalemic periodic paralysis had correlated with the present study.

| Clinical Parameters | AN Joshi, AD[2] Butt, AP Jain etal (n=25) | Present Study (n=50) |
|---|---|---|
| Number of cases | 25 | 8 |
| Acute onset | 14 | 8 |
| Quadriparesis | 15 | 8 |
| Paraparesis | 10 | - |
| Respiratory paralysis | 1 | 1 |
| Ventilator support | 1 | 1 |
| Treatment response | Good response | Good response |
| Heart blocks | 2 | - |
| Mortality | 0% | 0% |
| Recovery | 100% | 100% |

Table 6: Comparative study on hypokalemic periodic paralysis

8 cases were diagnosed as hypokalemic periodic paralysis. With acute onset of illness, 2 cases had antecedent illness gastroenteritis. Only one Patient development respiratory paralysis for which ventilatiory support was given. The respiratory paralysis and quadriparesis promptly responded to i.v potassium replacement similar to above study.

| Etiology | RN Chaurasia et al[1] (n=62) | Present Study (n=19) |
|---|---|---|
| Cervical spondylosis | 34.13% | 57.89% |
| Caries spine | 2.38% | 15.78% |
| Benign neoplasms | 4.76% | - |

| | | |
|---|---|---|
| Secondaries | 0.79% | 15.78% |
| Multiple myeloma | 1.59% | - |
| CV junction anomalies | 4.76% | - |
| Epidural abscess | - | 5.26% |
| Intramedullary tumor | - | 5.26% |

Table 7: etiological causes causing quadriparesis were compared to study chaurasia[1] et al

In the remaining 2 patients surgery could not be done due to myelomalacia and associated co-morbid conditions, they were given supportive medical therapy and had residual paralysis. Six patients of Hypokalemic periodic paralysis were treated with oral potassium chloride and 2 patients were treated with I.V. potassium chloride. All the patients with transverse myelitis were treated with I.V. steroids.

Out of 11 patients with spondylitic myelopathy, 9 patients underwent decompressive surgery and spinal fixation. Out of 9 patients, 8 of them had good recovery after surgery and 1 patient recovered partially following surgery, had poor prognosis and residual paralysis.

A study done by M Hochman et a[14] found that patients operated on within a year of the onset of symptoms were more likely to have favourable surgical outcomes than those who were not. Montgomery and Brower et al[15] found that the prognosis after surgery was better for patients with less than 1 year of symptoms, young age Furthermore, several studies have shown that many patients treated surgically have good outcomes. A prospective study by Mann et al[16] in 50 patients with rapidly deteriorating neurological status showed that more than half of the patients stabilized or improved after surgery. In the present study 9 patients underwent surgery out of 11patients, out of 9 patients,8 patients had good recovery and 1 patient had poor prognosis after the surgery. The present study has correlated with the above studies regarding the outcome of the patients following surgery.

All the 8 patients with Hypokalemic periodic paralysis recovered completely. 10 patients with AIDP recovered completely at the time of discharge. Remaining 5 patients had residual paralysis at the time of discharge. 3 patients of AIDP were expired. 4 patients of transverse myelitis recovered completely and 1 patient was expired.

Out of 50 cases of non-traumatic quadriparesis in the present study, 4(8%) patients were expired. 3 patients had AIDP and 1 patient had acute transverse myelitis. All the 4 patients were expired due to respiratory failure. (Table 4)

**CONCLUSIONS:** Guillian barre syndrome which constitute the most common cause of nontraumatic quadriparesis, followed by Spondylotic myelopathy. Transverse Myelitis. Caries spine. Secondaries cervical spine, spinal epidural abscess. AIDP and Hypokalemic periodic paralysis were the most frequent causes of flaccid quadriparesis while Spondylotic myelopathy was the most common cause of spastic quadriparesis Facial nerve was the most frequently involved cranial nerve. M.R.I was the most useful and appropriate investigation in the cases of cervical myelopathy of various etiologies Severity of paralysis and need for ventilator support were associated with poor prognosis in patients with acute flaccid quadriparesis. Decompressive

surgery in spondylotic myelopathy had good recovery after surgery. Patient recovery was complete in majority of cases in AIDP, transverse myelitis, hypokalemic periodic paralysis. Patients with axonal and mixed pattern of neuropathy had only partial recovery. So early evaluation and management of cases of quadriparesis will decrease morbidity and mortalityand aids in recovery.

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**ABBREVATIONS TO MANUSCRIPT:**

| | | |
|---|---|---|
| A | = | Ascending. |
| AIDP | = | Acute Inflammatory demyelinating polyneuropathy. |
| ASY | = | Asymetrical. |
| ANS | = | Autonomic Nerves System. |
| CS | = | Cervical Spondylosis. |
| D | = | Descending. |
| HPP | = | Hypokalemic periodic paralysis. |
| MRI | = | Magnetic resonance Imaging. |
| NCS | = | Nerve Conduction Studies. |
| R. P | = | Residual paralysis. |
| RTI | = | Respiratory Tract Infection. |
| S | = | Simultaneous. |
| SNS | = | Sensory Nerves System. |

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