The following table shows the diagnostic points in relapsing fever and the frequency of their occurrence. (Some of these points are really complications, but their early appearance renders them symptomatic.)

Spirochaetes in febrile period	100%
" in afebrile period	38%
Jaundice	72%
Rash	8%
Epistaxis	12%
Tongue symptoms	68%
Enlarged spleen	89%
Tender spleen	44%
Heart murmurs	38%
XK agglutination (done in 168 cases)	98%
Pain in left shoulder	4%

Complications

There is little to say about the course of the illness as all these cases were treated immediately and responded admirably to N.A.B. In about 6% malaria was found simultaneously, and the quinine treatment did not interfere with the N.A.B. (Our experience with typhus allows us to assume that the relapsing-fever infection provokes the malaria relapse.) Typhus in about 10% of the cases took its normal course. Jaundice (72%) was the most frequent complication, and formed no contraindication to the specific treatment. The next most frequent, and the severest, were haemorrhages from the mucous membranes (12%): if untreated the patients lose litres of blood. Occasionally bleeding in the central nervous system occurs, causing paralysis. Only three such cases have been observed; one of these patients died. Other complications are rare: oedema (6 cases), acute thyroiditis (3), parotitis (8), perisplenitis (4), infarcts in the spleen (2—both fatal). Spleen infarcts, however, are not always fatal, as we have found them occasionally in necropsies after death due to other causes. The last complication is pachymeningitis (3 cases—all fatal). In 2 of these 3 cases spirochaetes were found in the C.S.F. Examination of the C.S.F. in uncomplicated cases of relapsing fever revealed normal conditions. Dutton's spirochaetes have been found by Lodewyckx in the C.S.F. in 3 cases. In others a hyperlymphocytosis was noted.

Relapses occur in spite of treatment. In 16% of the cases there was one relapse and in 4% there were two relapses. The longest interval observed was 27 days.

Treatment

One, two, or three injections of N.A.B. are necessary, the first injection being repeated if the temperature does not fall the day after the injection or if there is a fresh rise. Haemorrhages if severe must be treated. After having observed that in some cases the blood did not clot, we started to estimate the "prothrombin time" and found it prolonged in every instance, even if not complicated by haemorrhage. As vitamin K therapy is the method of choice in prothrombin deficiency it was tried, and proved to be the ideal treatment. We used 5 to 10 mg. of 2-methyl-1:4-naphthoquinone in oily solution intramuscularly (1 to 2 ampoules of kapilin-Glaxo). Vitamin K preparations should, we think, be given in all relapsing-fever cases to prevent haemorrhages.

The case mortality was 3.5%. At necropsy, perisplenitis was found in almost every case, and sometimes infarcts in the spleen. Endocarditis was common.

Conclusion and Summary

Relapsing fever in Addis Ababa is transmitted by lice.

Spirochaetes are often found during the afebrile stage.

The rash has a typical appearance—a violet shade; and a typical localization—the shoulders.

Tongue pain, atrophy, and ulcerations are typical of relapsing fever.

Relapsing fever in Addis Ababa is assumed to cause cardiac lesions.

All cases show a positive agglutination with XK.

Haemorrhages from the mucous membranes are due to prothrombin deficiency and can be treated successfully with vitamin K.

Relapses occur in spite of N.A.B. treatment.

The mortality rate was 3.5%.

In cases of pachymeningitis, spirochaetes have been found in the C.S.F.

Perisplenitis, spleen infarcts, and endocarditis have been observed at necropsy.

I wish to thank the D.M.S., East African Forces, for the permission to publish this paper.

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MUSTARD-GAS BURNS

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The following recent experience emphasizes anew certain features of the effects of mustard gas.

On July 1, 1942, a site-decontamination demonstration involving the use of mustard gas was staged elsewhere in this region. Members of the Civil Defence Services of various areas were in attendance. By some mischance premature functioning of the demonstration weapon occurred, resulting in some of the spectators being affected, including 10 persons from this borough.

These patients had been entirely unaware of any contact with liquid mustard gas, which obviously had fallen in the form of fine droplets on their exposed skins. As a matter of fact, part of the bomb casing fell within two yards of the Gateshead party.

Photographs were taken of some of the burns on July 4 and 5, and two of these are reproduced here. The following abbreviated table summarizes each case and the length of the latent period:

Case	Latent Period	Site of Burns	Remarks
1	2½ hours	Left side of neck and temple; outer angle of orbit; left hand	
2	1½ "	Left side of neck and angle of jaw; back of left hand; front of right wrist	Faintness, nausea, perspiration on 2/7/42. Burnt by vapour in last war
3	Leg, 2 hours; neck, 8 hours	Left side of neck; right thigh and calf	
4	8 hours	Left side of neck and temple	
5	6 "	Bridge of nose; left cheek and face	
6	2½ "	Left side of neck; right hand. Small patch ½ in. below left eyelid	Nausea and vomiting on 3/7/42. Blister-gas burn in last war
7	14 "	Left side of neck and left hand	Nausea and vomiting, 3/7/42
8	12 "	Left side of neck; pinna and lobe of left ear	" "
9	About 12 hours	Left side of neck	
10	" 50 "	" " "	

When first seen the lesions took the form in all cases of a sharply defined raised erythema of the skin, and in 7 cases there were also varying degrees of punctate vesication of the burns of the neck. In one of these cases the vesicles continued to appear for a period of approximately 30 hours after exposure. One individual sustained burns on the leg due to

the liquid penetrating his clothing. The vesicles were incised where present, and the burnt areas were bathed with weak dettol solution and subsequently anointed with sulphanilamide paste. Four of the patients complained of nausea either one or two days after the onset of the lesions, and these symptoms lasted for approximately 12 hours. The incised vesicles took on the form of yellowish-brown crusts which later separated,

FIG. 1

FIG. 2

to leave pale areas in contrast with the erythematous skin, which became a dark coppery colour, so that the skin of the neck in particular had a mottled appearance. No septic complications were met with in the subsequent progress of the lesions. Two of the patients had sustained mustard-gas burns in the last war, and they had the shortest latent periods after exposure. One still complained 12 days afterwards of an intermittent burning sensation in the neck which interfered with his sleep.

Discussion

The 10 members of the local authority service present at this demonstration were all highly trained in anti-gas precautions. They were fully aware of the consequence of exposure to mustard gas, but not one realized that he had been splashed by droplets. They all assumed their respirators immediately the accident occurred and considered themselves safe. Conjunctivitis was not evident in any of the cases, probably owing to this; but two of the men had narrow escapes, as they sustained tiny burns on the eyelids.

Sulphanilamide paste apparently countered the danger of skin sepsis and proved a very satisfactory dressing.

Summary

We report 10 cases of mustard-gas burns sustained as the result of an accident during an A.R.P. demonstration.

Attention is directed to the insidious action of mustard gas, a feature that was of course noted in the last war.

The incident described emphasizes the need for strict observance of the recommended safety precautions required in the conduct of such demonstrations.

Medical Memoranda

Fulminating Purpura and Adrenal Haemorrhage

Cases of fulminating purpura and adrenal haemorrhage (Waterhouse-Friderichsen syndrome) are rare enough to be worth recording.

CASE REPORT

At about 12 noon on March 11, 1942, in response to an urgent call, I visited a male child aged 4 months who had suddenly become seriously ill. On my arrival the mother gave the following history: The child had always seemed perfectly healthy. On the previous evening he appeared to be quite normal and had taken his feed as usual. He had slept through the night. On the morning of March 11 he took his feed, though not very readily, the bowels had acted and were normal in appearance, but the mother had noted a rash behind his ears. As the rash began to spread over his face the mother thought that he was "going in" for measles. At about 11.30 a.m. the child suddenly became much worse; his breathing became very rapid and noisy, and as he appeared to be unconscious the mother became very alarmed.

Examination showed a well-nourished, extremely shocked, and cyanosed child, presenting almost a complete Hippocratic facies. A well-marked purpuric rash covered the face profusely, and was also present on the abdomen and on both extremities. There were also large blotches of ecchymoses on both thighs and forearms. The rectal temperature was 101.4°, the pulse about 160, the respirations 64, accompanied by a loud stertor. Nothing abnormal could be seen in the mouth, throat, or nose. The lungs were resonant, the abdomen was flaccid, and rectal examination revealed a soft yellow stool adherent to the gloved finger. There was no head rigidity; Kernig's sign was negative; the pupils were dilated, equal, and did not react to light. No history of a convulsion was elicited. The child died in my presence at 1 p.m.

I was allowed to perform a post-mortem examination on the following day. The heart, lungs, and gastro-intestinal tract presented no abnormality; the mesenteric glands were not enlarged; the liver, kidneys, spleen, and thymus appeared normal. There was, however, haemorrhage into both suprarenal glands, both cortical and medullary portions being involved. No bleeding had occurred into the adjacent tissues. Permission was not granted to examine the brain and spinal cord.

COMMENT

In a review of the literature Sacks (1937) found only 64 cases published up to that time; by the beginning of 1940 these had reached a total of 70 (Carey, 1940). All the cases show a striking similarity, the patient usually being a child aged 2 to 15 months, who becomes suddenly ill and dies often in less than 24 hours. A haemorrhagic rash of greater or less extent is present in every case, the temperature is mostly between 100° and 103°, and the sudden collapse, cyanosis, and accelerated respiratory rate may lead to a diagnosis of pneumonia. The illness is so fulminating and death occurs so early that complete investigation is generally not possible. The accepted view appears to be that the purpura and the haemorrhage into the adrenals are due to a massive bacteraemia, and MacLagan and Cooke (1916) suggest a selective action by the meningococcus. If that is so the disease is so fulminating that the patients appear to succumb to the general infection before the lesions of the meninges have had time to develop. It might, of course, be a fulminating type of any other infectious fever.

London, N.10.

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