Pneumococcal Meningitis– Diagnosis and Prognosis Revisited

Acute bacterial meningitis continues to be a major public health problem. Mortality in acute stages is high. Various clinical and cerebrospinal fluid (CSF) parameters have prognostic significance. A case of pneumococcal meningitis illustrative of relatively acellular CSF and its diagnostic significance is reported.

A 2-year-old female child was hospitalized with history of pain in abdomen, diarrhea, and altered sensorium of five days duration. Examination revealed a malnourished (Grade III), pale, and moderately dehydrated child. The neurological signs were–Grade III coma, clonic convulsions, non-reacting pupils, right sixth cranial nerve palsy, hypertonia, nuchal rigidity and decerabrate posture.

Investigations revealed: hemoglobin of 8.5 g/dl, total leucocyte count of 5600/mm^3 (neutrophils 61%, lymphocytes 37%, eosinophils 2%); blood culture was sterile; cerebrospinal fluid was turbid, with increased pressure, proteins were 240 mg/dl, globulin were increased, glucose was 18 mg/dl (simultaneous blood glucose was 100 mg/dl), cytology revealed WBC 10/mm^3 with lymphocytes 70% and neutrophils 30%. Gram's stain showed a large number of capsulated Gram positive diplococci in a relatively acellular field. Culture of CSF grew *streptococcus pneumoniae* sensitive to penicillin, chloromycetin, ampicillin, co-trimoxazole and gentamicin.

Intensive management of pyogenic meningitis in the form of antibiotics and anti cerebral edema measures was not successful and the child expired shortly after admission. Salient autopsy findings were a thick yellowish pus in subarachnoid space enveloping the whole brain and congestion of cerebral vessels. There was heavy neutrophilic infiltration of meninges and varying amount of fibrin.

Eventhough several tests have been evolved for the study of patients with meningitis, CSF analysis remains of fundamental importance. However, it is vital to be aware of the variables while interpreting it. In this case, cytology did not reveal pleocytosis of acute inflammatory exudation even remotely commensurate with the clinical and autopsy findings. Such relatively acellular CSF is known in early stages of pneumococcal meningitis(1). It is relevant to bear in mind that except in newborn, normal CSF contains not more than five leucocytes/mm^3 and the presence of neutrophils is abnormal(2). Though by their small numbers, overt pleocytosis is absent, the qualitative alteration of differential count carries the same significance as quantitative acute inflammatory cellular exudate. This has been amply illustrated in a study of eight cases of meningitis, without overt pleocytosis. Performing differential count significantly helped in diagnosing meningitis early before the onset of overt pleocytosis(3).

In a prospective study(4) of 256 children with pyogenic meningitis, the following were bad prognostic signs: (*i*) duration of illness more than five days prior to treatment; (*ii*) temperature less than 98°F or more than 102°F; (*iii*) Grade IV coma; (*iv*) neck flop or abdominal distension; (*v*) total leucocyte count 5,000-10,000/mm^3 or more than 20,000/mm^3; (*vi*) purulent CSF with

cell count more than 5,000/mm^3; (*vii*) glucose less than 20 mg/dl; and (*viii*) organism identified by Gram's stain and/or by culture. Other factors like young age, pneumococcus as causal organism and cell count in CSF less than 1000/mm^3 also has been linked with bad prognosis(5).

Relatively acellular CSF and significant change in differential count, should alert the treating physician in the diagnosis and management of a case of pyogenic meningitis.

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Is Preterm Milk Tailored to the Needs of a Preterm Infant?

The controversy of what is the ideal food for a preterm infant will probably rage on till the long term effects of nutrition in this critical period of life are accurately known. In the recent article, Saini *et al.*(1) have raised the question "Is preterm milk tailored to the needs of a preterm infant?". They have suggested that barring certain nutrients, perhaps it is. This is in contradiction to a recent report by Kashyap *et al.*(2). This report suggests that preterm infants fed fortified formula grow at rates faster than the fetus *in utero*. They achieved this by either increasing the protein content of the formula or the caloric content. The former was associated with elevated concentrations of plasma amino acids and the latter with increased deposition of fat. The long term effects of either in terms of brain growth, neurodevelopment or later predisposition to obesity are not known. On the other hand Jarvenpaa *et al.*(3) have shown that preterm human milk supports adequate growth. However, in their study, the babies had developed low serum albumin levels at the end of the study period.

Many studies(4,5) have prevented hypoalbuminemia by supplementing preterm milk with human milk protein with or without human milk fat. They have all shown better nitrogen retention and optimal growth following such supplementation. A preparation of human milk protein is, however, not available. Nor do any of the commercially available milk powders contain protein akin to human milk protein. Hence till such a preparation, or a practical substi-