



CAUSES OF FEVER WITHOUT LOCALIZING SIGNS OR WITH NONSPECIFIC SIGNS IN THE AGE GROUP OF 1 TO 12 YEARS

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ARTICLE INFO

Article History:

Received 6th, April, 2016,
Received in revised form 18th,
May, 2016, Accepted 17th, June, 2016,
Published online 28th, July, 2016

Key words:

Fever without localizing signs, nonspecific signs, pediatric age group.

ABSTRACT

Aim To find out the various causes of fever without localizing signs or with nonspecific signs in pediatric age group.

Methodology: children aged between 1 to 12 years with fever 5 days or more without localizing signs or with nonspecific signs included. Appropriate Investigations done and results are analyzed.

Results: Total of 140 children studied, enteric fever is the most common cause of fever, and UTI is the second common cause in this study.

Conclusion: though fever is common finding, it may require through investigations when it present without specific signs. The following causes to be kept in mind while evaluating Fever without localizing signs or with nonspecific signs. They are: Enteric fever, Urinary tract infection, Occult bacteremia, Scrub typhus, Viral fever, ASOM, Pneumonia, Acute gastro enteritis, Malaria, Dengue, Tuberculosis, Leptospirosis, Mesenteric adenitis, Viral hepatitis, Occult bacteremia, Kawasaki & Deep seated abscess.

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INTRODUCTION

Fever is one of the most common clinical symptoms managed by pediatricians and other health care providers and accounts for one-third of all presenting conditions in children³.

It should be emphasized that fever is not an illness but is, in fact, a physiologic mechanism that has beneficial effects in fighting infection. Fever retards the growth and reproduction of bacteria and viruses, enhances neutrophil production and T-lymphocyte proliferation, and aids in the body's acute-phase reaction³.

Definitions

Fever is defined as a rectal temperature $\geq 38^{\circ}\text{C}$ (100.4°F)¹.

Hyperpyrexia: Rectal temperature value $>40^{\circ}\text{C}$ (104°F)¹.

Fever without focus: Fever of acute onset and short duration (less

Than 2 week) without any localizing symptoms or signs².

Fever with nonspecific signs: Fever less than 2 weeks at presentation and child manifests with hepatomegaly, splenomegaly, rash, jaundice, or lymphadenopathy².

Body temperature fluctuates in a defined normal range ($36.6\text{-}37.9^{\circ}\text{C}$ [$97.9\text{-}100.2^{\circ}\text{F}$] rectally), so that the highest point is reached in early evening and the lowest point is reached in the morning. Any abnormal rise in body temperature should be considered a symptom of an underlying condition¹.

Pathogenesis: Three different mechanisms can produce fever: Pyrogens, Heat production exceeding loss, and Defective heat loss¹.

Pyrogens: Includes endogenous and exogenous pyrogens that raise the hypothalamic temperature set point.

Endogenous pyrogens include the cytokines interleukins 1 and 6, tumor necrosis factor α , and interferons β and γ . Exogenous pyrogens or substances that come from outside the body include mainly infectious pathogens and drugs. Microbes, microbial toxins, or other products of microbes are the most common exogenous pyrogens. Endotoxin is one of the few substances that can directly affect

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thermoregulation in the hypothalamus as well as stimulate endogenous pyrogen release. Drugs that are known to cause fever include vancomycin, amphotericin B, and allopurinol¹.

Heat production exceeding heat loss is the second mechanism that leads to fever, with examples including salicylate poisoning and malignant hyperthermia.

Defective heat loss is the third mechanism of fever genesis; for example, in children with ectodermal dysplasia or victims of severe heat exposure.

MATERIALS AND METHODS

A prospective of study of cause of fever without focus or with nonspecific signs in the age group of 1 to 12 years is conducted from November 2014 to august 2016 in Rajah Muthiah Medical College & Hospital, Chidambaram.

Study group: A total 140 cases of fever with 5 days or more in both sexes of 1 to 12 years age groups admitted in Rajah Muthiah Medical College, using simple random method, constituted the study group.

Inclusion criteria: Fever without localizing signs & fever with nonspecific signs.

Exclusion criteria: Fever patient with localizing signs or symptoms & Children referred from other center with confirmed diagnosis were excluded from study.

Collection of specimen: Blood samples were collected, and sent for enteric and nonenteric culture. CBC, dot-EIA, peripheral smear for malaria, urine routine examination, urine for culture and sensitivity done in all children in this group with fever of ≥ 5 days. Widal, dark field microscopy for leptospirosis were sent on fever with ≥ 7 days duration. Dengue NS1 antigen, IgM and IgG Elisa sent for clinically suspected cases. USG abdomen, X-Ray chest, IgM Elisa for Scrub typhus, Sputum microscopy, Gene xpert, LFT, RFT, CSF analysis done on case to case basis as per treating physician opinion. Results of all investigations were analyzed and causes of fever among study group Consolidated.

RESULTS

A total of 140 cases of fever with 5 days or more in duration without localizing signs and with nonspecific signs were studied. In the study group, 77 were boys and 63 were girls. Among these 43 was diagnosed as enteric fever based on Blood culture, Widal and dot-EIA. Urinary tract infection confirmed in 26 children based on urine routine and urine culture.

Total of 10 children confirmed Scrub typhus based on Ig M Elisa for scrub typhus. Pneumonia diagnosed in 4 children based on x ray findings. ASOM diagnosed in 2 children. Dengue fever diagnosed in 6 of the study population based on IgM Elisa. Malaria confirmed in 6 of them based on peripheral smear or malaria rapid diagnostic test. Leptospirosis diagnosed in 5 of them by Dark field microscopy examination in blood & ELISA. Acute gastro enteritis diagnosed 8 among them based on clinical findings, stool routine and stool culture. Mesenteric adenitis diagnosed in 4 of them based on USG abdomen.

Viral hepatitis (Hep A) diagnosed in 2 of them based on Anti HAV antibody (IgM). Pulmonary tuberculosis diagnosed in 2 of them based on Mantoux, Sputum for AFP or by geneXpert. Occult bacteremia constituted 1.4% of study population. One child had thrombophlebitis and another one had Kawasaki disease.

Seventeen children labelled as viral fever based on clinical ground, CBC results, and after excluding from all other cause of disease. One child had psoas abscess which become apparent after 6 days of fever.

DISCUSSION

Cause of fever	N	%
Enteric fever	43	30.7
Urinary tract infection	26	18.6
Scrub typhus	10	7.2
Viral fever	17	12.1
ASOM	2	1.4
Pneumonia	4	2.9
Occult bacteremia	2	1.4
Acute gastro enteritis	8	5.7
Malaria	6	4.3
Dengue	6	4.3
Tuberculosis	2	1.4
Leptospirosis	5	3.6
Mesenteric adenitis	4	2.9
Viral hepatitis	2	1.4
Thrombophlebitis	1	0.7
Kawasaki	1	0.7
Psoas Abscess	1	0.7
Total	140	100

In this study the most common cause of fever without localizing signs & with nonspecific signs are enteric fever. About 30.7% of study population diagnosed as enteric fever based on Widal, dot-EIA or blood culture. Blood culture confirmed enteric fever is 14.3%. Results of this study is comparable with Balakrishna TP⁷ *et al*, but Chandrasekar⁸ *et al* have lower incidence of enteric fever of about 14.3%. Because our study conducted in a hospital where most of the patients came from rural area with poor sanitation, incidence of enteric fever may higher.

Urinary tract infection is the second most common cause in this study with 18.6%. Though viral fever is the common cause of fever in pediatric age group, here it comes only in third place with 12.1%. Because most of the viral fever resolves by its own by 5th day, but this study conducted on children with fever more than 5 days only, this may be reason for viral fever at 3rd place. In Beatriz Marcondes Machado *et al*⁵ also document viral cause of fever in 13.5% of study population which is comparable with our study.

Scrub typhus comes in 4th place with 7.2% of the cause, it confirms that scrub typhus is endemic in this region. So in this locale high index of suspicion especially when a child presents with fever without foci, eschar, rash and hepatosplenomegaly will lead to early diagnosis. Muralikrishnan P *et al*⁹ also concluded that scrub typhus is a reemerging disease in children and it is not uncommon.

ASOM diagnosed in 1.4 % of children. Pneumonia diagnosed in 2.9% of children. Though Pneumonia is a major cause of admission for fever, in this study they were excluded because they had localizing signs on admission.

This study focus that small percent of pneumonia may present with fever without localizing signs or with nonspecific signs. In Beatriz Marcondes Machado *et al*⁵ study incidence of pneumonia in fever without focus is 1.4, which is less than our study.

Acute gastro enteritis may present with vague symptoms like only 2 to 3 episodes of loose stools per day with or without vomiting with fever in this age group. They developed more frequent loose stools in the later course of the disease. But in initial stage they also present as fever with nonspecific signs. AGE contributed 5.7% of cause in this study. In Beatriz Marcondes Machado *et al*⁵ study 4.2% of cause for fever without focus is acute diarrhea which is comparable with our study.

Dengue is a cause of fever among 4.3% of study group. In G Anusha *et al*⁴ study, dengue fever is a cause for fever with nonspecific sign in 4.67% which is comparable with our study. Malaria also cause fever among 4.3% of children in this study group. Above data confirms its endemicity in this region.

Leptospirosis also occur in 3.6 % of study group. Tuberculosis occurred in 1.4% fever without localizing signs & fever with nonspecific signs. Mesenteric adenitis also a cause in 2.9 % of children. Occult bacteremia diagnosed in 2 children. So occult bacteremia to be suspected in children with fever without focus. Viral hepatitis is a cause in 1.4% of study population. Thrombophlebitis, Kawasaki and Psoas abscess completes the cause with each one patient. IV line catheter site is the common site of thrombophlebitis in hospital admitted children. Care should be taken to prevent it.

List of Abbreviations Used: ASOM- Acute suppurative otitis media, CBC- Complete blood count, CSF- Cerebrospinal fluid, EIA -Enzyme immunoassay, ELISA- Enzyme-linked immunosorbent assay, HAV- Hepatitis A virus, IV- Intravenous, LFT- Liver function test, RFT- Renal function test, USG- ultrasonography, UTI- Urinary tract infection.

Acknowledgement

I thank our Respected Dean, Medical Superintendent, Head of the Department, Pediatrics for helping and allowing me to do this study in Rajah Muthiah Medical College & Hospital Chidambaram.

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