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Central Pontine Myelinolysis in a Normonatremic Child

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Central pontine myelinolysis (CPM) is a rare acquired demyelinating disorder of uncertian etiology, that primarily affects the pons. This uncommon condition was first described as a terminal event in severe alcoholism or in other forms of malnutrition. The disorder was once considered universally fatal and, in fact, the diagnosis of CPM was not accepted without autopsy verification(l). Thus, information about prognosis was limited. Newer imaging techniques have made antemortem diagnosis of CPM possible, and it is now evident that this disorder is not uncommon, and that patients make partial or even complete recovery(2,3). We report this disorder in a normonatremic boy who developed a locked-in' state and made near complete recovery.

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Manuscript received: May 7, 1996;
Initial review completed: June 18,1996;
Revision accepted: September 11,1996

Case Report

A 9-year-old school going boy was hospitalized with hectic fever of 10 days duration. Two days prior to admission he was noted to be drowsy. Past history involved chemotherapy for tubercular pleural effusion in June 1991. On admission he looked toxic, malnourished and dehydrated. He had a temperature of 40° C, but no rash, lymphadenopathy, jaundice or petechial hemorrhages were detected. He was stuporose and his neck was supple. Pupils were equal and reactive and fundoscopy did not reveal papilledema or hemorrhages. Kayser-Fleischer ring was not detected. The deep tendon jerks were lively and symmetrical and the plantar response flexor (Glasgow coma scale 7). A differential diagnosis of cerebral malaria, viral encephalitis and enteric fever with encephalo-

pathy was entertained. Parenteral quinine hydrochloride, ciprofloxacillin and acyclovir were administered.

Routine laboratory investigations revealed a hemoglobin of 9 g/dl with normal total and differential counts. Urine examination revealed 10 to 12 pus cells per cu mm. Blood and urine cultures were sterile and the Widal test was negative. Serum calcium, phosphorus, glucose and liver function tests were normal. Serum electrolytes were: sodium 140 meq/L, potassium 4 meq/L and chlorides 90 meq/L. CSF was clear, and contained 3 lymphocytes per cu mm, 100 mg/dl proteins and normal sugar. Gram stain and acid fast bacilli stains were negative. IgM serology for *Herpes simplex* virus in cerebrospinal fluid was negative. IgM for cytomegalo-virus was not elevated. Elisa for cysticerus in blood was negative. Serology for Japanese encephalitis was not performed. Computerised tomography (CT) revealed low attenuating lesions *(Fig.* 2) of the thalamus bilaterally that did not enhance with contrast. The boy had generalized tonic clonic status epilepticus the day after admission which was controlled with intravenous diazepam and phenytoin sodium. He remained in grade 3 coma for 5 days after hospital admission. Subsequently, he was noted to be quadriplegic with bulbar palsy. Magnetic resonance imaging (MRI) 2 weeks after hospitalization revealed extensive central area of hyperintensity in the pons with sparing of the periphery, and of the thalami

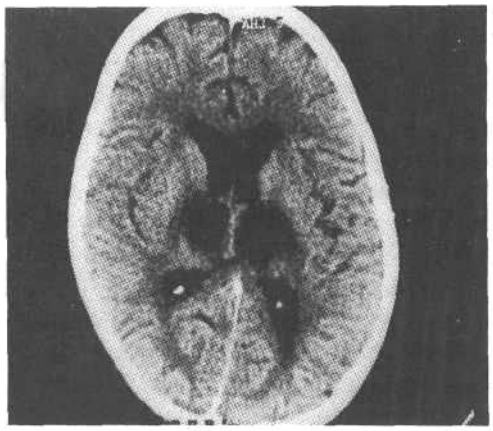

Fig. 1. CT scan at the level of thalamus and lateral ventricles. Extensive hypodense lesions are seen in both thalamii.

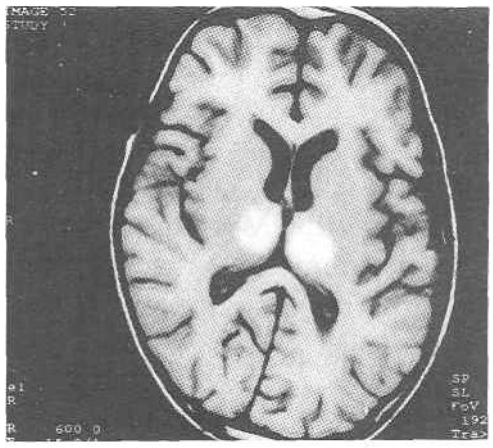

Fig. 2a

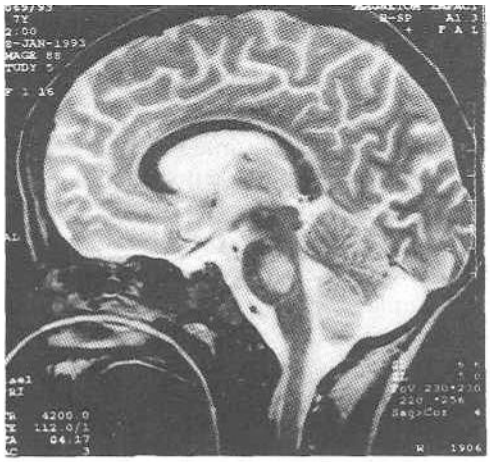

Fig. 2b

Fig. 2. Proton density and T_2 weighted magnetic resonance images in axial and sagittal planes reveal well defined bilaterally symmetrical central areas of increased signal intensity in the thalamii and the central pons. The rest of the brain parenchyma is normal.

(Figs, 2*a* & *b)*. He was managed conservatively and discharged from hospital in a 'locked-in' state after 2 weeks, He was followed up on outpatient basis periodically and at four months after discharge had made almost total recovery. At the last review, two years after discharge mild dysarthria was the only residual deficit noted.

Discuss ion

CPM was first described by Adams and co-workers in 1959(4). By 1976 more than 150 cases of CPM verified at autopsy had been collected(l). CPM. is not a primary disease but rather develops on a background of other, usually severe conditions. These diseases often result in multiple derangements such as sepsis, electrolyte disturbances and malnutrition(5). Liver disease was associated in 70% of cases, Wernickes encephalopathy in 28% and Wilson's disease in 14% of cases. Other conditions associated with CPM have included hyponatremia, carcinoma, leukemia, lymphoma, hyperglycemic coma, sepsis, malnutrition, nephrotic syndrome, burns, organ transplant and Addison's disease(6). Hyponatremia has been noted to occur in 60% of patients with CPM(7) and frequently precedes the develo pment of CPM(8) but the level is often normal at the time of paralysis. Nevertheless, CPM has been reported in patients with normonatremia and hypernatremia(9-12).

Our patient presented with a febrile illness, possibly enteric fever, and was found to be malnourished, toxic and dehydrated. Laboratory parameters revealed normal electrolyte values. His clinical condition, described as "locked in state" was a status of quadriplegia and mutism with preserved consciousness. This condition results from bilateral ventral pontine infarction and basilar artery occlusion. It has also been reported in other conditions like tumor, drug overdose, trauma, brainstem encephalitis and hemorrhage.

Majority of cases of CPM have occurred in adults with a background of severe liver disease. Children younger than 15 years have constituted 0% to 15% of cases of CPM, the youngest being 3 years old(12,13). The background disease in children have included acute myeloid leukemia, renal failure, Wilson's disease, mumps and severe weight loss in obesity(12-14). Majority of these patients were dehydrated, nutritionally compromised and had electrolyte disturbance(13).

CPM has been considered a difficult condition to diagnose clinically, and can be confused with viral encephalitis, enteric fever with encephalopathy, disseminated encephalomyelitis and cerebral malaria.

The possibility of bilateral thalamic infarctions was raised on CT images. However, the diagnosis of CPM was established only after MR imaging. It is important that the diagnosis be suspected on clinical grounds. The clinical presentation is that of a progressive brainstem disorder occurring over several days. The severity is variable, from a full locked-in state to lesser degress of limb weakness or dysarthria. Me Cormick and Daneel(12) recorded 10 symptoms, in descending order of frequency, commonly found in 69 autopsy proven cases CPM. These included reflex changes, pathological reflexes, quadriparesis, extraocular muscle palsies and pupillary changes, convulsions, tremor, dysarthria, dysphagia, incontinence and mutism.

The CSF anf EEG are not distinctive. The CT may show low density lesions in the pons, thalamus or cerebellum, but even extensive lesions may not always be visible. The radiological changes may become apparent during the recovery stage(9). MR is superior to CT in the visualization of CPM, and helps in differentiating various

lesions affecting the pons. Pontine signal abnormalities have a broad differential diagnosis that include infarct, metastasis, glioma, multiple sclerosis, encephalitis, and radiation or chemotherapy(15). Absence of a source of embolus, involvement of the pons and thalamus with sparing of the midbrain excluded an infarct in our case. The absence of edema, mass effect and enhancement (on CT) were pointers against infection or neoplasm(16). Pontine plus concomitant basal ganglia involvement is fairly specific for CPM(17).

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