Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2016; 4(2):57-61 **ISSN 2347-9507 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2016.v04i02.001

Complicated case of tubercular meningitis with hydrocephalus and ethambutol induced optical neuritis: A rare occurance

Manoj Kumar Sethi[*1], P. Ushashree[1], Tapan Kumar Patel[2], Md. Tarique Nadeem[1], Kapishwar Singh CH[3]
[1]Department of Pharmacy Practice, Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar, Telangana, India
[2]Department of Pharmaceutics, Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar, Telangana, India
[3]DepartmentofPharmacology, Smt. Sarojini Ramulamma College of Pharmacy, Mahabubnagar, Telangana, India

***Corresponding author**
Manoj Kumar Sethi
Email: manojkmr976@gmail.com

Abstract: To report a complicated case of tubercular meningitis with hydrocephalus and ethambutol induced optical neuritis. In dis case A 18 year old male Indian patient was admitted to neuro-ward on 26th november 2015 with presenting complaints of one week of altered sensorium, two weeks of vomiting and one and half month of fever. At the time of admitting the condition was very bad. Previously patient was diagnosed of tubercular meningitis and was on anti-tubercular therapy from 18th November of the same year. He developed hydrocephalus and worsen the condition hence referred to present multi-speciality hospital for treatment. In the admission period on 6th December 2015 patient was complaining of blindness and difficulty in recognising colours. In discussion the comorbidities of tubercular meningitis with hydrocephalus and developing optical neuritis in that same patient is rare occurrence and if left untreated it may be fatal to mankind those who are suffering to this. Although individually these diseases are not very uncommon but all together in a single person is complicated to understand. In conclusion the purpose here made by the authors is to make people aware of this disease and their presentation along with make educate while consuming drug like ethambutol and to contribute well for the improvement of quality of life and heathcare of the human which is the priceless creation of god of this heavenly world.
Keywords: Tubercular Meningitis, Hydrocephalus, Optical neuritis, Teleradiography

INTRODUCTION:

Tuberculosis is a devastating disease with more than 9 million new cases and over 1 million related deaths every year [1, 2]. The causative agent of human tuberculosis is mycobacterium tuberculosis complex and it is the most common pathogen of both pulmonary and non-pulmonary (extrapulmonary) tuberculosis cases. Pulmonary disease is the most common manifestation of tuberculosis, the involbment of central nervous system (CNS) and associated tuberculous meningitis represents its most severe form [3,4,5]. If tubercular meningitis left untreated than the fatality rate is almost 100%. The delay in treatment lead to permanent neurological damage hence prompt diagnosis needed to start the therapy as earlier as possible to avoid secondary complication [6].

Hydrocephalus is one of the most common complications of tubercular meningitis and almost always present in patients who have had the disease for four to six weeks. It is more frequent and severe in children than in adults and also occurs at an earlier stage in the disease process [7]. As per definition hydrocephalus is an abnormal build-up of cerebrospinal fluid (CSF) in the ventricles of the brain. The fluid is often under increased pressure and can compress and damage the brain. The exact pathogensis of hydrocephalus is still a mystery. Some studies suggested about the pathophysiology stated below.

Hydrocephal using patients with TBM could be either of the communicating or the obstructive type, the communicating type being more common [8]. In both instances, the main cause is the inflammatory exudate occupying the subarachnoid spaces or the ventricular pathways. In the earlier stages of the disease, the thick gelatinous exudates block the subarachnoid spaces in the base of the brain (notably the interpeduncular and ambient cisterns)leading to communicating hydrocephalus [9].The exudates lead to a denses carring of the subarachnoid spaces in the later stages of the disease again leading to communicating type of hydrocephalus. A communicating hydrocephalus can also result from the exudates blocking the arachnoid granulations which prevent the absorption of cerebrospinal fluid (CSF).

Ethambutol hydrochloride is one of the first line agents in the treatment of tuberculosis. Frequently optic neuritis most commonly retro bulbar neuritis is the

form of ocular toxicity has been well predictable since 1960s. The ocular side-effects of EMB therapy were first described by Carrand Henkindin1960s [10]. Optic neuritis is the most important budding side-effect of EMB. Medical Protection Society1984 states that "it is wise to make a documentation of ophthalmic result, including visual insight, in each eye, before treatment starts, and at numerous (say monthly) intervals during treatment." This neuritisis generally reversible and is specific to dose and duration of treatment [11].

Although these diseases are common in developing countries but co-morbidities of all these is a rare occurrence. Here the authors are trying to explain the very complicated co-morbidities of tubercular meningitis along with hydrocephalus and ethambutol induced optical neuritis.

CASE HISTORY:

An 18 year old male Indian patient was taken to out-patient department of a hospital with complaints of altered sensorium, vomiting and fever. Previously he was taking anti-tubercular therapy for tubercular meningitis which was diagnosed by a private doctor. Hence he was admitted immediately in the neuro-ward of that same hospital for further diagnosis and treatment.

Presentation of case:

The patient was admitted to neuro-ward on 26th november 2015 with presenting complaints of altered sensorium since 7 days, vomiting since 15 days and fever since 45 days. At the time of admitting the condition was very bad. Previously patient was diagnosed of tubercular meningitis and was on anti-tubercular therapy from 18th November of the same year. He developed hydrocephalus and worsen the condition hence referred to present multi-speciality hospital for treatment. In the admission period on 6th December 2015 patient was complaining of blindness and difficulty in recognising colours.

Investigations:

For investigation patient was underwent examination like haematology, biochemistry, profile for Australia antigen, CT of brain, examination of cerebro-spinal fluid and for consciousness investigation Glasgow comma scale is used. Hematological report revealed increased neutrophil and means corpuscular haemoglobin concentration and decreased lymphocyte and means corpuscular volume.

Biochemical examination revealed increased SGOT, SGPT, alkaline phosphatase, serum bilirubin indirect and decreased albumin, serum sodium and potassium ion concentration, Profile for Australian antigen found negative.

Examination of cerebro spinal fluid revealed presence of increased protein, adenosine deaminase activity, and total count and decreased sugar levels. Traces of RBC found in background. The amount of Protein was 249 mg/dl, Sugar was 33 mg/dl, ADA level was 15.2U/L and total blood count 36/cumm.

CT of brain done one week before and the Teleradiography report reveals features of meningitis and its sequence in the form of infract left ganglio capsular region with mild communicating hydrocephalus.

Glasgow comma scale was used to evaluate the conscious state of patient and it was found that patient was in a state of $E_2V_1M_5$ stage. This means opens eyes in response to painful stimuli, makes no sounds and localizes painful stimuli.

Final diagnosis and comments:

Basis of the above examination the final diagnosis made was tubercular meningitis with hydrocephalus on 28th November and suggested the anti-tubercular therapy to continue. But on 6th December patient was complaining of blindness hence eye check-up done. It was found development of optical neuritis which was due to ethambutol a standard first line drug of anti-tubercular therapy. So the physician replaced ethambutol with streptomycin.

Treatment:

As far as the treatment is concerned the patient received rational drug therapy for the management of tubercular meningitis. For tubercular meningitis the patient was given four drug combination of anti-tubercular therapy which includes streptomycin 500 mg, Isoniazid150mg, Pyarazinamide 750 mgandethambutol 400 mg. But when it was observed that patient was developing optic neuritis ethambutol substituted by Rifampicin 300mg Corticosteroid Prednisolone 20mg was given for the alleviation of inflammatory reactions as a consequence of tubercular meningitis. Phenytoin100mg was given as a prophylactic measure for seizure. Regular physiotherapy was given during the treatment phase in hospital for motor and verbal disorder. Then the patient was discharged due to improving condition and called for review after one month. At the time of review again imaging of brain was done by CT scan and found that size of hydrocephalus decreased and condition was good at that time.

DISCUSSION:

Central nervous system tuberculosis is the most severe manifestation of extrapulmonary tuberculosis and constitutes approximately1% of all new cases annually, with the commonest form of the disease is tubercular meningitis [3]. So many studies till

date have attempted to assess it epidemiology with variable conclusions as the disease's incidence and mortality rates differ from country to country according to their individual socio economic and public health statuses across the globe. Mortality rates have been described to range from 7–40% in developed countries, while the percentages from TB endemic countries as well as countries with high HIV prevalence have been found to be significantly higher, reaching a 69% in South Africa [12, 13]. The key point in understanding the epidemiological pattern of the disease is the fact that TBM and tuberculosis infection are closely related in this aspect, so that it is generally accepted that occurrence of the former in a community is correlated with incidence of the latter and vice versa [14]. It is therefore considered safe to assume that at a global level these two entities share a common trend. According to the latest available data, in 2009 the global incidence of TB was 9.4million cases which are equivalent to 137 cases per 100000 populations with most of the m occurring in Asia and Africa and a smaller proportion occurring Europe and the Region of the Americas. Developing countries in particular account for more than 80% of the active cases in the world.

Throughout the world the diagnosis and management of tuberculous meningitis(TM) still remain challenges for physicians. Unlike pulmonary tuberculosis, which has been the subject of many clinical trials, the pathogenesis, diagnosis, and treatment of TM have received little attention. How the disease kills or disables more than half of those it infects is not understood; the best diagnostic tests are controversial; the optimum choice, dose, and treatment duration of anti tuberculosis drugs are not known; and the outcome from adjunctive corticosteroids and neurosurgical intervention has been difficult to study.

Tuberculosis of the central nervous system may take several forms, which cannot be easily classified (Table1). Besides inflammation of the meninges, which is the most common form [15], it also includes space occupying lesions in the brain parenchyma as well as focal disease of the spinal cordandits osseous structures.

Table 1: Classification of central nervous system tuberculosis

Intra cranial central nervous system tuberculosis	Tuberculous meningitis Tuberculous meningitis with miliary tuberculosis Tuberculous encephalopathy Tuberculous vasculopathy Central nervous system tuberculoma
Spinalcentralnervoussystemtuberculosis	Pott's spine and paraplegia Tuberculous arachnoiditis Nonosseous spinal tuberculoma

If anybody suspected with the symptoms of tubercular meningitis antituberculous chemotherapy without awaiting for the CSF laboratory results. There commended first line treatment agents are isoniazid (INH) , rifampicin (RIF), pyrazinamide (PZA), streptomycin(SM), and ethambutol for all forms of CNS tuberculosis administered daily either individually or in a combination form. Second-line therapy includes ethionamide, cycloserine, para amino salicylic acid (PAS), amino glycosides, capreomycin, thiacetazone, while potential new agents include oxazolidinone, is epamicin and a new rifamycin called rifapentine. Fluoro quinolones that have a role in the treatment of TBM include ciprofloxacin, ofloxacin, and levofloxacin. Finally, because of the intensity of the inflammatory and fibrotic reactions at the meningeal site, adjunctive corticosteroids, in addition to standard antituberculous therapy are recommended [16, 17] which is given in this case.

Earlier studies using air encephalography in patients with TBM suggested hydrocephalus in 62% of the patients [18]. In a CT study, only three of 60 children and adults with TBM were found to have normal ventricles, giving an incidence of 95% [19]. Significantly, 87% of children in this study had severe hydrocephalus. Compared to an incidence of 71% in children, only12% of adults with TBM had hydrocephalus.Thus the evidence found that compared to adult's hydrocephalus is more common in children with TBM. Hydrocephalus is also more common in the later stages of the disease.

Ethambutol (EMB) is one of the frequently used first-line anti-tubercular agents. One of the most common adverse effect is ocular toxicity termed ocular neuritis requires a rapid withdrawal of this drug which is clearly observed in presenting case. This visual impairment is either dose or duration related. Leibold described two types of ocular neuritis due to the therapy of EMB, i.e., axial neuritis and periaxial neuritis. Axial neuritisis the most common form which involves the papillo macular fibers of optic pathway and ensuing in decline of visual insight, color vision

impairment and central scotomas. Periaxial neuritis peripheral defects are noted, but insight is spared [20, 21]. Normally the neuritis is retro bulbar, and the fundus is normal.Ingeneral, EMB adverse effect is seen in high doses 35 mg/kg in 20% of patients. However, now the maximum dose is given as 25mg/kg daily for 2months, if the drug is continued for longer, the dose should be reduced to15mg/ kg.

In this case standard treatment for tubercular meningitis was given which is according to standard anti-tubercular therapy guideline. Due to ethambutol optical neuritis observed hence need withdrawal. Rifampicin administered instead of ethambutol and condition observed improving. Prognosis of the patient was satisfactory.

CONCLUSION:

The comorbidities of tubercular meningitis with hydrocephalus and developing optical neuritis in that same patient is rare occurrence and if left untreated it may be fatal to mankind those who are suffering to this. Although individually these diseases are not very uncommon but all together in a single person is complicated to understand. The purpose here made by the authorsis to make people aware of this disease and their presentation along with make educate while consuming drug like ethambutol and to contribute well for the improvement of quality of life and health care of the human which is the priceless creation of god of this heavenly world.

Conflicts of interest:

The authors hereby declare that the reason conflict of interests.

REFERENCES:

1. Smith I; Mycobacterium tuberculosis Pathogenesis and Molecular Determinants of Virulence. Clin Microbiol Rev, 2003; 16(3):463–496.
2. Yasar K.K, Pehlivanoglu F, Sengoz G, Ince E.R, Sandikci S; Tuberculous meningoencephalitis with severe neurological sequel in an immigrant child. J Neurosci Rural Pract, 2011; 2(1): 77-79. .
3. Christensen ASH, Andersen AB, Thomsen VO, Andersen PH, Johansen IS; Tuberculous meningitis in Denmark: are views of 50cases. BMC Infect Dis, 2011; 11:47. ISSN1471-2334.
4. Puccioni-Sohler M, Brandão CO; Factors associated to the positive cerebrospinal fluid culture in the tuberculous meningitis. Arq Neuropsiquiatr, 2007; 65(1): 48-53.
5. Venkataswamy MM, Rafi W, Nagarathna S, Ravi V, Chandramuki A; Comparative evaluation of BACTEC 460TB system and Lowenstein-Jensen medium for the isolation of M. tuberculosis from cerebrospinal fluid samples of tuberculous meningitis patients. Indian J Med Microbiol, 2007; 25(3): 236–240.
6. Chandramuki A, Lyashchenko K, Kumari HB, Khanna N, Brusasca P, Gourie-Devi M, *et al.;* Detection of antibody to Mycobacterium tuberculosis protein antigens in the cerebrospinal fluid of patients with tuberculous meningitis. J Infect Dis, 2002; 186(5): 678-683.
7. Tandon PN; Tuberculous meningitis (cranialand spinal).In: Vinken P**J**, Bruyn GW, editors. Handbook of Clinical Neurology. Infections of the Nervous System Amsterdam: North—Holland; 1978; 33: 195-262.
8. Schoeman **J**, Donald P, vanZylL, Keet M, Wait **J**; Tuberculous hydrocephalus: Comparison of different treatments with regard to ICP, ventricular r sizea nd clinical outcome. Dev Med Child Neurol 1991; 33:396-405.
9. Dastur DK, Manghani DK, Udani PM; Pathology and pathogenetic mechanisms in neurotuberculosis. Radiol Clin North Am 1995; 33:733-52.
10. Carr RE, Henkind P; Ocular manifestations of ethambutol, Toxic amblyopia after administration of an experimental antituberculous drug. Arch Ophthalmol. 1962; 67(5):566-71.
11. Chatterjee VKK, Buchanan DR, Friedmann AI, Green M; Ocular toxicity following ethambutol in standard dosage. Br J Dis Chest. 1986; 80:288-91.
12. Karstaedt AS, Valtchanova S, Barriere R, Crewe-Brown HH; Tuberculous meningitis in South African urban adults. QJM, 1998; 91(11): 743-747.
13. Kent SJ, Crowe SM, Yung A, Lucas CR, Mijch AM; Tuberculous meningitis: a30-year review. Clin Infect Dis, 1993; 17(6): 987-994ISSN1058-4838.
14. Chakraborty AK; estimating mortality from tuberculous meningitis in a community: use of available epidemiological parameters in the Indian context. Indian J Tuberc, 2000; 47(1): 9-13, ISSN0019-5707.
15. Blaivas AJ, Lardizabal A, Macdonald R; Two unusual sequel aeof tuberculous meningitis despite treatment. South Med J, 2005; 98(10): 1028-1030.
16. Girgis NI, SultanY, Farid Z, Mansour MM, Erian MW, Hanna LS, Mateczun AJ; Tuberculus meningitis, Abbassia Fever Hospital-Naval Medical Research UnitNo.3-

Cairo, Egypt, from 1976to1996. Am J Trop Med Hyg, 1998; 58(1): 28–34.
17. Ramachandran TS; Tuberculous Meningitis. In: Medscape Reference, 12.06.2011, Availablefrom: http://emedicine.medscape.com/article/1166190-overview.
18. Lorber J; Studies of CSF circulation in tuberculous meningitis. II. Are view of 100 pneumo encephalograms. Arch Dis Child 1951; 26:28-48.
19. Bhargava S, Gupta AK, Tandon PN; Tuberculous meningitis-ACT scan study.BrJRadiol1982; 55:189-96.
20. Report of World Health Organization Regional Office for the Western Pacific-First Technical Advisory Group Meeting to Stop TB in the Western Pacific Region; 21-24.Geneva: World Health Organization; 2000.
21. Kahana LM; Toxic ocular effects of ethambutol. Can Med Assoc J. 1987;137:213-6.