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Case Report

Enteric fever

Enteric Encephalopathy associated with reversible ECG changes: A Diagnostic Dilemma

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Enteric fever is common in India. It presents with various clinical manifestations. Encephalopathy and ECG changes are indicators of prognosis. Persistent ECG changes indicate a poor prognosis. The pathogenesis of encephalopathy is unclear though prostaglandins and free oxygen species may be implicated in the prognosis and justifies the use of steroids in enteric encephalopathy with antibiotics. The case presented here presented with encephalopathy and ECG changes which reversed following antibiotic and steroid therapy. The importance of the case lies in the fact that typhoid should not be missed in the diagnosis of encephalopathy and ECG should be done in all cases of enteric fever to determine the prognosis.

Keywords: Enteric fever, Encephalopathy, ECG changes, Prognosis

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Case Report

A 43 years Hindu female, housewife by occupation residing in South 24 Parganas, West Bengal presented with fever for 4 days, intermittent, low grade in nature, associated with impairment of consciousness without any localizing signs. She was non, diabetic, non-hypertensive. There was no history of pain abdomen, vomiting, skin rash, myalgia, arthralgia or arthritis. She had attained menopause a year earlier. There were no bladder or bowel symptoms. There was no weakness on any side of the body, nor any history of convulsions. Drug history, treatment history, travel and addiction history were unremarkable. On examination, she was drowsy and disoriented in time, place and person. Neck was supple without any signs of meningeal irritation, but the bilateral plantar responses were extensor. There was no cranial nerve palsy and reflexes were normal without any abnormality in tone. On examination of other systems, there were bi basal fine crepitations without any murmur and no skin rash or organomegaly were present. Ophthalmoscopy examination was unremarkable.

A provisional diagnosis of septic encephalopathy was made with a differential diagnosis of meningoencephalitis and metabolic encephalopathy.

Laboratory investigations: CBC revealed neutrophilic leukocytosis(TLC-11,300/mm3) with 70% neutrophils without toxic granules.FBS, urea, creatinine, sodium, potassium, magnesium, LFT, INR, CRP were normal.MP Slide and Dual antigen, NS1 antigen, Scrub Typhus antibody, COVID 19 RTPCR, urine reports were normal. Typhi DOT M was positive and a Blood culture was sent.ECG revealed RBBB with first degree AV block and biphasic T waves which were absent in the old ECG done during a routine cardiological check-up one month earlier. Chest x-ray, 2D Echocardiography with Color Doppler, MRI Brain were normal. CSF study done after exclusion of papilledema was unremarkable.CPK, CPK MB were normal.

Treatment: The patient was admitted to ICU and was put on Ryle's tube, catheter and intravenous fluid was started with injection Ceftriaxone 2 gm iv BD APST with injection Doxycycline 100 mg iv BD APST with intravenous dexamethasone, PPI, ondansetron and Paracetamol for fever. The patient started to recover after 24 hours, fever subsided

And she was alert, conscious and oriented from Day 2 of starting antibiotics. Ryle's tube, catheter were removed and the patient started to take a semisolid diet. Blood cultures came to be positive for *Salmonella typhi*.EEG report has done earlier revealed encephalopathy with a background theta delta activity and presence of generalized slow waves.ECG was repeated and it revealed no abnormality with reversal of the earlier changes and 24 hours Holter report was also normal. The patient was discharged on day 14. Steroids were tapered accordingly within 12 days of admission.

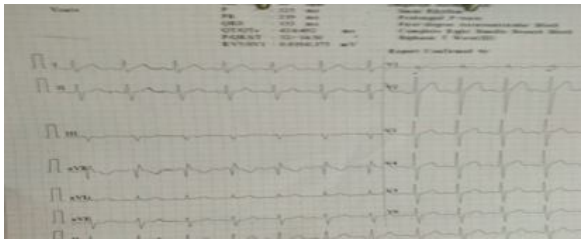

Figure 1: Showing ECG changes of Enteric Fever with RBBB,First degree AV block and Biphasic T waves.

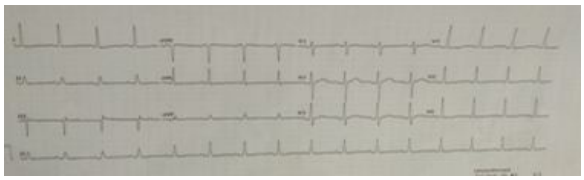

Figure 2: Showing ECG changes which reversed following recovery from Enteric Fever.

Discussion

Enteric fever is an infection common in middle and low-income countries and is the commonest cause of fever by bacteria in migrants and travellers from these places. [1,2]. Typhoid is caused by *Salmonella enterica serotype Typhi.* Clinical features include fever with chills, headache, abdominal pain, constipation or diarrhoea. Severe typhoid fever can cause intestinal hemorrhage and perforation, but encephalopathy can also occur.[3,4]. Typhoid" originates from the Greek word"typhos" which means smoke which describes the confusion and apathy associated with it. [5]. Typhoid state" described by Osler mentioned blank stare, non-interactive arousable patient with incoherent and muttering speech.[6]. Case series from India [7]. Bangladesh [8]. etc show that up to 75% of cases may have stupor, delirium or confusional

State, although parkinsonism, myelitis, cerebellitis, acute psychosis and insomnia may occur. [8-11]. Enteric encephalopathy has a high rate of mortality, approximately 50%, even with antibiotics, though recent evidences are lacking. [12,13]. The pathophysiology of neurological and psychiatric manifestations are not clear. Apart from antibiotics, high dose dexamethasone reduces morbidity and mortality in enteric encephalopathy. [12,14,15]. Delaying steroids increase mortality and relapse. [14,16]. Typhoid encephalopathy occurs in the third week but may occur within 7-9 days according to an Indonesian Study.[15].Leukopenia and thrombocytopenia were associated with encephalopathy, but not with alterations of sodium according to a study by Daniel T.Leung et al. [17]. The case presented here responded to antibiotics and dexamethasone but was not associated with abnormalities of serum sodium, leukopenia and thrombocytopenia. The pathogenesis of encephalopathy is not clear as the organisms are rarely detected in the CNS in 2% of culture-positive severe enteric.[14]. Steroids reduce the synthesis of free oxygen species and prostaglandins by salmonella endotoxin-induced macrophages.[12].

Cardiovascular complications in typhoid are found in approximately 4.6% of patients according to one study.[18]. The Commonest CVS abnormality is myocarditis (1-2%), but pericarditis and endocarditis can also occur. Venous and arterial thrombosis can also occur. [19]. 40-80% of cases may show ECG abnormalities at the height of fever. All are transient except bundle branch block which may persist longer.ECG changes occur during the first and second week of illness. Our patient had a transient bundle branch block which recovered quickly. ECG abnormalities in typhoid are QTc prolongation (tissue anoxia causing potassium loss from myocardium), PR interval prolongation, ST-T changes, Wenkebach phenomenon, [19,20]. RBBB and myocarditis may cause decreased QRS complex amplitude. The severity of enteric is related to the ECG changes, occur in the height of illness and is related to prognosis. Persistent ECG changes lead to a poor prognosis. [21]. ECG should be done in all patients for prediction of cardiovascular complications, to determine the prognosis and to start appropriate treatment at the earliest to avoid complications.

The case presented here had transient ECG changes with encephalopathy which responded to steroids And antibiotics. The importance of the case lies in the fact that encephalopathy and cardiovascular complications in Enteric should be identified early, so that prompt treatment with antibiotics and steroids may hasten the recovery avoiding further complications. Morover, transient ECG changes are associated with a good prognosis and ECG should be done in all cases of typhoid, particularly those with complications as was done in our patient.

Conclusion

Enteric fever presents with various complications including encephalopathy and ECG changes. The exact pathogenesis of encephalopathy is not clear, though prostaglandins and free oxygen species may be related which is to be confirmed in further studies. Morover ECG changes may occur which may be related to poor prognosis if persistent. So ECG must be done in all cases of enteric fever and should be repeated for prognostication.

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