South African Tick Bite Fever in a Rural General Practice

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Summary

A retrospective study of patients with tick bite fever in a rural practice was done. Certain findings eg clinical history, presenting symptoms, epidemiology and treatment are discussed.

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Curriculum vitae

Dr Neethia Naidoo qualified as a general practitioner from the University of Natal Medical School in Durban. He has been in general practice since 1972 and obtained the MFGP in 1978. He is chairman of the Natal Midland Branch of the South African Academy of Family Practice/Primary Care and is a member of the National Council of the Academy. He was the first President of the National Medical and Dental Association (NAMDA). He is presently chairman of the Dalton and Districts Child and Family Welfare Society and District Surgeon for the magisterial district of New Hanover. He is active in under- and post-graduate education in general practice.

Tick-borne rickettsial infections occur fairly commonly in many different regions of the world where they have been given different regional or local names[1-4]. It occurs in every part of South Africa except the North Western districts of the Cape Province. The infection is especially common in the bushveld areas of the Transvaal and along the coastal belt of Natal and the South East and South Cape Province.[5]

The causative agent is Rickettsia coronii var pijperi which is transmitted to man from an animal reservoir by the bite of an infected ixodid (hard) tick which have cycles in nature that involve dogs, rodents and other animals[5]. Man, a dead end host becomes infected when he intrudes into this zoonotic cycle for recreational or occupational reasons and is bitten by an infected tick.

The signs and symptoms of tick bite fever are so characteristic that there is usually no difficulty in diagnosing the condition on the clinical findings. The problem, however, is that the diagnosis is often missed especially in the early stages or that the condition remains undiagnosed until fairly late in the disease. This is sometimes made difficult by the fact that several febrile conditions associated with a rash can cause diagnostic problems.

Clinically the condition is characterised by a pyrexial illness from one to 14 days with a severe headache. At the site of the infective bite, a characteristic local lesion develops, the primary sore which is the most important single diagnostic sign of tick-bite fever.[9]

It is initially a red raised inflammatory nodule which later develops into a painless ulcer with a black necrotic centre – the "eschar". There is usually enlarged regional lymphadenitis. A maculo-papular rash typically develops from

about the third to the fifth day and may be sparse or profuse. When profuse, it involves the palms of the hand, the soles of the feet and the face.

In many cases no primary lesion or regional lymphadenitis can be detected initially but develops about 7-10 days later. Some patients develop no further symptoms[9]. Generally this rickettsial infection is mild and is seen predominantly in Caucasian people. Early exposure causing mild illness and producing long lasting immunity might account for the infrequent occurrence in the other groups of people.[8]

The disease is usually self limiting with symptoms settling after a week or two in some untreated cases. Significant cardiovascular, respiratory or neurological features are absent, except rarely in the more severe forms of the disease especially in elderly patients.[6]

The Weil-Felix test, although non specific is very helpful if rising antibody titres to the Proteus 0 × 19 and 0 × 2 strains can be demonstrated.

The response to tetracyclines is prompt and patients generally become afebrile after 2 or 3 days of treatment and recovery is rapid. Drug treatment should be continued until the patient has been afebrile for at least 48 hours except in severe cases where one may have to continue treatment for several days.[10]

The diagnosis of tick bite fever is often missed in the early stages

Patients and methods

All patients treated by the author have been analysed in a retrospective study from the records of the practice which is a general practice in the Magisterial district of New Hanover. Fifty three (53) patient records were analysed during the study period January 1983 to August 1988. Fifty three (53) patients were diagnosed as tick bite fever. Forty five (45) on clinical findings, six (6) with the help of laboratory tests and two (2) were diagnosed in hospital after further investigations were carried out. Twenty three (23) of the fifty three (53) patients were diagnosed with certainty at the initial consultation. The remaining twenty two (22) patients were diagnosed at subsequent visits usually the second but sometimes on the third visit. As previously mentioned, eight patients were only diagnosed after special laboratory or hospital investigations were carried out, ie high or rising 0 × 19 and 0 × 2 titres.

Mostly the diagnosis can quite confidently be made on clinical grounds

Table 1 — Sex distribution of patients

	Number	%
Male	42	(79,0)
Female	11	(21,0)
Total	53	(100,0)

Table 2 — Sex and ethnic distribution of patients

	Number and percentage (%)				
Sex	**White**	**Indian**	**Black**	**Other**	**Total**
Male	34(64,0)	4(7,5)	3(5,7)	1(1,9)	42(79,0)
Female	6(11,0)	2(3,8)	3(5,7)		11(21,0)
Total	40(75,0)	6(11,3)	6(11,4)	1(1,9)	53(100,0)

Table 3 — Population distribution in the area

	Number	%
Blacks	40 171	(89,6)
Whites	2 669	(6,0)
Indians	1 854	(4,1)
Coloured Other	129	(0,3)
Total	44 823	(100,0)

Table 4 — Age and sex distribution of patients

	Number and percentage (%)							
Age	**0-19**	**20-29**	**30-39**	**40-49**	**50-59**	**60-69**	**70-79**	**Total**
Male	20(38,0)	7(13)	3(5,7)	8(15,0)	1(1,9)	1(1,9)	2(3,8)	42(79,0)
Female	5(9,0)	3(5,7)	—	1(1,9)	—	1(1,9)	1(1,9)	11(21,0)
Total	25(47,0)	10(18,7)	3(5,7)	9(16,9)	1(1,9)	2(3,8)	3(5,7)	53(100,0)

Table 5 — Presenting symptoms at initial consultation

	Number	%
Headaches — severe	49	(92,5)
— mild/moderate	4	(7,5)
Fever	38	(71,7)
History of a bite	23	(43,4)
Myalgia	19	(35,9)
General aches and pains	32	(60,4)
Anorexia	16	(30,2)
Malaise	13	(24,5)
Rash	19	(35,8)
Backache	3	(5,7)
Nausea, vomiting	3	(5,7)
Arthralgia	21	(39,6)

Table 6 — Presenting signs at initial consultation

	Number	%
Fever	51	(96,2)
Rash	23	(43,4)
Eschar	17	(32,1)
Regional lymphadenitis	21	(39,6)
inguinal nodes	11	
posterior cervical	6	
suboccipital	4	
Conjunctival injection	7	(13,2)
Sore Throat	7	(13,2)
Limb muscle tenderness	7	(13,2)
Neurological abnormalities - delirium	1	(1,9)
Dehydration	1	(1,9)
Febrile convulsion	1	(1,9)

Table 7 — Length of history prior to first consultation

	Number and percentage (%)							
Days	0-1	2-3	4-5	6-7	8-9	10-11	12-13	14-15
Number	1(1,9)	2(3,8)	4(7,5)	26(49,0)	13(24,5)	2(3,8)	2(3,8)	3(5,7)

Table 8 — Other diagnosis made at initial consultation

	Number	%
1. Viral Infection	15	(28,3)
2. Measles	6	(11,3)
3. Infectious Mononucleous	4	(7,5)
4. Typhoid	2	(3,8)
5. Streptococcal Injection	1	(1,9)
6. Rubella	1	(1,9)
7. Meningococcaemia	1	(1,9)

Laboratory confirmation was obtained in 8 patients where a high titre to the Proteus 0 × 19 and 0 × 2 were demonstrated.

Table 9 — Complications

	Number	%
Febrile Convulsion	1	(1,9)
Severe prostration/dehydration	1	(1,9)
Broncho pneumonia	1	(1,9)

Outcome

All patients recovered completely with no residual problems including the two treated at hospital

Discussion

An acute febrile illness with or without rash, in a person with a history of tick bite, exposure to ticks, either in a tick-infested rural or suburban area or contact with a tick infested dog, or equally important, recreational or occupational activities which might have brought the patient into a potentially tick infested area, should alert the family physician to the possibility of tick bite fever.

The diagnosis can be quite confidently made in the majority of cases on clinical grounds, although other diseases, especially those with a rash, may present early differential diagnostic problems especially measles and meningococcaemia.

The history of tick bite can be elicited in the majority but not all patients. A black pea size firm area called a "eschar" appears at the site of the bite. There is a wide variation in incubation period from 2 to 14 days with the average being 6–9 days. Very severe disease is preceded by a short 2–5 day incubation period.

Attacks may be so mild that the patient may not present with any significant symptoms. Prodromes, when present, consist of anorexia, malaise, feverishness, general aches and pains and chilly sensation.

The more typical infections are more sudden in onset with severe headaches, chills, fever, myalgia (back and legs) nausea with occasional vomiting especially in children and conjunctival injection.

There may be abdominal muscular pains, tenderness of the muscles on palpation and

arthralgia in one or more joints as the rickettsia multiples and subsequently damages endothelial cells throughout the vascular tree which probably accounts for the rash, severe headaches and other symptoms.

The body temperature can be elevated to about 39 to 40°C in the first few days. The rash usually appears from 2nd to about the 6th day. The rash is fairly widespread on the limbs and trunk including the palms, soles and face, mouth and throat in severe cases. First, pink macules 2–5 mm in diameter appear, which blanch. In about two days these become fixed darker red and can become purplish macular papular in light skinned individuals. In severe cases it may become petechial, even haemorrhagic. The rash begins to disappear as the fever subsides but remains as pigmented spots for a few days.

Serologic methods remain the mainstay of routine laboratory diagnosis. However, since an antibody response rarely occurs before the end of the first week, and since a rise in antibody titre is more or less essential to a definitive diagnosis, this may only be available after a clinical diagnosis has been made.

People do become fully immune to the disease in time

At present the non-specific Weil-Felix test is generally available to laboratories. The more group specific rickettsial complement fixation tests are also available, usually at State Health Laboratories.

The organism can be isolated from skin lesions by biopsy and their presence demonstrated fairly early by direct immunofluoresence. The last two tests are very reliable but not readily available.

There are usually no significant alterations in the full blood count.

Specific antibiotic therapy has little effect on the time of appearance of antibodies or on their ultimate titre, provided treatment is initiated some days after onset of illness. If the disease is cut short by early and vigorous treatment, antibody production may be delayed for a week or so, but will be present 4–6 weeks after onset of illness.

Tetracyclines, eg oxytetracycline, doxycycline, which suppress but do not kill all rickettsia, are effective therapeutic agents. Patients generally become afebrile after 2 or 3 days of treatment. Tetracyclines should be given in a dose of 50mg/kg/24 hours every 4–6 hourly for 4–10 days. This should be continued until the patient has been afebrile for 48 to 72 hours.

Supportive measures may include parenteral fluids, sedation and skin care.

For families living in tick infested areas, an especially effective preventive measure is for parents to establish the routine of examining themselves and their children for ticks frequently especially in the summer months and for the children to examine themselves after they have been into the veld. Particularly dogs should be prohibited from entering bedrooms and beds and babies' cots. Fortunately individuals become fully immune to the disease in time.

Dogs should be kept out

Epidemiology

The infection may be transmitted to man by most species of the ixodid ticks. There is a hereditary transmission from one generation of ticks to the next, each stage of the larva, the nymph and the adult are infected and infective. Although the infection may be transmitted to man by the nymphs and adults, this is relatively rare. In most human cases the infection is transmitted by larval ticks which are so small that they are not felt on the skin and indeed are almost invisible and so have better opportunities attaching to the host.

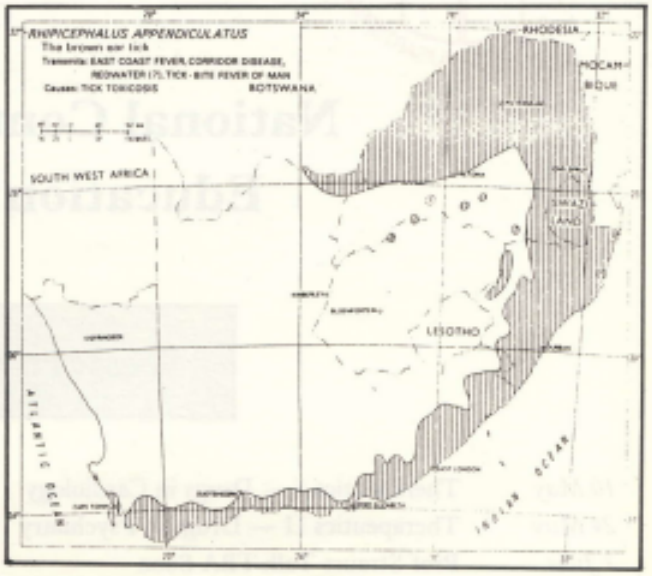
In the rural areas the ticks most commonly responsible for the transmission of infection are the red tick rhipicephalus appendiculatus and other species of rhipicephalus and the bont tick Amblyomma hebraeum.[10] The larva of these ticks are found on rodents and the nymphs and adults on larger animals such as cattle. Infections are

Tetracyclines are effective

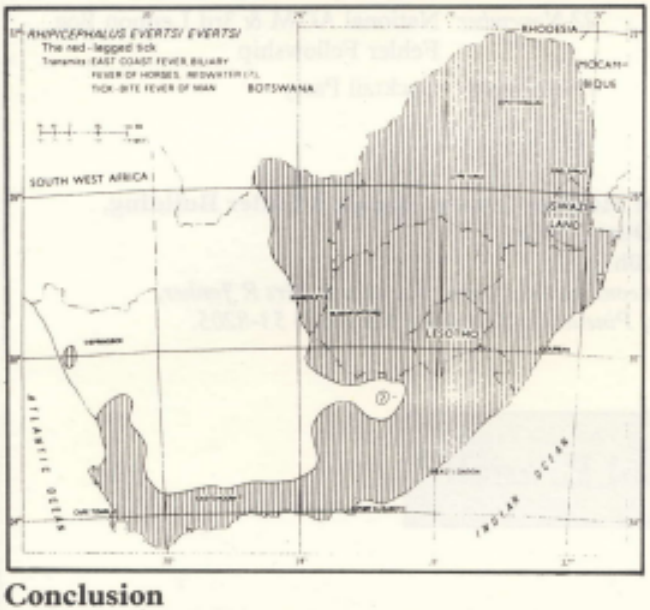
also commonly acquired in the suburbs of the towns and cities where it is usually transmitted to man by the larva of the common dog tick of this region Haemophysalis leachi.

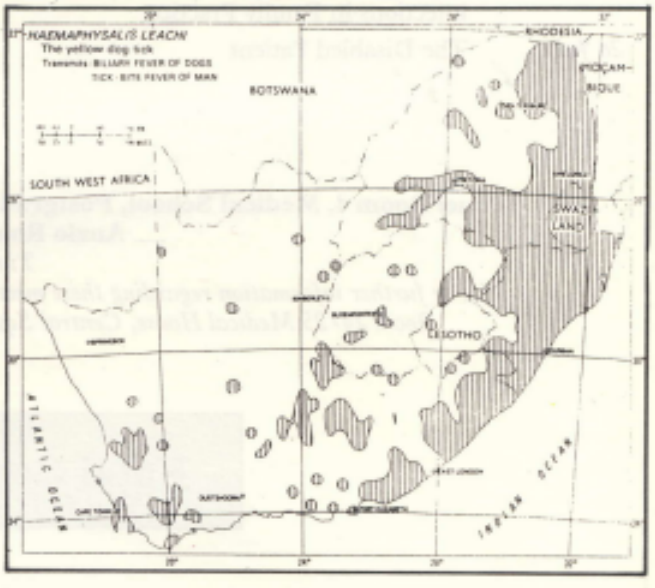
Families who allow their dogs inside houses and particularly if they are allowed to sleep on beds and to share the baby's cot, are especially liable to infection.[10]

The following maps show the distribution of the ticks which transmit tick bite fever in South Africa.[7]



The distribution of ticks which transmit tick bite fever in South Africa.





Conclusion

Tick-bite fever, the variety of tick typhus occurring in Southern Africa is caused by Rickettsia coronii var pijperi. Clinically the signs and symptoms are so characteristic that there is usually no difficulty in diagnosing the condition. In most cases the diagnosis should be made on clinical grounds and specific treatment with tetracycline, commenced in time, to be of benefit to a patient who is likely to have been exposed to ticks.

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