When the radiological evidence of union is considered sufficient to make the possibility of redisplacement unlikely the plaster is removed and the pins extracted. A further skin-tight plaster case is retained until union is complete.

Summary

A method of reduction of fractures of the shaft of the tibia is described. It is claimed that the vertical position of the limb above the table allows of good operative access, with ease of radiographic control; that posterior angulation of the fragments due to gravity is eliminated; and that the plaster technique is simplified.

FULMINATING SONNE DYSENTERY

REPORT OF TWO CASES

BY

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Although Sonne dysentery is a common illness in children throughout the British Isles and at any season of the year, the mortality rate is low and fulminant cases are rare. The following two cases may therefore be of interest.

Case I

A baby girl aged 20 months was admitted to the Preston Royal Infirmary at 10.40 a.m. on September 3, 1939, having been convulsed in the train from Manchester. She had been roused at 6 a.m., but took no breakfast, appearing upset at her early awakening.

On admission there was drowsiness, fever (temperature 100.4°), tachycardia, and tachypnoea; but apart from coarse rhonchi in the lungs physical examination was negative. Convulsions occurred at 3.30 and 7.30 p.m. The cerebrospinal fluid was at a pressure of 250 mm. of water, but was normal to the naked eye and as regards cell count, globulin, protein, and chloride content, gold curve, and Wassermann test. Only one stool was passed, and that was mucoid and tinged with blood. Death occurred at 1.55 a.m. on September 4, about seventeen hours after the onset of symptoms.

At necropsy, nine and a half hours after death, the mucosa of the colon was thickened and pink, the Peyer's patches of the lowest yard of ileum were red, and there was congestion of the pyloric mucosa and of the lungs and pink hyperaemia of the brain. The liver substance contained patchy yellow areas. Sonne's bacillus was isolated from the colon contents, and microscopically the liver lobules showed central degeneration.

Case II

A girl aged 4 years was admitted to the Preston Royal Infirmary at 7.45 p.m. on October 8, 1939, after five hours of illness characterized by headache, vomiting, and convulsions. There was fever, tachycardia, and tachypnoea; and frequent convulsions occurred, but only one stool was passed before death at 12.40 p.m. on October 9. The cerebrospinal fluid was crystal-clear and normal in all respects.

At necropsy, three hours after death, the only abnormal features were (a) in the colon, the contents of which were milky and mucoid and whose mucosa was generally congested (especially immediately round the ileo-caecal valve and orifice); and (b) in the liver, the cut surface of which was markedly pale. Sonne's bacillus was obtained in almost pure growth from the contents of the ileum, caecum, and colon, and its identity was confirmed by Dr. Scott of the Ministry of Health Laboratory. Microscopically the liver lobules showed fatty degeneration of the central zones.

The brain was submitted for histological examination to Dr. Pollak of the Manchester University Surgical Research Institute, and he reported that a toxic reaction was present, similar to that found in other infective diseases and characterized by a "homogenization" of the cells of the post-central and pre-central gyri, in the medulla oblongata, and in the dentate nucleus of the cerebellum.

Literature

Pickles (1932), MacGill and Downie (1932), and Laws (1936) have recorded outbreaks of over 100 cases without any deaths. None of the seven infantile deaths in Glasgow's first recorded outbreak (Hay, 1930) can be described as fulminant, as the interval between the onset of diarrhoea and death varied from five days (two cases) to twenty-four days (two cases). Mita (1921) does not make it clear how many of his seventy-three cases were fulminant. He examined post mortem three subjects of "paradysentery" who had died thirty-six to sixty hours from the onset of illness, and found that the intestinal changes resembled but were slighter than those found in "true" dysentery. He comments on the similarity of the fulminant "paradysentery" case to the fulminant "true" dysentery case, but adds strangely: "However, such fulminating symptoms are not infrequently present after orthopaedic operations for congenital malformations . . . and sometimes such fulminating symptoms develop without the presence of any pathogenic organism." In Glasgow's first large outbreak there were six deaths, all, however, in elderly persons who had been suffering from pre-existing illnesses (Bloch, 1938).

Wiseman (1927) describes the case of a young man who collapsed and died one morning after a night of diarrhoea and being "out of sorts" the previous day. At the post-mortem examination Sonne's organism was isolated from the lower part of the colon, the mucosa of which was intensely red. Fromme (1935) met, over a short space of time, six cases in children that resembled those presented here; five were fatal, all in less than three days, and two of these were proved at necropsy. He also describes a previous similar case which, although proved at necropsy, was thought to be complicated by an overdose of calomel.

Fromme stresses the fact that clinically these cases show a severe intoxication, with the intestinal symptoms in the background. All his cases, however, had some degree of diarrhoea. Clayton and Hunter's case (1928) was that of a boy of 11 who died thirty-three and a half hours after an illness characterized by bloody mucoid diarrhoea, vomiting, and unconsciousness; while Howel Evans's (1928) patient died in sixteen and a half hours after a similar illness. The fulminance of Sowden's (1933) two fatal cases (boys of 11 and 13 years who died in less than twenty-four hours) out of thirteen patients might be considered artificial, as it was believed that a girl of 9 harbouring Sonne's bacillus had contaminated the pease-pudding of which all had partaken. Although the five "coroners' cases" described by Harvey (1933), writing on "Dysentery as a Cause of Sudden Death," showed a striking lymphoid hyperplasia around the ileo-caecal valve (see also Case II) bacterial proof was lacking, as Sonne's bacillus was obtained only from a sick relative of one of the patients.

Charles and Warren (1929) saw ten fatal and fulminant out of 191 positive and suspected dysentery cases in Newcastle-upon-Tyne between March, 1928, and June, 1929. Two of these were due to Sonne's bacillus. The post-mortem findings were similar in all—namely, an enterocolitis, with enteritis predominant in most; together with toxic changes in the heart, liver, and kidneys. Charles and Warren underline the sudden onset and the toxic rather than diarrhoeic symptoms, and stress the important part overcrowding plays in propagating the disease.

Discussion

It is clear that cases arise, although rarely and in different parts of the world, in which death rapidly occurs from toxæmia, with little or no diarrhoea, and yet in

which at post-mortem examination the signs of dysentery are found and Sonne's bacillus is isolated from the intestine. Individual susceptibility rather than virulence of organism is the most probable explanation. Clinically the diagnosis has to be made from other acute infections, especially cerebrospinal fever, and poisonings; and, in infants, also from the convulsions of the tetany of rickets. Treatment can hardly be other than symptomatic.

Summary

Two cases are reported of children, aged 20 months and 4 years, who died of toxæmia due to Sonne dysentery in under twenty-four hours; and the few similar cases in the literature are reviewed.

It is a pleasure to acknowledge my indebtedness to the assistant deputy coroner of the County Palatine of Lancaster, Mr. A. L. Ashton, for permission to record the post-mortem findings in the two cases, and to Dr. A. E. Rayner and Dr. R. P. A. Rigg for access to the ward notes; and to thank also Major F. B. Smith for the use of the post-mortem notes in the first case, Dr. E. Pollak for the histological examination of the brain in the second case, Dr. W. F. M. Unger for assistance with translation, Dr. W. M. Scott of the Ministry of Health Laboratory for advice, and Mr. T. J. Shields, librarian at the B.M.A., for help with the references.

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COMPOUND HYPERTONIC SALT IN THE TREATMENT OF SEPTIC WOUNDS

BY

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Five years ago J. C. Lyth contributed an original article (*British Medical Journal*, 1935, 2, 903) on the value of hypertonic lotions in the treatment of infected wounds. After using his technique in a large and varied group of cases I had no hesitation in accepting the remarkable statistics relating to 1,096 patients which he summarized in the *Lancet* on February 3, 1940. Moreover, I confirm his conclusion that from the point of view of osmosis a 10% solution of sodium sulphate acts more rapidly and efficiently than similar saturations of magnesium sulphate or sodium chloride.

In several instances, however, I have been impressed by the failure of hypertonic lotions to prevent the spread of cellulitis, particularly in toxic patients with extensive wounds. During the past twelve months this finding has led me to combine varying concentrations of acriflavine with the sodium sulphate solution. Thanks very largely to the co-operation of Messrs. Crookes Ltd. I now employ a mixture of sodium sulphate and acriflavine in the form of a fine powder, which I have termed "compound hypertonic salt." By dissolving a measured quantity of the product in warm water a 10% sodium sulphate solution containing 0.1% acriflavine can be made ready for use in a few moments.

I am satisfied in the first place that acriflavine does not interfere in the slightest degree with the mechanical efficiency of the hypertonic sodium sulphate. Secondly, in a concentration of 1:1,000 acriflavine does not harm the tissues or inhibit the activity of leucocytes. The main advantage of this antiseptic dye is that it rapidly infiltrates

the wound margins and destroys most types of invading organisms. As a result spreading infections are promptly localized, sloughs separate more rapidly, and granulation and epithelization are stimulated to a far greater extent than by sodium sulphate alone. Although I have only twelve months' experience of compound hypertonic salt, the proved value of the product in recent casualties must excuse the prematurity of this memorandum.

Illustrative Case Histories

The following short case-histories may prove interesting to other practitioners, and in due course I would welcome their observations.

Case 1.—Male casualty aged 38, admitted 10.7.40 with lacerated wound on inner side of ankle, penetrating talonavicular joint. Wound margins and damaged tissues excised, no sutures, cavity packed with compound hypertonic solution, back-splint with foot-piece applied. Re-dressed four-hourly at first, now twice daily. Moderate fever for two days only. To-day, 15.7.40, no evidence of local inflammation, complete absence of pain, wound has granulated almost to surface level.

Case 2.—Male casualty aged 46, admitted with shrapnel wounds of left buttock (operation by Mr. Black); shrapnel removed, wound margins excised, sutured with drainage. Compound hypertonic solution applied on gauze pack twice daily. 15.7.40, wound has healed by first intention and patient is to be discharged to-morrow.

Case 3.—Male aged 59, admitted to hospital five days after onset of acute appendicitis. Temperature 103° F., pulse 130. Abscess in right iliac fossa had ruptured, causing general peritonitis. The appendix was not removed but three large corrugated rubber drains were inserted. At conclusion of operation large gauze soaks (compound hypertonic solution) were applied to the wounds, and this measure was repeated four-hourly. Although a faecal fistula arose and discharged for seven days, all wounds had granulated to skin level in three weeks and healing was complete in one month.

Case 4.—Male aged 29 sustained compound comminuted fractures of tibia and fibula ten days previously. Leg had been encased in "open" plaster and large doses of sulphapyridine (M & B 693) administered. Temperature varied between 104° and 101° F. Bone was protruding, the wounds were very foul, and after removing the plaster a diffuse cellulitis was found involving the tissues from the ankle to the knee. The leg was put up on a Braun splint, extension being secured by a Kirschner wire inserted through the os calcis. No incisions were made, and the leg was merely wrapped in gauze soaked in compound hypertonic solution, which was changed at four-hourly intervals. Within a week fever had subsided, all traces of cellulitis had disappeared, and the wounds were healthy. Complete healing occupied a period of three weeks from the beginning of the treatment. Bony union is now progressing satisfactorily.

Case 5.—Male aged 61 with acute retention due to prostatic hypertrophy. Urine very foul. Four days after suprapubic cystostomy the wound sloughed and there was cellulitis of the abdominal wall. The patient appeared gravely ill. Packs saturated with compound hypertonic solution were at first applied hourly because urinary escape was not confined to the tube. Within three days there was marked constitutional and local improvement. Large sloughs were shed, and eighteen days later the prostate was successfully removed.

Case 6.—Male aged 34 with left arm involved in machine belt forty-eight hours previously. Elbow-joint opened up, very extensive damage to skin and musculature, obvious sepsis. Amputation was discussed, but after suturing tendons and excising wound margins compound hypertonic solution was tested. Dressings were changed four-hourly, and the joint was irrigated twice daily with the same fluid. Fair-sized areas of skin became gangrenous and the temperature remained high for a week. Once the sloughs had separated improvement was rapid. Within three weeks of the beginning of treatment all wounds had granulated to surface level and most of the sutured tendons had held. The application of skin grafts secured healing with a useful range of movement at the elbow, wrist, and finger-joints.