Chemical Meningitis Caused by Spontaneous Rupture of Spinal Teratoma

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Abstract

Chemical meningitis is a medical condition characterised by sterile meningitis that usually develops in certain patients after neurosurgical procedures. Its acute clinical course and standard laboratory findings are indistinguishable from those of bacterial meningitis. We hereby describe a case who presented with clinic-investigatory profile suggestive of acute bacterial meningitis. Patient showed good response to standard antibiotics and steroids, but deteriorated on stopping steroids. MRI brain showed hyperintense signal in the frontal horns of lateral ventricle on T1 weighted images suggesting presence of fat. MRI spine confirmed presence of ruptured teratoma in lumbo-sacral region which had caused chemical meningitis. Patient responded well to steroid therapy. Tumour histopathology confirmed the diagnosis of mature cystic teratoma.

Case Report

A 32 year old male presented with history of headache, neck ache, vomiting and fever for last 3 days. On examination, patient was conscious, he had bilateral facial palsy of lower motor neuron type, right 6th nerve palsy, left pupil was dilated, relative afferent pupillary defect present on left side, vision of left eye was restricted to hand movement at 1 feet (nasal half was affected more than temporal half). Fundus examination was normal. Patient had neck rigidity but there was no other sensory motor deficit. CT scan of head was normal. His cerebrospinal fluid was turbid, with neutrophilic pleocytosis (TLC 3000, neutrophils 80%), high proteins (118 mg %), and low sugar (34 mg%, blood sugar 120 mg %). His hemogram also revealed neutrophilic pleocytosis. Patient was put on intravenous broad spectrum antibiotic coverage with steroids. On the third day his blood and CSF culture results revealed no growth. Patient showed good clinical recovery, he became afebrile, headache and neck rigidity disappeared, right eye abduction also improved. But bilateral facial palsy and visual blurring on left side persisted. Patient’s blood counts also came down to normal. Steroids were stopped after 5 days. On 7th day patient again started complaining of headache and developed fever. His repeat blood counts were 22,000 (polymorphs 90%). Lumbar puncture was repeated which revealed purulent CSF, very high counts 41000 (polymorphs 80%), low sugar (10 mg %) and high proteins (547 mg %). Repeat contrast enhanced MRI of head did not show any parenchymal abnormality or meningeal enhancement. However on carefully reviewing MRI we could see subtle hyperintense signals on T1 weighted images in left frontal and temporal horns of lateral ventricles (Figure 1). CT cuts ruled out any bleed. This suggested that patient had fat droplets in his lateral ventricles and he was suffering from chemical meningitis. Though patient did not have any stigmata of spinal dysraphism, since there was no history suggestive of any external source and MRI of brain did not show any mass lesion, MRI screening of whole spine was done. In lumbo-sacral region a large extradural cystic mass was seen extending from L5 level up to S3 region, along with tethered cord and fat intensity signals at the L3-4 and D3-4 level (Figure 2). This confirmed that this patient was suffering from chemical meningitis caused by spontaneous rupture of the cystic tumor. Repeat culture reports were also sterile. Patient responded well to parenteral steroid followed by oral steroids. Tumor excision was done one month after the ictus. Histopathological examination confirmed diagnosis of mature cystic teratoma (Figure 3).

Discussion

Teratomas are histologically characterized by the presence of tissues that are endomesoectodermal in origin and are thought to be from cells that did not differentiate during embryogenesis. The presence of teratomas in spine is extremely rare. Moreover, a spinal teratoma is less common in adults. Because of slowly growing nature; these tumors can reach rather large sizes without producing any symptoms or findings. Although their nature is benign, they may cause high morbidity and mortality, when rupture occurs. Spinal cystic tumors can rupture after surgery, after a trauma or spontaneously. Fat droplets spreading into ventricles and subarachnoid space secondary to rupture of the tumor are typical findings in magnetic resonance imaging. Clinical consequence of rupture is chemical meningitis resulting in headache, vomiting, fever, vision problems and even altered sensorium and coma. Existence of fat droplets in subarachnoid space and ventricular space may lead to arachnoiditis and ventriculitis with resultant neurological deficits and behavioral problems. Teratomas are often confused with dermoids as both of them contain fat. Radiological criteria cease to exist regarding intraspinal teratoma; these neoplasms continue to be
pathological surprises. Although chemical meningitis has been described in neurosurgical literature since the time of Cushing, this entity is not known to many internists and neurologists who may be involved in the care of patients with meningitis. There is only limited information to help distinguish such patients from those with bacterial meningitis. Chemical meningitis can be confused with acute bacterial meningitis. The results of CSF gram stain (positive in only 60% cases) cannot rule out infection. Hence, empirical antibiotic therapy is necessary until the results of CSF cultures are known. Sensitivity of CSF culture ranges from 80-90% for different organisms and that too is decreased if patient has taken oral or intravenous antibiotics prior to the test. Our patient was on oral antibiotics for three days before he reported to us. Presence of focal neurological deficits in an adult is a rare finding in pyogenic meningitis and suggests possibility of alternative diagnosis. However, Beek et al6 found focal neurological deficits in 33% of their adult bacterial meningitis cases.

One potential approach to the management of patients with acute meningitis, where most confusion occurs, is to treat all patients with CSF pleocytosis for 2-3 days until results of CSF and blood cultures become available and to discontinue antibiotics if the results are negative. Because the results of spinal fluid cultures can be negative in patients with bacterial meningitis, this cannot be used as sole criteria for differentiating two entities. Carefully reviewing history, neuroimaging and CSF findings along with clinical course remains the only approach for management of such patients.

References