EDITORIAL

Celiac Disease and Anemia

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Celiac Disease is an autoimmune enteropathy caused by exposure to dietary gluten in genetically predisposed individuals. It has a prevalence of 0.8-1.0% [1-3] and is a classical iceberg disease where in clinically diagnosed cases represent only 10-12% of the total number of cases in the community [4,5].

Celiac disease classically presents early between 6 months to 3 years of age with diarrhea, abdominal distension and failure to thrive. However, a significant proportion of cases do not have classical manifestations but may present with a myriad of clinical manifestations such as anemia, short stature, recurrent abdominal pain (RAP) and delayed puberty. With increasing awareness and availability of serological tests, more and more cases of atypical rather than typical or classical celiac disease are now being diagnosed clinically.

Among the atypical manifestations, anemia, especially iron deficiency anemia, is a particularly common manifestation in children as well as in adults. Kochhar, *et al.* [6] reported that out of 434 children diagnosed with celiac disease at a gastroenterology clinic, 84% had anemia at presentation and 39% had anemia as a presenting feature. Similarly a study by Carroccio, *et al.* [7] reported that out of 130 Italian children diagnosed with celiac disease, 70% had iron deficiency anemia. More importantly, 1.5% of these children had anemia as the sole presenting symptom. Similar findings were quoted by a Turkish study where Kuloglu, *et al.* [8] reported that 81.6% of children with celiac disease (n=109) had iron deficiency anemia at presentation and 14.6% had repeated iron deficiency.

Iron deficiency is a significant public health problem in India and is a widespread micronutrient deficiency among Indian children. Data from the third National Family Health Survey (NFHS-3) of India [9] showed alarmingly high prevalence of anemia – 60% and 70% among preschool children and adolescents, respectively. Poor iron reserves at birth, inadequate dietary iron intake, inappropriate timing and type of complimentary feeds in infants, frequent infections and defective iron absorption from a diseased gut are some of the causes of iron deficiency anemia in India. Celiac disease is an important cause of poor iron absorption because of associated villous atrophy. Wide prevalence of iron deficiency anemia and increasing prevalence of celiac disease in our country raises a pertinent question: could some of these cases of iron deficiency in the community be due to undiagnosed celiac disease representing the silent iceberg of celiac disease?

Several studies have looked into prevalence of celiac disease in iron deficiency anemia. In a Turkish study on 135 children with anemia and 223 healthy children, the authors reported that 4.4% of anemic children had celiac disease [10]. Abd El Dayem, *et al.* [11] studied 25 children with refractory iron deficiency anemia of which 44% had celiac disease. Bansal, *et al.* [12] reported 83 Indian children with difficult to treat anemia from a hematology clinic who were subsequently found to have celiac disease. However, most of these studies have been carried out in a specialized hematology clinic focusing on difficult to treat or refractory anemia. Only one of the above studies had a control arm. Some of these studies, especially those from Turkey and Egypt, do not address the issue of geographical and ethnic variation, and may not be applicable to countries with high prevalence of celiac disease such as India.

The study by Narang, *et al.* [13] in this issue has addressed some of these issues while trying to answer the question regarding the prevalence of celiac disease among children with iron deficiency anemia. They found that 3.9% children with moderate-to-severe anemia had biopsy proven celiac disease compared to none among equal numbers of controls. It would be interesting to know whether these anemic children (who were found to be having celiac disease) were also having any other features (like short stature, RAP, constipation, diarrhea etc.) suggestive of celiac disease, as in our experience [14], children having two or more of these clinical features had much higher chances of celiac disease; 8.4% with two

features and 24.2% with ≥3 clinical features compared to 0% with only one feature. Nevertheless, if this finding of even 3.9% prevalence of celiac disease among moderate-to-severe iron deficiency anemic individuals can be confirmed by larger community-based multicentric studies, it will go a long way in at least partially addressing the large public health problem of iron deficiency anemia in India.

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EDITORIAL

Scrub Typhus Meningitis *Versus* Acute Bacterial Meningitis and Tuberculous Meningitis

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Meningitis in the form of cerebrospinal fluid (CSF) pleocytosis (lymphocytes predominant) in a patient with scrub typhus diagnosed by the presence of eschar and/or immunological means would constitute scrub typhus meningitis (STM). This comes under a broad umbrella of diseases causing aseptic meningitis – spirochetal, viral, rickettsial, tubercular, neoplastic, and drug-related meningitis [1]. This contrasts with acute bacterial meningitis (ABM) where neutrophils are predominant in the cerebrospinal fluid (CSF), and bacteria identified by Gram stain, culture, or immunological tests.

Kakarlapudi and colleagues [2], in this issue of *Indian Pediatrics,* reported a retrospective analysis of 123 children with meningitis managed in their department over a period of 5 years. They found that children with STM were older than children with either bacterial or tuberculous meningitis, and had a better prognosis than the other arms. Thrombocytopenia and splenomegaly were more often associated with STM. Information regarding hepatorenal symptoms were not available. Similarly, information about chest radiograph, liver function and renal function tests would have been more illuminating to this study.

Scrub typhus is a common cause of acute febrile illness in Asia, and complications include respiratory, neurological, hematological, myocardial and vasculitic manifestations [3]. STM is a spectrum ranging from aseptic meningitis to meningoencephalitis rather than a purely meningitic illness [4]. Diagnosis of STM is often expensive, and Weil Felix Test (WFT), the commonest test used for its diagnosis, has poor sensitivity. It is probably the easiest meningitis to treat as there is only one drug to be administered – doxycycline or chloramphenicol or azithromycin or rarely rifampicin. The morbidity and mortality of a diagnosed case of STM is generally low [4].

The comparison of STM with other meningitides as in this study is timely, especially in the Indian context [2]. As a physician, I think the following things should merit attention in the assessment of the differential diagnosis for acute to subacute febrile illness with meningeal signs. History of a mite bite is useful, but virtually never revealed. Respiratory symptoms (cough and breathlessness), abdominal symptoms (jaundice, abdominal pain, and diarrhea), and musculoskeletal manifestations (myalgia and arthralgia) should make a consideration of STM, while neurological symptoms (seizures, limb weakness, and coma) would be commoner in tuberculous meningitis (TBM). On examination, pulse and blood pressure (tachycardia and hypotension being more commonly seen in STM and ABM, while bradycardia and increased blood pressure seen more frequently in TBM-related raised intracranial pressure), tachypnea (ARDS and myocarditis in STM, pericardial and pulmonary tuberculosis in TBM), anemia (more in TBM), lymphadenopathy (both in STM and TBM), rashes (purpuric in ABM and maculopapular in STM), elevated JVP (myocarditis in STM, pericarditis in TBM), respiratory findings (seen in STM and TBM), hepatosplenomegaly (seen in STM and disseminated tuberculosis), arthritis (STM and ABM-meningococcal), cranial nerve deficits (sixth cranial nerve deficits in STM and TBM, cochlear nerve involvement in STM and ABM, multiple cranial nerve palsies in TBM), papilledema (TBM>ABM), vasculitic events (strokes in STM and TBM, myocardial infarction in STM), and shock (cardiogenic in STM and TBM, and septic in ABM) makes TBM a closer differential diagnosis to STM than ABM.

On working up such patients with acute meningitis, hemogram may show normal to a mild increase in counts in STM and TBM (ABM with blood leucocytosis and rarely leukopenia) and thrombocytopenia in STM (like viral meningoencephalitis or leptospirosis), and occasionally disseminated intravascular coagulation (ABM and STM). Deranged liver and renal functions and creatine kinase elevation are more common in STM. CSF

lymphocytic pleocytosis is found in both STM and TBM. CSF protein content and hypoglycorrhachia do not help much in differentiation between the three, although TBM would have the highest protein in CSF. Gram stain and culture would be of use only in ABM and to a lesser extent in TBM, because of the time taken. Adenine deaminase (TBM), polymerase chain reaction (TBM, STM, and ABM), Cartridge Based Nucleic Acid Amplification Test (CB-NAAT for TBM) and Scrub IgM ELISA will help clinch the diagnosis, but are not routinely available in all institutions. Chest radiograph is useful for both STM and TBM. Fundus examination helps in TBM (papilledema and choroidal tubercles) and STM (papilledema). Basilar meningeal enhancement on contrast CT favors TBM [5].

Barring a few exceptions of drug resistance, one drug is sufficient for treating STM, especially if diagnosed early (unlike ABM where steroids and antibiotics, and TBM with steroids, antituberculous therapy and mannitol being necessary). Rifampicin, in even a single dose can cause clinical improvement [6]. In settings when the treating physician is unaware of STM or the facilities are inadequate to diagnose the same, the patient ends up in taking treatment for months for TBM, because of improvement with rifampicin [7]. Even though detection of serum IgM levels for scrub typhus is an affordable test, most patients and their caregivers thronging government institutions find the costs involved a deterrent, and need to be convinced about the need of such a test, which would prevent such a prolonged therapy and a label of their children having had TBM.

In conclusion, STM more closely mimics TBM in terms of clinical features, CSF findings and therapy, but differs in hematological features, hepatorenal and musculoskeletal dysfunction and neuro-imaging. ABM is like STM with its short duration of illness and can be well-differentiated with hematological, renal and liver profiles, CSF neutrophilia and culture positivity. In this age of evidence-based medicine, expensive tools such as PCR, CBNAAT, and IgM levels for scrub typhus are the need of the hour, but the availability is more of an exception rather than the rule. In localities where scrub typhus is endemic, empirical therapy could be instituted in patients with acute meningitis until a conclusive diagnosis is obtained. Multiorgan involvement should always make consideration of STM.

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