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Schwannomas are the most common tumors of spine. Dumbbell schwannomas are more commonly found in cervical spine. Complete excision of schwannoma is mandatory to prevent its recurrence. However, at times it becomes difficult and rather impossible in certain cases of giant schwannomas. It is more so when there is no intraoperative neurophysiological monitoring.

In this regard here we present 11-year-old boy with giant dumbbell schwannoma at the level of C2 cervical spine. The boy presented with progressive left upper limb weakness. He started having a lump, which got more prominent with time, on the back surface of left upper neck. MRI showed mass at C2 starting from left intradural space extending to extraforaminal space. The mass was giant measuring about 100 mm and was homogeneously enhanced with contrast (**Figure 1**).

Surgery was planned through extraforaminal approach. A curvilinear incision was given with the vertical limb of incision in the midline. Extraforaminal giant mass was approached first. Surrounding dissection of the mass was done. Foramen was approached and foraminotomy was done along with small hemilaminotomy of C2 on left side. Total mass was excised in block through the foramen doing durotomy.

Neurophysiological monitoring is essential intraoperatively while operating on such cases to minimize possible neurological deficit.² However, in our context,

Complete Excision of Giant Dumbbell Schwannoma without Neurophysiological Monitoring

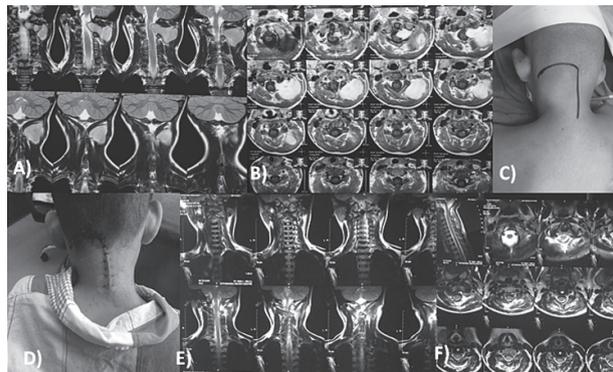


Figure 1: A, B) Preoperative MRO TIW with contrast Coronal and Axial view showing giant dumbbell schwannoma at C2 level on left side, C) intraoperative position and incision mark, D) post operative wound, E, F) post operative MRI showing complete excision of mass

since it is not yet available in Nepal, we did complete excision without any monitoring. Surgery was done with through understanding of local anatomy as depicted by MRI. As a result neurovascular structures were spared and the boy improved significantly after surgery.

Such surgical procedure often require instrumentation like pedicle or lateral mass screw to stabilize spine as facet joint is often disrupted in such cases.^{1,3} However, in our case we didn't disrupt facet joint, rather did small foraminotomy and small hemilaminotomy through which mass was completely excised.

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Case Report

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Vaccine Induced Acute Transverse Myelitis: A Case Report

Acute transverse myelitis is a focal inflammatory disorder of the spinal cord. One of the main etiologic factors include, multiple sclerosis, post-infectious and post-traumatic events although autoimmune phenomenon is the most common cause.² Transverse Myelitis (TM) due to etiology other than Multiple Sclerosis has shown spinal cord involvement of two or more segments. Annually millions of active immunization with vaccines is carried out globally with few transverse myelitis caused because of the adverse reactions due to these vaccinations. In order to improve accuracy of reporting, research and diagnosis, the Transverse Myelitis Consortium Working Group (TMCWG) have produced criteria for the diagnosis of ATM. Here we report a case of TM in adult, diagnosed as TM consistent with the TMCWG criteria and probably this is the first ever been reported case from Nepal.

Key Words: acute transverse myelitis, autoimmune, vaccine

Acute transverse myelitis is a focal inflammatory disorder of the spinal cord.³ One of the main etiologic factors include, multiple sclerosis, post-infectious and post-traumatic events⁷ although autoimmune phenomenon is the most common cause.⁷ Transverse Myelitis (TM) due to etiology other than Multiple Sclerosis has shown spinal cord involvement of two or more segments.⁵ Annually millions of active immunization with vaccines is carried out globally with few transverse myelitis caused because of the adverse reactions due to these vaccinations.^{2,9} In order to improve accuracy of reporting, research and diagnosis, the Transverse Myelitis Consortium Working Group (TMCWG) have produced criteria for the diagnosis of ATM.¹¹

Here we report a case of TM in adult, diagnosed as TM consistent with the TMCWG criteria and probably this is the first ever been reported case from Nepal.

Case Report

An otherwise healthy 38-year-old male presented to the Neurology clinic with the complaint of progressive weakness of both of his lower limbs that began 2 days earlier. Before the onset of weakness, he felt mild pain associated with the tingling sensation from the waist down. Several hours later after that he felt difficulty in passing urine and burning sensation while passing it eventually urinary urgency. He visited the local hospital and was prescribed metronidazole and pain killer with the diagnosis of Urinary Tract Infection (UTI). Symptoms, however, did not get relieved despite medications. On the next morning, he noticed that he was able to raise his legs only with great difficulty. Weakness progressed ultimately resulting to an inability to stand. He also noted that he had numbness below his nipple line and neck flexion triggered

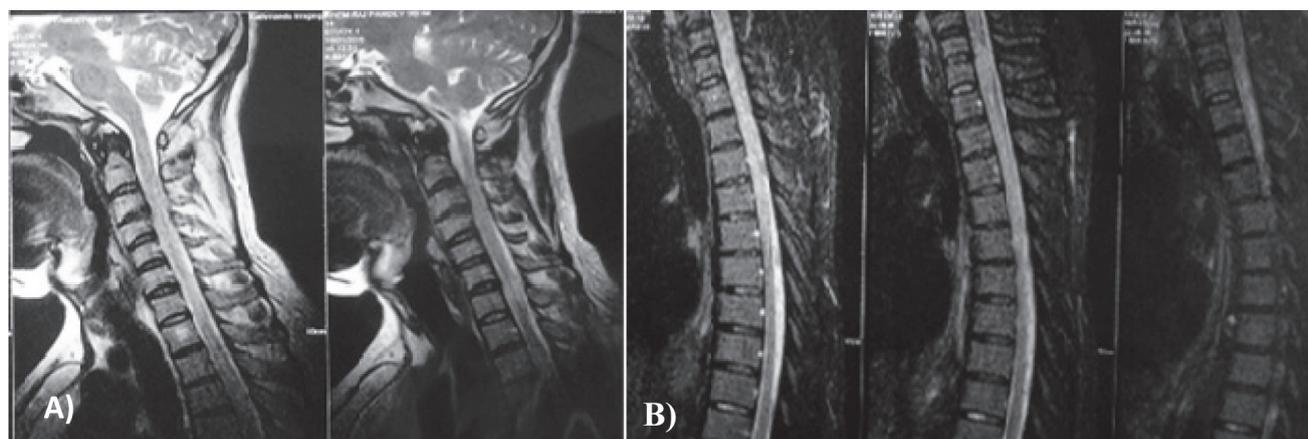


Figure 1: Sagittal images of the spine demonstrating diffuse high signal in T2WI at the level of lower cervical and upper dorsal spine

an electrical like sensation going till coccyx. Ten days prior to the onset of these symptoms, he had received vaccination for MMR and Influenza as a part of vaccination program before immigration to the USA. Examination revealed he was afebrile, with normal fundi, cranial nerves and upper limbs. Examination of lower limbs demonstrated slightly reduced tone, a pyramidal pattern of weakness, and moderately brisk reflexes with ankle clonus and extensor plantars of bilateral lower limbs. Sensory examination showed diminished sensation below T5/6 without the clear cut level. Abdominal reflexes were absent. Initial investigations revealed mild neutrophilic leukocytes and slightly raised ESR. Other routine investigations were within normal limits. An urgent MRI scan of the spinal cord was performed. No epidural collection or herniated disc or discitis was noted. However there was abnormal signal noted within the cord revealing the short segment patchy area of high intensity in cervical spinal cord at C7 to D5 levels (**Figure 1**). Muscle Research Council (MRC) scale showed muscle power bilateral upper limb as normal and bilateral lower limb as 1/5. Cerebrospinal fluid had a protein concentration of 20mg/dl, a glucose concentration of 3.5mmol/l, and a white blood cell count of 1/cumm with 100% lymphocytes. Bacterial and viral cultures as well as oligoclonal bands results were negative. All other lab investigations revealed no abnormality.

Steroid with high dose (~15mg/kg body weight) followed by rapid tapering (~2 weeks) and then pulse therapy for another 2 weeks was used as a main line treatment besides giving other supplements like calcium. Therapy also included physiotherapy along with the acupuncture therapy.

Discussion

Ever since the age of vaccine has started, the morbidity and mortality caused by many infectious diseases has been

successfully declining over time. The function of vaccines is to initiate and produce antigen-specific IgG antibodies and stimulate body's immune system without actually causing the disease. However despite the usefulness of vaccines, attention has now shifted to the complications that arise after vaccination. Several complications related to neurological conditions like Guillain Barr Syndrome, Transverse Myelitis, Neuromyelitis Optica, Acute Disseminated Encephalopathy are being reported with several vaccines though not proven. The probable diagnoses are based on biological and laboratory evidences or in some cases epidemiologic evidences.¹⁶ TMCWG criteria states that in order to diagnose as TM, there needs to be exclusion of idiopathic TM, Bilateral signs and/or symptoms (though not necessarily symmetric), exclusion of extra-axial compressive etiology by neuroimaging.¹¹ Our case fits well with these criteria since our case has dysautonomic function and MRI evidence of diffusely high signal in D5 level and onward. There are some hypotheses regarding the possibility of TM following vaccination as this is not a usual adverse event^{8,6,4} and the causal relationship of vaccination with TM has not yet been well established.¹⁵ Only few (around 5) cases of TM following Tetanus toxoid (Td) and diphtheria-tetanus-pertussis (DTP) as a single vaccine or in various combinations have been reported so far.^{17,12} Out of those cases, only one is TM following Td vaccination.^{1,6,12,13,17} The hypotheses for vaccine induced neuroinflammatory disorder emphasize on the concept of autoimmunity where there is cross reaction of antibodies and T cells to CNS and PNS neural epitopes.¹⁴ There is another, "Molecular Mimicry" hypothesis which basically states that immunization may result in autoimmune disease because the proteins on microbial pathogens are similar to the human proteins and thus induce immune response that damage the human cells¹⁵ with some conflicting reports on animal studies.¹⁴

Conclusion

Transverse myelitis is an inflammatory disorders that are characterized by acute or sub acute motor, sensory, and autonomic (bladder, bowel, and sexual) spinal cord dysfunction. Demyelinating diseases (of neuroinflammatory origins) might also be caused due to the cross reaction from vaccines, although very less likely. However, to establish the causal relationship, large based case studies, with studies on animal model and molecular level are needed.

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