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Study of acute febrile illness: A 10-year descriptive study and a proposed algorithm from a tertiary care referral hospital in rural Kerala in southern India

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Abstract

Acute febrile illness (AFI), the initial diagnosis of whose cause is often presumptive, can sometimes be a challenge for the treating physician. To address this issue we carried out a hospital- based descriptive study. More than half (51.5%) of the patients were presumed to have viral fever. Most of the patients (60%) were in the productive phase of life (age range, 18–45 years). The outcome was worst among those aged over 65 years. A definite seasonal trend was observed with a peak in incidence with the arrival of the monsoon in Kerala. Public awareness regarding fevers in the pre-monsoon season should be heightened. Special care should be given to the elderly as they are often the most vulnerable. The use of the proposed locally based algorithm may avoid unnecessary investigations and treatment.

Keywords

Acute febrile illness, outcome, algorithm

Introduction

Acute febrile illness (AFI) is common in tropical countries but the aetiology may vary from country to country. In a vast country like India it varies from region to region. From the snow-capped Himalayas in the north to the sun-bathed beaches in the south and from the humid jungles in the east to the arid regions of Rajasthan, there is wide variation in infectious aetiology of AFI. Similarity in clinical presentation, lack of focal signs and symptoms, and scarce diagnostic tools make diagnosis a challenge. Even an infection found in the community at large such as a urinary tract infection (UTI) may present as AFI without any organ-specific symptoms. Often diagnosis and treatment of these fevers is presumptive, based on clinical features and physician experience. This has a potential for increased morbidity and mortality.

Studies from other tropical regions have identified and documented cases of acute fever.[1–4] Emerging and re-emerging infections are of concern in many of these tropical areas.[5,6] Rapid urbanisation,[7] the burgeoning population, global migration[8] and climate change[9–11] may all contribute to this problem.

There are limited data from India regarding AFI.[4,12] Even in a small state such as Kerala, some tropical infections have emerged for the first time while others have re-emerged after a significant interval; infections including leptospirosis,[13] scrub typhus,[14] chikungunya[15] and dengue[16,17] have all been documented in the recent past.[18] Here we describe the demographics, diagnosis, seasonal variation and outcome among adult patients admitted in our hospital with AFI between January 2002 and December 2011.

Patients and methods

This study is a hospital-based descriptive study, conducted in a tertiary care referral hospital situated in a rural inland area of Kerala state in south India.

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The patients who seek treatment here are either from the same district or are referred cases from neighbouring districts, especially the hilly district of Idukki along the Western Ghats. The climate is humid with abundant rainfall especially between early June and late September when the monsoon sets in. With a number of canals criss-crossing the area, the soil is marshy with multiple crops, especially rice, rubber and pineapple being cultivated all year round. The climate, soil and farming practices, all favour the presence of different vectors, particularly rodents and mosquitoes.

All patients aged over 18 years and admitted with AFI from January 2002 to December 2011 were included in the study. AFI was defined as fever, documented as >38°C at the time of admission, on more than two occasions for at least 2 days but less than 10 days. The time of onset of fever as related by the patient was taken as the inception of illness. The diagnosis was made in most cases on the basis of clinical examination supplemented by standard evidence-based investigations described in literature. Culture of suitable body fluids (blood, urine, stool as the case may be), peripheral smear for malarial parasite, and acute and convalescent phase serology, in addition to basic investigations were done. A fever was presumed as viral by way of exclusion – absence of a specific infectious aetiology, self-limiting and requiring only symptomatic measures. Fever attributed to infection of a specific organ (pneumonia or UTI, for example) was excluded from the study. Viral exanthematous illness with typical rashes (chicken pox, measles and rubella) were likewise excluded. Data were retrieved from the medical records library of the hospital using a preset proforma, entered in an Excel spreadsheet and a master chart was generated. The coding of the data was based on the ICD10 classification. Data were analysed using proportions and chi-square test was performed to find out the association between different variables included in the study. The study was approved by the research ethics committee of the hospital.

Results

A total of 9,739 patients were enrolled in the study. More than half were presumed to have viral fever by way of exclusion, followed by leptospirosis in 33.3% (Table 1). There was a clear preponderance of men (61%). However there was no statistically significant association between gender and outcome. Most of the patients (60%) were in the productive phase of life and were earning members of the family (Table 2). There was a statistically significant association between age group and outcome of the subjects. The outcome was worst among those aged over 65 years (Table 2).

Table 1. Frequency of illness ($n = 9,739$).

Diagnosis	*n* (%)
'Presumed Viral Fever'	5,025 (51.5%)
Leptospirosis	3,251 (33.3%)
Dengue fever	741 (7.6%)
Typhoid fever	493 (5%)
Malaria	80 (0.8%)
PUO	61 (0.6 %)
Others (Chikungunya, Paratyphoid Fever, Salmonellosis, Brucellosis, Typhus Fever): 1.2%	

Table 2. Age group and outcome.

	Outcome		
Age group (years)	Alive	Expired	Total
18–25	1,950	6	1,956
	99.7%	0.3%	100.0%
26–35	1,917	15	1,932
	99.2%	0.7%	100.0%
36–45	1,913	27	1,940
	98.6%	1.4%	100.0%
46–55	1,804	39	1,843
	97.9%	2.1%	100.0%
56–65	977	33	1,010
	96.7%	3.3%	100.0%
>65	1,010	48	1,058
	95.5%	4.5%	100.0%
Total	9,571	168	9,739
	98.3%	1.7%	100%

P value <0.0000001.

There were a total of 168 deaths, of which 85% ($n = 143$) were due to leptospirosis. On analysing fatalities individually, leptospirosis caused the most deaths (4.4%); all of these were due to multi-organ failure. Other deaths were due to dengue (0.9%), enteric fever (0.4%) and viral fever (0.3%).

The trend of three infections which are historically new to Kerala was analysed independently: leptospirosis and dengue saw a peak towards the latter quarter of the study, chikungunya saw a peak only in 2007, while among all three there was a general decrease in incidence. Scrub typhus, though new to Kerala, did not have sufficient numbers to merit an independent evaluation. However a common point noted was that all victims of this disease came from the hill district of Idukki. Cases of malaria, though insignificant (<1%), were all imported from outside the state. The other cases reported were enteric fever (5%), paratyphoid

fever (0.3%), salmonellosis (0.07%), and brucellosis (0.08%).

A definite seasonal trend observed across the years was a peak in the incidence of AFI between the latter half of May to mid-September; this coincides with the arrival of monsoon in Kerala (Figure 1).

Discussion

The majority of patients were presumed to have viral fever. This is a serious limitation of our study as the diagnosis was based purely on exclusion. Lack of testing kits in India and their cost, when available, can with difficulty be justified for an otherwise self-limiting illness. However the fact that this was the diagnosis of the majority validates the point that patients with AFI may initially only need domiciliary care, thereby avoiding improper utilisation of health resources. The predominant involvement of men and that these are in the productive age groups (age, <45 years) affects small families because they are often the only bread-winners. Therefore economically disadvantaged families may be helped by being given free rations when the only earning male member is sick with fever. A poor outcome among the elderly also alerts us to the need for special care in this age group. A rise in the number of cases during the monsoon calls for the initiation of preventive measures including those against mosquitoes (dengue), rodents, the use of protective garments for farmers (leptospirosis), and general public awareness and education.

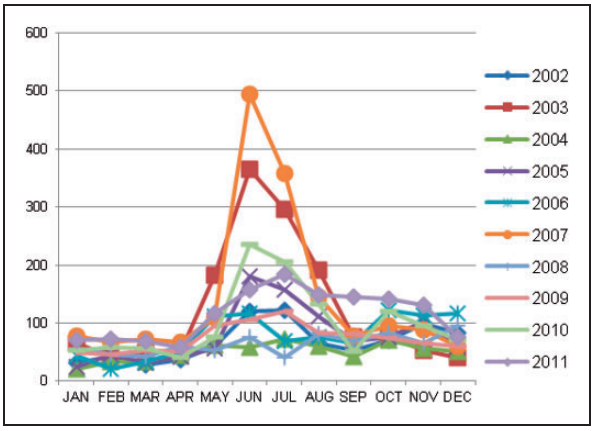

Figure 1. Seasonal trend of fever.

There is a significant dearth of information in the literature regarding this subject, making comparison difficult. A study from Vellore in Tamil Nadu noted a wide variation in aetiology[12] with scrub typhus being the predominant cause. Our results also differed from studies reported from other tropical countries.[2,3]

Based on our study we propose an algorithm for a more scientific approach to AFI (Figure 2). This, we believe, will avoid unnecessary tests and also limit antibiotic misuse. A patient with AFI with tell-tale signs of sepsis, or a relevant history with or without signs, should be managed as such. A case of undifferentiated

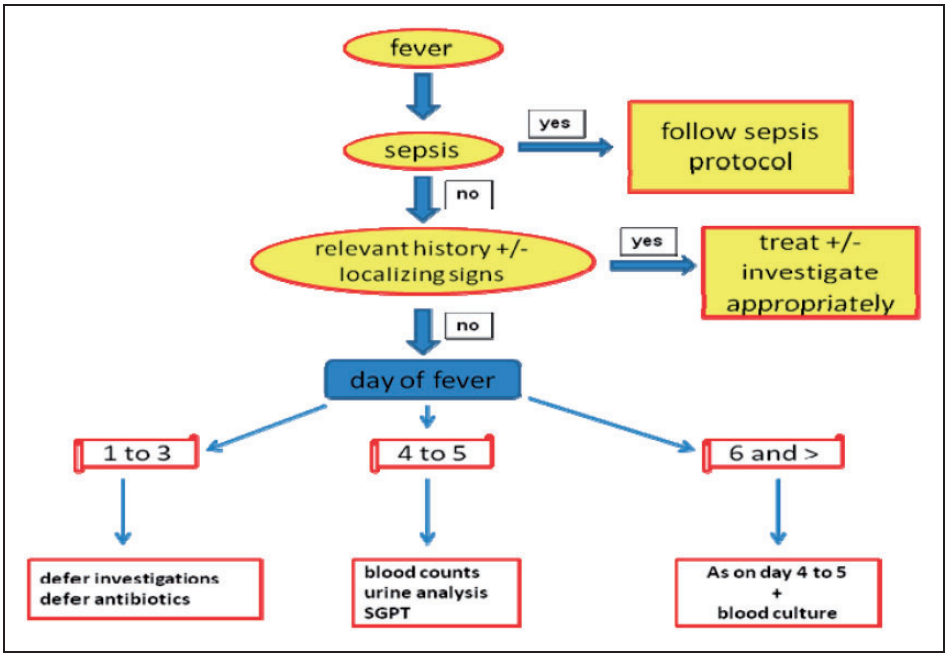

Figure 2. Algorithm for AFI.

febrile illness may be treated symptomatically for a period of 3 days; investigations and antimicrobials should be deferred. We propose investigations relevant to our area for a fever beyond 3 days. This may be modified from region to region using local epidemiologic surveillance data. Furthermore, this type of chart may need to be modified in course of time because of changing epidemiological trends. Fever beyond 6 days should be approached as a case of pyrexia of unknown origin. Inevitably adoption of such methodology ultimately calls for strengthening the epidemiologic surveillance network by local health authorities. We wish to utter, however, a word of caution: such an algorithm cannot be considered as a substitute for the clinical acumen of the physician, rather it is meant to supplement his decision-making and, in the process, avoid unnecessary investigations and treatment.

In spite of the best efforts on the part of the physician, diagnosing a case of fever will sometimes be a challenge. In our country, prescription rules are often not enforced and patients are free to try any 'quick fix' strategies; moreover other streams of healthcare like ayurveda, homeopathy and traditional forms of treatment for fever may complicate the picture. With antibiotic resistance increasing and healthcare costs spiralling, a rational approach to fever will go a long way in mitigating misdiagnoses.

Declaration of conflicting interests

None declared.

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