microscopical examination Gram-negative rods were seen, and on culture the isolated organism proved to possess the biochemical and serological properties of *Salm. paratyphi B* (Schottmüller). The same organism was isolated from another specimen of pus taken a few days later. The patient's serum agglutinated the organism isolated from his pus at a titre as high as 1 in 5,000. Urine and faeces yielded no growth of *Salmonella*. After the operation the temperature dropped, the E.S.R. became less rapid, and the patient greatly improved. When he was discharged from hospital on Dec. 12 the incision wound had almost healed. He reported back to the out-patient department a few weeks later complaining of pain in the right loin and renewed fever in the evenings. Into a small opening which remained in the incision scar lipiodol was injected, and an x-ray film showed communication with a cavity which tomography revealed between the third and fourth lumbar vertebrae (see illustration). Since then the patient has been seen repeatedly. When the fistula stops discharging the pain and fever reappear, but cease when drainage is re-established.

Comment

According to various statistics, almost 1% of cases of typhoid are complicated by osteomyelitis: 0.82% according to Winslow (1923), 0.87% according to Keith and Keith (1926). The reported incidence of this complication in cases of paratyphoid is much lower. Webb-Johnson (1917) saw only two instances of bone involvement in 1,038 cases of paratyphoid. Winslow (1924) in 100 cases of paratyphoid observed no case of osteomyelitis. Ross Veal and McFetridge (1934) collected 16 cases from the literature and added two of their own. Their series does not include the cases of Reenstjerna (1910). Two additional cases have since been reported (Just, 1937; Jetter, 1938). Our two cases bring the total number recorded up to 23. From the historical point of view it is interesting to recall that *Salm. paratyphi B* was first isolated—even before its definite identification by Schottmüller—from an osteomyelitic lesion of the sternoclavicular region by Achard and Bensaude (1896).

Osteomyelitis, both typhoid and paratyphoid, is rare in children. Winslow (1923), who collected all bacteriologically proved cases, found only four cases between the ages of 2 and 10. A typhoid abscess of the spine in a 3-year-old child was reported by Abbassy (1946). We were unable to find in the literature an instance of typhoid or paratyphoid bone abscess in infants. Our case of paratyphoid osteomyelitis in a 1-year-old infant seems to be the youngest recorded.

In Case 2 the abscess presented itself clinically 32 years after an attack of enteric fever. The coxalgia for which the patient at that time was put in plaster was apparently a paratyphoid spondylitis. The localization in our patient was typical, as the lumbar spine is involved in about 70% of cases showing spine lesions (Ross Veal, 1939).

The affinity of the typhoid and paratyphoid bacilli for the bone marrow invites consideration. The bacillus is already found in the bone marrow at the beginning of the infection (Storti and Filippi (1937). There is also good clinical and experimental evidence to show that the bacillus may persist in the marrow for a very long time (Dmochowski and Janowski, 1895; Lüdke, 1909; Coplans, 1936; Ling *et al.*, 1940; MacDonald, 1941; Kernwein and Capps, 1943).

Ten cases of typhoid osteomyelitis have been reported in the literature in which the time interval between disease and the bone complication exceeded ten years. We found only one case of paratyphoid osteomyelitis reported in which the bone abscess appeared 20 years after the original disease (Jensen and Kock, 1913).

What are the factors involved in the sudden exacerbation of an infection after so long a latent period? Most

authors agree that trauma may upset the equilibrium between the bacilli and the defence mechanism of the body. The traumatic agent need not be a direct blow. Undue strain or fatigue, pyrexia, or anything likely to lower the body's capacity for defence may cause the latent infection to flare up and show itself clinically. In our case the herniotomy may well have acted as such a trigger mechanism.

Summary

Two cases of paratyphoid osteomyelitis are reported, one occurring in a 1-year-old infant and the other in an adult 32 years after the initial infection.

Factors contributing to abscess formation and the incidence of this complication are discussed.

We are indebted to Dr. J. Gurevitch, head of the department of bacteriology and serology, and to Dr. A. Druckmann, head of the x-ray institute of our hospital, for their help.

REFERENCES

- Abbassy, A. Shafik (1946). *Arch. Pediatr.*, **63**, 63.
 Archard, C., and Bensaude, R. (1896). *Bull. Soc. Méd. Hôp. Paris*, **13**, 679.
 Coplans, M. (1936). *J. Path. Bact.*, **43**, 517.
 Dmochowski, Z., and Janowski, W. (1895). *Beitr. path. Anat.*, **17**, 221.
 Jensen and Kock (1913). In Kolle and Wassermann's *Handbuch der Mikroorganismen*, **3**, 1054. Jena.
 Jetter, W. W. (1938). *Amer. J. Dis. Child.*, **56**, 846.
 Just, E. (1937). *Disch. Z. Chir.*, **249**, 105.
 Keith, D. Y., and Keith, J. P. (1926). *J. Amer. med. Ass.*, **87**, 2145.
 Kernwein, G. A., and Capps, R. B. (1943). *Amer. J. Surg.*, **60**, 433.
 Ling, C. C., Taur, S. S., Hsueh, P. C., and Yang, S. Y. (1940). *Chin. med. J.*, **57**, 11.
 Lüdke, H. (1909). *Münch. med. Wschr.*, **56**, 57.
 MacDonald, A. (1941). *Lancet*, **1**, 174.
 Reenstjerna, J. (1910). *Disch. med. Wschr.*, **36**, 896.
 Veal, J. Ross, and McFetridge, E. M. (1934). *J. Bone Jt. Surg.*, **16**, 445.
 — (1939). *Amer. J. Surg.*, **43**, 594.
 Storti, E., and Filippi, Ch. (1937). *Sang*, **11**, 440.
 Webb-Johnson, A. E. (1917). *Lancet*, **2**, 813.
 Winslow, N. (1923). *Ann. Surg.*, **77**, 319.
 — (1924). *Bull. Sch. Med. Maryland*, **8**, 164.

SALM. ORANIENBURG SEPTICAEMIA REPORT OF A FURTHER CASE

BY

C. N. PARTINGTON, M.B., B.Ch.
Assistant Pathologist, County of Dorset

AND

T. V. COOPER, M.B., B.S.
County Pathologist, Dorset

In the first recorded case of *Salmonella oranienburg* blood infection in Britain the source of the infection was never discovered (Kerrin, Elder, and Smith, 1935). In the light of events in the recent war, when *Salm. oranienburg* contamination of transatlantic dried egg was shown to be common, this original infection may well have been imported, for in 1935 food flowed in plenty to this country from all over the world.

A subsequent case was reported by one of us (Cooper, 1944), but, although intestinal infections with this *Salmonella* are not uncommon, blood infection has rarely come to light. For this reason we venture to publish a further case met with in this laboratory. There were strong reasons for suspecting dried-egg infection as the cause of the 1944 case, but at that time it was ruled impolitic to say so. In our present case no history of dried-egg consumption could be obtained, but presumably this substance is an ingredient of a variety of creams and sauces which may be consumed in hotels and restaurants. The old view that the carrier state was rare in salmonella infections is no longer tenable. Our present patient was shown to be a convalescent carrier for over five weeks. Food-borne infections of human origin are therefore probable.

Case History

The patient, an unmarried woman aged 21, was first seen by her doctor on Aug. 22, 1947, having returned on Aug. 19 from a holiday in Jersey, where she spent Aug. 16 in bed with headache, diarrhoea, and vomiting. The headache had persisted, and the doctor's view on the 22nd was that the patient was clinically likely to be suffering from typhoid fever. Next day he therefore requested the county laboratory to undertake a blood culture. At that time the patient's bowels were constipated. Pyrexia, lassitude, and headache persisted for a further nine days. There was no rash and the spleen was never palpable. The temperature chart is here shown; the pulse was

Temperature chart of case.

of the order of 70 to 80 throughout. The headache, associated as it was with stiffness of the neck muscles and the incidence of an outbreak of poliomyelitis at the time, brought in the exclusion of that condition as a further problem. There was no history of the patient having had dried egg in a form she was able to recognize, but she had partaken of salad dressings while on holiday.

We withdrew 20 ml. of blood: 5 ml. was put into 100 ml. of bile-salt broth, 5 ml. into 100 ml. of glucose-proteose peptone No. 3 which contained "liquoid" and para-aminobenzoic acid, 5 ml. into Wintrobe mixture, and 5 ml. of clotted blood was used for the Widal test. Growth appeared in the glucose-proteose after 48 hours' incubation. No growth appeared in the bile-salt broth. Subculture produced a non-lactose-fermenting Gram-negative bacillus which was motile and grew freely in taurocholate media.

Acid and gas developed in glucose, maltose, mannite, and dulcitol—all within 24 hours. There was no reaction in lactose, saccharose, or salicin, but a slight acid reaction in litmus milk. The indole test was negative. Gelatin was not liquefied.

Agglutination reactions: polyvalent *Salmonella A*, negative; polyvalent *Salmonella B*, negative; polyvalent *Salmonella C*, positive titre 1 in 250; *paratyphosum C "O"*, positive titre 1 in 50. An organism isolated from the stools on Aug. 23, 24, 30, and Sept. 5 and 29 produced identical results. The first negative result was obtained on Oct. 25, and all three subsequent stools were negative. The organisms recovered from the blood and faeces were confirmed by Dr. Joan Taylor as conforming to *Salm. oranienburg*.

A blood count on Aug. 23 showed: haemoglobin, 92%; red cells, 4,630,000; leucocytes, 6,600 (polymorphs: neutrophils 70%, monocytes 4%, lymphocytes 26%). Urine taken on Aug. 23 was negative biochemically and bacteriologically. Widal reactions were negative.

Discussion

Kerrin *et al.* (1935) give a similar clinical story of their case, but hypostatic pneumonia and death occurred. Their blood culture was positive in taurocholate media. Cooper's (1944) patient presented as a case of gastro-enteritis with continuing pyrexia. This case also continued to excrete the organisms for at least 55 days. In our own case it is reasonable to suppose that infectivity of the faeces ceased midway between Sept. 29 and Oct. 25—about 40 to 50 days after the organism was first detected on Aug. 23.

Summary

A further example of the isolation of *Salm. oranienburg* from blood is recorded.

The value of blood culture in cases of pyrexia of unknown origin is re-emphasized.

The discovery by the same laboratory of two cases of blood infection with this organism draws attention to the occurrence of septicaemia in at least a proportion of salmonella infections.

REFERENCES

- Cooper, T. V. (1944). *Mon. Bull. Min. Hlth*, 3, 40.
Kerrin, J. C., Elder, A. T., and Smith, J. (1935). *Lancet*, 1, 1042.

Medical Memoranda

Nitrogen Mustard in Polycythaemia Vera

Since Wilkinson and Fletcher (1947) reported the results of treatment of three cases of polycythaemia vera with nitrogen mustard the opportunity for treating a further case has occurred.

CASE REPORT

The patient, a woman aged 51, had been a known sufferer from this condition since she had been admitted under the care of Professor Nattrass in 1935. At that time she complained of high facial colouring of four years' duration, with pain in the left side and nausea, dyspnoea, and palpitation of two years' duration. The haemoglobin was 106% (Haldane), the red blood cells

the white cells had risen from 12,000 to 36,000 per c.m.m.

The patient was given methyl-bis(β -chloroethyl)amine hydrochloride intravenously in doses of 0.1 mg. per kg. of body weight on the 3rd, 8th, 19th, 23rd, 28th, 37th, 43rd, 57th, and 64th days after coming under observation. Apart from nausea and vomiting, which came on three hours after each injection and lasted for two to three hours, no untoward side-effects of the treatment were encountered. As will be seen from the charts, the haemoglobin level and the red and the white blood cell counts dropped during the first month and thereafter there was a pronounced tendency for these values to increase in spite of treatment. There was no significant alteration in the size of the spleen during the three-months period of observation. The patient stated that she experienced slight alleviation of her symptoms during the first two months.

This case falls into line with two of the three cases of polycythaemia vera in Wilkinson's series in which the therapeutic response to nitrogen mustard was unsatisfactory.

I wish to thank Professor Nattrass, Royal Victoria Infirmary, Newcastle-upon-Tyne, for permission to publish this case, and Dr. W. A. R. Thomson, of Boots Pure Drug Co., Ltd., for the supplies of nitrogen mustard.

A. W. WOODRUFF, M.D., M.R.C.P., D.T.M.&H.

REFERENCE

- Wilkinson, J. F., and Fletcher, F. (1947). *Lancet*, 2, 540.