Contemporary Themes

Assessment of patients with suspected viral haemorrhagic fever

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Summary and conclusions

We reviewed our two-year (1976-7) experience of patients who might have had an African-derived haemorrhagic fever: only two out of 46 suspects had such infections, and these were successfully contained. Malaria was the most frequent diagnosis in those patients recently returned from Africa, especially if malarial prophylaxis had been inadequate. Altogether 26% of patients had become ill before travelling to Britain.

It is impossible to ensure absolute safety even with draconian measures, but the degree of isolation recommended (based on epidemiological factors that included return from Africa within the previous three weeks, visiting country districts, exposure to possible cases, or infected material and illness despite adequate malarial prophylaxis) has proved effective and acceptable.

Introduction

Of 2000 passengers arriving daily from Africa at the three major London airports, over 700 start their journey in West, Central, or East Africa¹—that is, in areas known to be endemic for viral haemorrhagic fever (VHF), such as Lassa, Ebola, and Marburg.

Some of these passengers, who develop fever or other symptoms, present an increasing medical problem in terms of diagnosis and management. While most such travellers are likely to have readily recognisable conditions such as malaria or to suffer from mild self-limiting illness, a minority must be considered as potential cases of VHF, who need special isolation with appropriate handling of laboratory specimens.

Method

We reviewed the case records of all patients admitted with a febrile illness within three weeks of return from tropical Africa or a history of contact, either directly or indirectly, with African haemorrhagic fever. We focused particular attention on epidemiological factors in diagnosis and practical aspects of management of those suspected of having VHF.

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Results

Seventy-nine patients who fulfilled our criteria were admitted during 1976 and 1977; 46 had been referred specifically because of suspected VHF. In the remaining 33 patients no such suspicion arose, either before or after admission. The country of origin of all patients is given in the table.

Country of origin of all patients

	Suspected disease		
	Lassa fever	Ebola or Marburg infection	Pyrexia of unknown origin or malaria
West Africa excluding Nigeria	7	0	7
Nigeria	29	0	21
Central Africa	1	3	1
East Africa	0	0	4
England	5	1	

Fifty-four of the 73 patients from Africa became ill shortly after arrival in Britain, the mean time elapsing before the onset of symptoms being seven days ($\pm$ SD five days). Nineteen patients had become ill before departure for Britain, and of these, 13 were admitted as having suspected VHF. Forty-nine of the 73 from Africa had not taken adequate malarial prophylaxis (defined as regular administration of an antimalarial agent on arrival in an endemic area, during stay, and for one month after return).

The 33 patients who were not thought to have VHF were admitted to a standard isolation room, investigated, and treated routinely.

Final diagnosis of all patients: non-VHF suspects in white and VHF suspects in black. (Some patients had more than one diagnosis made.)

None had a dangerous transmissible infection: 21 (63%) had malaria, two respiratory infections, two gastroenteritis, one streptococcal tonsillitis, another cytomegalovirus infection, and yet another influenza. No conclusive diagnosis was made in six patients. (Several patients had more than one infection.)

There were 46 VHF suspects. Their mean age was 33 years ($\pm$ SD 11; range 11-64 years). Thirty were male. Forty-two patients were admitted with a provisional diagnosis of Lassa fever and four with a suspicion of Ebola or Marburg infection. On arrival 15 were admitted to standard isolation rooms, 20 to a high-security room,² and 11 directly into a Trexler negative-pressure isolator.³ The initial placements were made on an assessment of the likely degree of risk based on the following relevant factors, often in combination.

Occupation—Of the nine engineers and others employed in the construction industry who were admitted with suspected VHF, four were admitted into a Trexler isolator, four into a high-security room, and one into a standard room. Two technicians, who had been handling potentially dangerous material in the laboratory, were also admitted to an isolator. Occupation was not considered relevant in assigning the remaining 35 patients to appropriate isolation.

District visited—Fifteen patients had visited a rural area: three were admitted to a standard room, eight to a high-security room, and four into a Trexler isolator. Of the 17 patients who had stayed exclusively in cities, six were admitted to a standard room, seven to a high-security room, and only four into a Trexler isolator. One patient was removed from a high-security room into a Trexler isolator.

Contact—Of four patients in contact with possible cases of VHF, one was admitted into a Trexler isolator, two to a high-security room, and one to standard isolation.

Malarial prophylaxis—Forty VHF suspects had returned from a malarious zone. Thirteen had taken adequate prophylaxis: of these, four were admitted to a standard room, five to a high-security room, and four into a Trexler isolator. The corresponding figures for those who had not taken adequate prophylaxis were 11, 12, and four.

Clinical condition on admission—A detailed history and careful clinical examination may show the true nature of the illness. In particular a sudden onset of fever accompanied by rigors and an enlarged spleen would make malaria a highly probable diagnosis. When clinical examination suggested a strong possibility of a VHF the patient was transferred to maximum security in a Trexler isolator.

Of the 46 VHF suspects, only two were found to be positive, one with Lassa virus and another with Ebola virus.⁴ In both instances the measures taken successfully contained infection.

Discussion

It is common for travellers who have recently arrived from tropical Africa to develop feverish illness, and some may fall under suspicion because of the wide publicity given to Lassa fever, "green-monkey" disease, and other newsworthy tropical infections. Nearly all of these patients have minor respiratory infections or malaria, and very few have VHF. We estimated that over 500 000 travellers arrived from tropical Africa during this two-year period yet only 40 (8 per 100 000) had an illness sufficiently suspicious to warrant admission to our high-security unit designated to serve south-east England (population 11 million).

Thirteen of the patients with suspected VHF (32%) had been ill before leaving Africa. The arrival of these travellers caused considerable alarm and incurred additional effort and expense to the environmental health service.

It is obviously impracticable and unnecessary to take stringent precautions with all who have become ill before or immediately after arrival from tropical Africa. Yet there is always the possibility that some may be dangerous. Unfortunately there are no distinctive features in the early stages of VHFs to enable a firm diagnosis to be made on clinical grounds, so judgment rests mainly on epidemiological evidence. We consider certain factors to be of major importance—namely, the occupation of the patient; a history of visits to small towns or the countryside; whether adequate malarial prophylaxis has been taken or not; and a history of contact with a possible case of VHF.

Our policy based on these criteria is to classify patients with unexplained fever, who have arrived from tropical Africa within

the previous three weeks, into three categories according to the degree of risk and admit to hospital accordingly.

Minimal risk—Those who have come from major cities, where the risk of VHF is negligible, are admitted to standard isolation rooms with routine barrier nursing. Specimens for investigation are sent to routine laboratories. When there is no immediate threat to life patients in this category may be nursed at home while appropriate investigations are carried out.

Moderate risk—Patients from small towns or country districts are regarded with more suspicion and are admitted to a high-security room with filtered negative-pressure ventilation and separate facilities, where they are kept under observation. Specimens of blood for examination to exclude malaria are processed in high-security cabinets. If no parasites are found and fever continues such patients are transferred into a Trexler isolator in maximum security. Any further laboratory investigations are postponed until the results of the malarial studies are known.

High risk—The last and potentially the most dangerous group of patients are those who have been living or working in rural areas; medical and nursing staff from country hospitals; contacts of known cases; and laboratory workers handling dangerous material. Patients in this group are admitted direct into a Trexler isolator. Specimens are sent to maximum-security laboratories.

Malaria is the commonest and clinically the most urgent diagnosis to establish, so that there must be adequate facilities for speedy examination of blood films under conditions of safety. Our survey has shown that 63% of patients admitted with the provisional diagnosis of pyrexia of undetermined origin or malaria were found to have malaria, and 45% of travellers admitted for investigation of VHF had positive blood films for malaria. Once malaria has been excluded the possibility of VHF is greatly enhanced, and stricter measures are necessary until the illness resolves or the results of virus studies prove negative. Usually the illness settles uneventfully within 48 hours, and simple observation under strict isolation is all that is needed. In a few cases, however, where symptoms persist, more elaborate studies are necessary, and these can be performed only in suitably equipped and staffed laboratories.

In recent years we have been gradually acquiring experience and knowledge in managing these complex problems. Obviously it is impossible to ensure absolute safety even with draconian measures for isolation. The policies we have outlined have proved effective in practice and acceptable to the patients and hospital staff.

References

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WORDS ARTERIES were so called because they were believed to contain air. They were seen to be empty after death, so they were obviously not blood conduits. They were believed to convey vital spirit (*G pneuma*), a material derived from inspired air and not clearly distinguished from it. The usage persists also by implication in the word TRACHEA, Greek for the rough. The term is short for arteria trachea, the rough air-carrier; rough because of the cartilaginous rings. The noun was dropped: the adjective persisted and became a noun. This often occurs in word evolution. After all, we have the rough in golf. It really was all quite simple. Air was taken in by the arteria trachea, endowed with vital spirits on mixing with blood in the heart, whence it pulsed to and fro in the arteries (pneumatic arteries?).