Cross Sectional Study to Assess Rationale Behind Anti Koch Treatment in Severe Acute Malnourish Children in Ujjain Block M.P

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ABSTRACT

Background: Tuberculosis (TB) and under-nutrition has got vicious cycle presence of one can increase the chance of having other. Both are common in under-five children. In spite of many efforts still TB and under-nutrition are most important cause of mortality and morbidity. To get rid from TB it is essential to diagnose and manage TB accurately.

Method: A cross sectional observation study was planned to estimate the prevalence of AKT prescription and rationale behind AKT prescription in 204 admitted SAM children in Ujjain block.

Result: Total 51% admitted SAM children were put on AKT among them only around 8% children were having the rationale for starting AKT .Chi square test was applied for data analysis.

Conclusion: Present study concludes that very few children were prescribed AKT rationally. Is Gap in the TB diagnosis and treatment in children especially in SAM children is resulting in over-prescription of AKT in SAM children. It may be contributing in AKT resistance which is the most deadly problem we are facing with many antibiotics including AKT.

Keywords: AKT, Tuberculosis, Acute Malnourished, pediatric

INTRODUCTION

Childhood tuberculosis (TB) and under nutrition are major global public health challenges.[1]TB is commoner in under 5 years children[2] predominantly because of differences in the immune system of children & adults [3, 4]. TB in children represents the acquisition of recent infection & ongoing transmission of M. tuberculosis in a community[5]. Tuberculosis increases the risk of undernutrtion and vice-versa[1]. It is usually very severe in malnourished children[6]. Thus both TB and Under-nutrition are compounded in a high proportion of affected children. Accurate diagnosis of TB in children remains an obstacle which becomes more pronounce in children with severe acute malnutrition (SAM). A SAM child defined as who has one of the following: In different age group for **children of 0-6 months** too weak to suckle effectively (irrespective of weight-for-length (WfL), WfL <–3SD (in infants >45 cm) visible severe wasting in infants <45 cm in length and presence of bilateral pedal oedema. For **children 6-60 months** children with bilateral pitting edema, &/ or, MUAC (Mid Upper arm circumference) <115 mm, &/or and weight-for-age z-score (WAZ) below -3 SD of WHO Child Growth Standards[7] . Diagnosis of TB

in SAM Children is challenge because the usual methods are not always effective in diagnosing the disease accurately because of the multiple reasons. Firstly, **Symptom** based diagnosis is difficult because of poor discriminative power as respiratory tract infection like pneumonia & other symptoms like weight loss, failure to thrive are typical characteristic of both TB & malnutrition thus it is non-specific. Secondly **Culture** has got slow turnover time, poor sensitivity in children. Third, **Monteux Test (MT)** is less specific for TB due to environmental mycobacteria & cross-reaction with BCG vaccine. It is less sensitive in SAM due to low Cell Mediated Immunity, despite using reduced indurations cut off of ≥5 mm. Although MT poorly differentiates between recent & previous infection, it is considered as a standard marker of infection. Forth, **X-ray chest** is subjective & is complicated by malnutrition related co-morbidities like bacterial pneumonia. Although hilar adenopathy is often regarded as hallmark of primary TB, it is a transient phenomenon in 50–60% of children. Therefore, in asymptomatic cases, hilar adenopathy is more indicative of recent primary infection than active disease. And fifth, **Microscopy** is also not very useful as children (<10 years) rarely produce sputum smear positive cavitatory TB.[8]

That's why the present study was planned with the objective to find out the prevalence of use of AKT in admitted SAM children, to explain the confusion /gap in diagnostic algorithm of TB in admitted SAM children and to observe the rationale behind starting AKT in admitted SAM children.

METHODOLOGY

Observational Cross sectional study was planned. Ethical Approval was obtained from institutional ethical committee of R.D. Gardi Medical College Ujjain. Data was collected with the help of a proforma .As no suitable validated questionnaires were available for the stated objectives self prepared semi-structured pretested questionnaires were used. The study was conducted in a selected Nutritional Rehabilitation centre (NRC) of Ujjain block, where SAM children are admitted for nutritional rehabilitation. Consecutive sampling technique was used. Admitted SAM children were selected as study participants. Recruitment of participants was done by fixing inclusion and exclusion criteria at design stage.SAM children admitted in 1 year in selected NRC were recruited for present study so final sample size came out to be 204 .Written informed consent was taken from guardians of SAM children.

SAM children whose guardians had given consent were **included** in study and the SAM children already on AKT before admission in NRC were **excluded** because their basis of starting AKT may not be completely known. SAM children's clinical history along with their Socio-demographic profile is inquired. SAM children on AKT were selected then the clinical history, history of contact with TB, relevant investigations (X-ray chest, MT,) were noted. Then matched/ compared with the recommended criteria of diagnosis and starting AKT in children according to national guidelines on management of TB in children[9]. They are as follows if presence of 2 or more of the following symptoms cough >2 weeks ,Weight loss or poor weight gain persistent fever and or night sweats >2 weeks, fatigue ,reduced playfulness ,less active PLUS presence of 2 or more of the following positive contact history ,respiratory signs , CXR suggestive of PTB (where available),Positive Mantoux test (when available) are present then Pulmonary TB is likely and treatment is justified. According to recent recommendation 2 of WHO *(new)* Xpert MTB/RIF may be used rather than conventional microscopy and culture as the initial test in all children suspected of having TB.[10]

RESULTS

Total 204 SAM children admitted in NRC were included in final analysis.

Table 1 shows maximum 39% SAM children belongs to 12-24 months age group followed by 20% in 25-36 months age group .Regarding the gender of children 51 % were males while 49 % were females. About 51% belongs to SC category, 35.8% belongs to OBC, 7.3 general, ST 5.4% .Approx 57% study participants were urban resident. Most (81%) participants were having BPL card. Most of the mothers (69%) and fathers (72%) were educated. Around 56% participants were from joint family.

Among SAM children admitted in NRC in 1 year 51% were put on AKT, whereas remaining 49% were not on AKT.

Participants who were put on AKT Only 7.7 % were fulfilling recommended criteria for prescribing AKT.

Table 3 shows probability of making a correct decision for treatment. Proportions of patients who had a rationale for treatment and treated were 8/8 (100%). Proportions of patients who did not have a rationale and not treated were 100/196 (51%).
Table 3 also shows probability of making incorrect decision for treatment. Proportion of patents who did not have rationale for treatment and treated were 96/196(49%) and proportion of patients who had a rationale for treatment and not treated were none.

Table 1 Socio-demographic profile of study participants

Variables(n=204)	Cases (%)
Age in months	
0-6months	08(3.9)
7-12 months	32(15.7)
13-24 months	79(38.7)
25-36months	41(20.1)
37-60 months	44(21.6)
Gender	
Male	104(51)
Female	100(49)
Caste	
General	16(7.3)
OBC	73(35.8)
SC	104(51)
ST	11(5.4)
Residence	
Urban	116(56.9)
Rural	88(43.1)
Family type	
Nuclear	90(44)
Joint	114(56)
Socio-economic status	
APL	39(19.1)
BPL	165(80.9)
Mother's education	
Uneducated	63(30.9)
Primary	42(20.6)
Middle	43(21.6)
Higher secondary	51(25)
Graduate or more	5(2.5)
Father's education	
Uneducated	58(28.4)
Primary	37(18.1)
Middle	46(22.5)
Higher secondary	56(27.5)
Graduate or more	7(3.4)

Table 2 Number of criterion/s (according to recommendations) present in the participants who were put on AKT

Number of diagnostic criteria in participants who were put on AKT	Cases (%)
No	21 (20)
One	11 (10.6)
Two	39 (37.5)
Three	25 (24)
Four or more	8 (7.7)
Total	104 ()

Table 3 Participants having rationale for starting AKT

On AKT	Having rationale		Total
	Yes (%)	No	
Yes	8 (100)	96(48.9)	104
No	0 (0)	100(51.1)	100
Total	8(100)	196(100)	204
(chisquare 8.99, df=1, p value <0.005)			

DISCUSSION

Main results of the study - 51 % SAM children were put on AKT. There is lake of diagnostic and treatment guideline of TB in children especially in SAM children. SAM children who were put on AKT, only 8% had rationale.

Very less study were done to know the basis of prescription of AKT. T Munthali, C Chabala, E Chama et al [11] concluded that the proportion of TB in SAM children was 1.58%. R Bollinger, M Tambe [12] conducted a study with similar objective like current study that is to find out the prevalence of active tuberculosis disease in children with severe acute malnutrition (SAM) admitted to the Nutritional Rehabilitation Center.M. J. Chisti, Stephen M. Graham, T Duke concluded[13] Concluded that prevalence of TB in SAM children was 7% which was diagnosed on the basis of sputum culture and MTB/RIF assay N Safdar, SG Hinderkar, NA Baloch, DA Enarson, MA Khan, O Morkve[14] conducted a interventional study and found that pre-intervention no combinational diagnostic test were used for prescribing AKT. MT test was not done in any case .Positive sputum smear test was the most frequently used test for prescribing AKT R Prasad, RG Nautiyal, PK Mukherji, A Jain[15] also concluded that in their study Doctors were not following any standard guidelines for diagnosing and managing the patient of TB. LaCourse SM, Chester FM, Preidis G[16] et al done a study to assess Use of Xpert for the diagnosis of pulmonary tuberculosis in severely malnourished hospitalized Malawian children and concluded Microbiologic confirmation likely underestimates the prevalence of pulmonary tuberculosis in severely malnourished children..

CONCLUSION

TB eradication is impossible in the absence of accurate diagnostic and treatment guideline. The management of childhood TB is complicated by the absence of a practical gold standard for diagnosis. Hence there is constant need for development for more sensitive & specific test for diagnosis of TB especially for SAM children, which may assist tuberculosis eradication efforts in non-endemic countries & the diagnosis of M. tuberculosis infection in high-risk individuals. In absence of specific guideline for diagnosis of TB in SAM children the benefit of doubt is given to the patient and AKT prescribed without rationale in many cases may be it is life saving in some cases but possibly it is contributing hugely in drug resistance.

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