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"STUDY OF DEMOGRAPHIC PATTERN, CLINICAL PICTURE & RECENT TREND OF ANTIBIOGRAM OF ENTERIC FEVER IN PEDIATRIC AGE GROUP"

Pediatrics

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ABSTRACT

Background: ENTERIC fever is a systemic infection caused by Salmonella enterica.1 1. 1% of children between the ages of 0-17 years suffer per year with Madhya Pradesh.2 The demographic data and clinical response of illness to antibiotics differ geographically.3

Methods: 294 patients in age group (6 month- 14 year) admitted during 13 months, with history of fever and positive blood culture/ Widal test were included in study.

Result: Typhoid fever is considered to be a disease mainly of children. 4 The maximum number of cases reported in the month of July (26.6%). The lack of infrastructure had lead to large burden of many infectious diseases. 5 The commonest symptom and signs observed was fever and anemia. The drug of choice came out to be Cefixime & Azithromycin.

Conclusions:

The optimal antimicrobial treatment of patients with typhoid depends upon the understanding of local patterns of antimicrobial resistance.

KEYWORDS

enteric fever, Widal titer, antibiotics.

Introduction:

Enteric fever is a systemic infection caused by Salmonella enterica serotype Typhi (S. Typhi). Enteric fever is endemic in India because of poor sanitation, lack of safe drinking water, illiteracy and poverty. Children usually present with fever and gastrointestinal symptoms. Physical signs include pallor and more isolation was made in the months of July–september.[1]

Enteric fever limited studies in the country reveal more than three lac cases and more than 650 deaths (approx.) annually.[6] Maximum cases were reported from Bihar (2.6 lac cases with 2 deaths) while Madhya Pradesh reported (1.14 lac cases and 28 deaths). [2]

Moreover if symptoms disappears, patient may turn into carrier state excreting the bacilli for several years .[4]The incidence of enteric fever is highest in the age group of 5 - 19 years [6] In enteric fever initial antibiotic might modify the course of the disease and pose significant difficulty in interpretation of lab investigations.[3]

Enteric fever is one of the common causes of fever in children including India where patients report throughout the year with monsoon clustering patterns. The matter is further worsened by the fact that etiological diagnosis for cases of pyrexia is available in relatively few centers. This might lead to improper therapy and worsen the drug resistance among Salmonella isolates. [3]

Thus aim & objective of present study is to study demographic pattern, clinical picture, laboratory profile and antibiotic trend of enteric fever. Also to find out culture positivity rate & antibiotic sensitivity of Salmonella enterica and any association between culture positivity & severity of disease.

Materials & method:

This was a hospital-based observational study where data was collected during 1March 2016 - 31 June 2017 (15 months). Ethical clearance was obtained from Ethical Committee, Gandhi Medical College, Bhopal, prior to the start of the study. A verbal and written consent was obtained from the patient's parents or guardians after explaining the nature and purpose of the study.

All the patients in age group (6 month- 14 year) who were admitted in Department of Paediatrics, GMC, Bhopal with inclusion criteria was history of fever more than 3 days with Widal test O& H titer of 1:80 & 1:160 respectively or positive blood culture. The clinical features includes Nausea and vomiting, abdominal pain/ tenderness, Anorexia, Hepatosplenomegaly, Malaise, Diarrhoea/ constipation, Headache. Out of 354 patients, 60 patient met inclusion criteria whose demographic, socio-economic, clinical and laboratory profile was collected in a form of proforma.

Laboratory investigation includes Complete Blood Count done using an automated SYSMEX cell counter using electrical impedance (Coulter Principle) and flow cytometry, for the detection of haemoglobin, total & differential leucocyte count and platelet. Rapid Diagnostic Test and peripheral smear examination of thick and thin blood films with Giemsa stain were done on each patient to rule out malaria. Liver Function Tests and Renal Function Tests using an Automated Biochemical Analyser.

Widal test was done using standard tube test method using 3 x 0.5 ml Kahn tubes for both (O&H) types of agglutination. Blood culture was done using macconkey agar. Pale non -lactose fermenting colonies that may appeared on this medium were further characterized by biochemical tests like Salmonella ferment glucose, mannitol, maltose forming acid and gas.

Results:

The maximum number of children affected were in 6-10 year age group (24). Male outnumbered the female with ratio as 1.5:1. Only 52 cases out of 60 which was discharge successfully after treatment. Average duration of stay was 7.8 days (range 3-13 days). Majority of cases that is around 58% came in hot and humid climate of summer and monsoon months. Almost equal number of cases lives in rural (45%) and urban (55%). The majority of cases had pakka house (58.3%). The parent education of majority of cases was below high school (79.6%). The family income of majority of cases was above ten thousand per month (48.3%) and parent occupation was farmer (36%) of cases with under lower middle (48.3%) and upper lower class (43.3%) as per modified Kuppuswamy scale.

Majority of cases had open field defecation and open water drainage. Equal number of cases had corporation and ground water supply, with no treatment before use of drinking water in all cases with average level of hygiene. All (100%) cases had a complaint of fever, of which most (73.3%) presented with fever of more than 7 days duration. Fever with chills were present in only 9 (15 %) of children. Frequency of complaints out of which anorexia, nausea/vomiting was the commonest symptoms. Clinical signs in majority of cases was pallor and complications were seen in 19 cases (31.6%) with encephalopathy been the common complication. Moreover none of the cases had taken vaccination against Salmonella.

81.6% cases received antibiotics prior to admission with oral (66.6%) antibiotics for duration of 3-5 days. Almost all cases (96.6%) had anaemia. Majority of cases transaminases (SGOT, SGPT) were raised more than two times the normal value. In majority of cases Serum bilirubin was raised while renal function test was within normal limit. Also majority of cases titre of "O" antibody was 1:160 (65%) and titre of "H" antibody was 1:160 in 50% cases. S. typhi was isolated in majority of cases with positive blood culture.

Azithromycin, Cefixime and Ceftriaxone had maximum sensitivity without any resistance from the organism while other antibiotics does not show significant sensitivity as shown in figure 1.

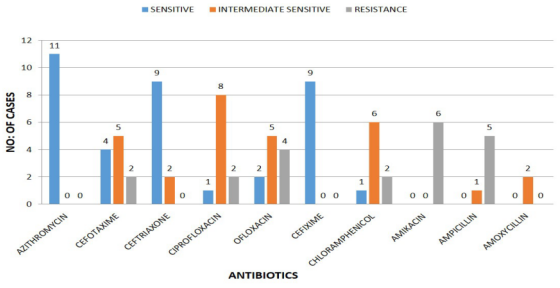

FIGURE 1: Anti-biogram

Chi-square test and Mann-Whitney test were used to compare significant association within the group.

Discussion:

There is a dearth of available data to view the epidemiological status of typhoid in India. [8] Central Bureau of health Intelligence, Directorate General of Health Services, Ministry of Health and family welfare (MOHFW), Government of India showed 1.08 million cases were reported with 440 deaths in 2010 to 1.24 million cases were reported with 296 death in 2015. [9,10]

In our study, maximum number i.e. 40% cases were in the age group of 5-10 years. Typhoid is considered to be a disease mainly of children and young adults because of less frequently reinforced acquired immunity through numerous sub-clinical exposures to typhoid bacilli. [4] These result was confirmed by **Sudharshan & Sudhindra.** [11,12]

In the present study the male female ratio was 3:2 as young sons are more highly valued and are therefore more likely to be taken for hospital treatment. [13] This was in accordance to **Parande et al** with 1.6:1 while **Sudharshan** showed lower incidence with 1.1:1. [14,11]

In the present study maximum number of cases were reported in the month of July (26.6%). **Sudharshan** showed maximum admission in between June to September (45.6%) while **Ashraf et al** reported highest in August to September. [11,13]

In the present study 55% cases were urban while 45% were rural as tertiary care hospital located in urban area, also shown by **Ashraf et al**. [13] In contrast **Sharma et al** with higher incidence rates in rural areas where the blood samples were collected from 5474 patients suspected. [15] In the present study the typhoid fever was common among illiterate and low educational status people (63.3%) because of ignorance, poverty, lack of knowledge and poor personal hygiene. This was in accordance to **Parande et al** with 49.70% were illiterate. [14] **Bairwa et al** stated the most widely used scale for urban populations is Kuppuswamy's socioeconomic scale. [16]

In the present study average duration of stay in hospital was 7.8 days, where 33 cases out of 42 cases (78.5%) showed hospital stay of 5-10 days similar to **Parande et al** 2011, with duration of stay was 7.91 (2-35) days. [14]

The commonest symptom observed in typhoid was fever (100%) with majority of cases with more than 7 days (73.3%) with chills and rigor present in only 15% of cases similar to **Sudharshan** and **Pandey et** al with predominant symptoms was fever (100%). [11&17]

The common seen signs in the present study were pallor (76.6%), complications seen were encephalopathy (10%). Similar results were reported by **Sudharshan** with pallor (51.9%). [11] A significant association was present between GI bleeding and duration of stay because of development of complication like intestinal perforation which might increases duration of stay. [18]

In the present study none of the children had taken any prior vaccination (100%). **John et al** advocated that WHO recommends use of typhoid vaccine in endemic areas. In 2014 the Indian Academy of Paediatrics (IAP) Advisory Committee on Vaccines and Immunization Practices (ACVIP) strongly urged the Government of India (GOI) "to include universal typhoid vaccination in its UIP [Universal Immunisation Programme] all over the country." [19]

81.6 % cases had already taken antibiotic prior to admission. The possible reason can be attributed to presentation of fever in all the positive cases.

Present study concluded that almost all cases had anaemia (96.6%) while **Sudharshan** reported 41.8% cases. [11] Bone marrow suppression and hemophagocytosis are responsible in producing hematological changes. [20] Moreover thrombocytopenia seen(48.3%) similar to **Abro et al** 2009 (Dubai) with 40% cases. [20]

Majority of cases had two times higher SGOT & SGPT (68.3% & 65%) respectively and raised serum bilirubin (66.6%). Similar result were seen in Pohan with raised SGOT & SGPT (92.1% & 68.3%) and increased bilirubin (12.4%) in the patients because of hepatic destruction due to endotoxins or inflammatory process. [21]

In the present study majority of cases showed 1:160 "O &H" antibody titre in 65% & 50% of cases respectively which is higher than **Pohan** 2004, who reported 1:160 "O &H" antibody titre in 17.4% & 12.8 % of cases respectively. The factors responsible for variation can be the nutritional status, prior use of antibiotics, immunological state, immunosuppressive drugs and method of examination. [21]

In the present study causative organism isolated was S typhi in 82% cases and S paratyphi in 18% cases similar to **Begum et al** 2015, with 63.3% and 36.1% cases respectively. [22]

In present study, all cases (100%) showed sensitivity towards Azithromycin and Cefixime while all cases showed resistance to Amikacin and 83% cases were resistant to Ampicillin. This was in contrast to **Pokharel et al** were both S typhi and S paratyphi were sensitive to Amikacin. [23] While **Sudharshan** reported no resistance to cefixime, and ceftriaxone and resistance against ampicillin which can be due to widespread use of penicillin. [11]

The optimal antimicrobial treatment of patients with typhoid depends upon the understanding of local patterns of antimicrobial resistance. Therefore it is advocated to test the antimicrobial susceptibility of Salmonella isolated from individual patient. [22]

Conclusion:

We attempted to study the features of typhoid or enteric fever in Paediatric population in Bhopal with a focus on its laboratory investigation and antibiotic sensitivity. The optimal antimicrobial treatment of patients with typhoid depends upon the understanding of local patterns of antimicrobial resistance. Therefore it is advocated to test the antimicrobial susceptibility of Salmonella isolated from individual patient. Widespread community awareness on safe and healthy drinking water, better sanitation facilities and practice, early and comprehensive healthcare intervention, and rationalize use of antibiotics are required to curb the incidence of enteric fever.

References:

1. Mangal H.N, Gupta D P, Mangal H N, Joshi K C. Prevalence of enteric fevers in Jaipur. Indian J Med Res. 1967;55 (3): 219-223
2. K. Park: Park's Textbook of P.& S.M. , 23th ed. Banarsidas Bhanot Publisher, Jabalpur,

2015.p.234-235.
3. Chandrashekar A, Kumar YC, Sodhi K, Dalal S.S. Study of clinical and laboratory profile of enteric fever in pediatric age group. International Journal of Basic and Applied Medical Sciences. 2013;3(3) :16-23.
4. Singh B. Typhoid fever epidemiology. Journal, Indian Academy of Clinical Medicine. 2001;2(1&2): 11-12.
5. Akullian A, Ng'eno E, Matheson AI, Cosmas L, Macharia D, Fields B, Bigogo G, Mugoh M, John-Stewart G, Walson JL, Wakefield J, Montgomery JM. Environmental Transmission of Typhoid Fever in an Urban Slum.PLoSNegl Trop Dis. 2016 Jan;10(1):1-14.
6. Textbook of Public health and Community Medicine, By Department of Community Medicine, Armed Forces Medical College, Pune in collaboration with World Health Organization, , India Office, New Delhi, first edition, 2009.,1132-1134.
7. Ananthanarayan R, Paniker CKJ. Chapter 31: EnterobaccteriaceaeIII:Salmonella. Textbook of microbiology. 9th ed. Universities Press Ltd. 2015.p.290-295.
8. Banerjee T, Shukla BN, Filgona J, Anupurba S, SenMR.Trends of typhoid fever seropositivity over ten years in north India.Indian J Med Res. 2014 Aug;140(2):310-3.
9. Health Status Indicators. National Health Profile 2011.p. 60-61.
10. Water Borne Diseases. Ministry of Health & Family Welfare. Government of India. 2016.p.4.
11. Sudharshan Raj C. Clinical profile and antibiotic sensitivity pattern of typhoid fever in patients admitted to pediatric ward in a rural teaching hospital.Int J Med Res Health Sci. 2014;3(2):245-249
12. Sudhindra BK. Enteric fever in young children. Indian pediatr 1995;32:1127.
13. Ashraf M. Dewan, Robert Corner, Masahiro Hashizume, Emmanuel T. Ongee. Typhoid Fever and Its Association with Environmental Factors in the Dhaka Metropolitan Area of Bangladesh: A Spatial and Time-Series Approach.PLoSNegl Trop Dis. 2013 Jan; 7(1): 1-14.
14. Parande MA, C. G. Patil, Madhavi V Rayate, Mehboob U Lukde. Epidemiological profile of enteric fever cases admitted in SCSMGH, Solapur. National Journal Of Community Medicine 2011;2(1): 91-95
15. Sharma J, Malakar M. Distribution of Typhoid fever in different rural and urban areas of Lakhimpur District of Assam.Int J Res Dev Health. August 2013; Vol 1(3): 109 – 14
16. Bairwa M, Rajput M, Sachdeva S.Modified Kuppuswamy's Socioeconomic Scale: Social Researcher Should Include Updated Income Criteria, 2012.Indian J Community Med. 2013 Jul;38(3):1-4.
17. Pandey KK, Srinivasan S, Mahadevan S, Nalini P, Rao RS. Typhoid fever below five years. Indian Pediatr. 1990 Feb;27(2):153-6.
18. Jemni L, Mehdi A, Chakroun M, Chatti N, Djaidane A. [Complications of typhoid fever]. Med Trop (Mars). 1989 Apr-Jun;49(2):189-91.
19. John J, Van Aart CJ, Grassly NC. The Burden of Typhoid and Paratyphoid in India: Systematic Review and Meta-analysis.PLoSNegl Trop Dis. 2016 Apr 15;10(4):
20. Abro AH, Abdou AMS, Gangwani JL, Ustadi AM, Younis N, Hussain HS. Haematological and biochemical changes in typhoid fever. Pak J Med Sci 2009;25(2):166-171.
21. Pohan HT. Clinical and laboratory manifestations of typhoid fever at Persahabatan Hospital, Jakarta.Acta Med Indones. 2004 Apr-Jun;36(2):78-83.
22. BegumA, Bari MS, Chowdhury FR, Ahmed N, Sayeed KAR. Pattern of Anti-Microbial Sensitivity and Resistance against Salmonella Species in a Tertiary Hospital in Dhaka. J Enam Med Col 2015;5(2):88-92.
23. Pokharel P, Rai SK, Karki G, Katuwal A, Vitrakoti R, Shrestha SK. Study of enteric fever and antibiogram of Salmonella isolates at a teaching hospital in Kathmandu Valley.Nepal Med Coll J. 2009 Sep;11(3):176-8.