

CASE 63.—Multiple Wounds (Abdomen, Buttock, and Arms). Fractured Humerus. Wounds of Small Bowel and Bladder.

Clinical History.—Nature of wound : Gunshot wound, arm and abdomen. (Rifle grenade.)

Signs and symptoms : Wound near the back of the left shoulder, extending down the arm ; humerus is fractured in its upper third, foreign body presumably there. Wound of right buttock, also wound of the lower abdomen to the left of the mid-line. Catheter passed, urine blood-stained. Temperature 97° F., pulse 90. Shocked, but quite conscious. The day after operation he was very ill ; temperature 97° F., pulse 140, respirations rapid ; no vomiting.

Operation : Operated on four and a half hours after being hit. Flesh wounds excised, tube inserted ; arm splinted. Median laparotomy performed in Trendelenburg position ; some blood in the peritoneal cavity, no urinous smell ; small bowel shot through in two places about two inches apart ; the bowel was excised and end-to-end anastomosis done. A through-and-through wound of the bladder near its base was discovered ; the two wounds were sutured. Operation took about an hour and a half.

Survival : About twenty-four hours.

Post-mortem Result.—Abdomen : The sutured bowel proved to be within a foot of the ileo-cæcal valve and was intact. The bladder suture was also intact. There was free gas in the peritoneal cavity, which came from wounds high up in the jejunum, which had not been discovered during life. Some hyperæmia of some coils of bowel.

Comments : Apparently died of shock with very early peritonitis. It is probable that if the patient had not been put in the Trendelenburg position before he was opened, the wounds of the jejunum would have been discovered at operation. But even so that would have lengthened the time of operation ; this factor probably contributed more to death than the early peritonitis.

(To be continued.)

Current Literature.

HARE, R. Sources of Hæmolytic Streptococcal Infection of Wounds in War. *Lancet*, January 20, 1940.

The author states that in the Great War, 1914–18, the most important bacteria infecting wounds were the *Clostridium tetani*, the gas gangrene bacilli, and hæmolytic streptococci. Tetanus was controlled by injection of serum and gas gangrene by early excision and debridement of wounds, but infection due to streptococci was not controlled at all. The source of the organisms of tetanus and gas gangrene was undoubtedly the soil over which the armies fought, but that of streptococci remained a mystery.

Recent work has shown that hæmolytic streptococci form a family divisible into groups numbered from A to K. Only one group, A, needs to be considered as pathogenic to man, the others, though often strongly hæmolytic, are rarely pathogenic. Group A may be further divided by agglutination and precipitin tests. The sources of these pathogenic strains may be pre-existing infections in the neighbourhood, the patient and his attendants, and possibly infected air, clothing, instruments and dressings, or food. A high proportion of wounds in the last war was certainly infected. The report of the U.S. Army states that a combination of hæmolytic streptococci and *Staphylococcus aureus* was the most prominent in the Base Hospital No. 15. Investigations have shown that most of the streptococcal infections of man belong to class A. Out of 1,376 strains 1,307 were placed in Group A. It may therefore be assumed that most of the wound infections in the present war will be due to strains of this group.

Many people apparently in normal health carry hæmolytic streptococci. According to Colebrook Group A strains are not found on the skin. Hæmolytic streptococci are relatively common in the nasopharynx, only a third of the numbers belong to Group A, and are pathogenic. A carrier rate of 7 per cent for these organisms is considered to be possible. Investigations of fæces showed many streptococci but these were not pathogenic, and it appears improbable that even if the wound is extensively contaminated with fæces infection by Group A strains can take place, unless there is a coincident infection of the throat. In hospitals streptococci are found in the air of infected wards and have often been shown to belong to Group A. Examination of soil from areas likely to be contaminated in Toronto did not yield any hæmolytic streptococci. It is difficult to imagine how soil could be contaminated with Group A strains. Infection of clothing with Group A strains must be unusual, except in a grossly contaminated ward.

In the last war it was found that cultures of wounds taken on arrival at the C.C.S. showed hæmolytic streptococci in 12 to 15 per cent. Most of these were probably Group A strains because Stokes and Tytler stated that 19 out of 20 wounds containing these organisms suppurred when treated by primary excision. Before arrival at the C.C.S. a wounded man can have had little contact with infected persons. But in his journey he has come in contact with 13 medical officers, 270 other ranks, and 150 patients, and as 7 per cent of normal people are carriers of Strain A in the nasopharynx he has run the gauntlet of 23 nasopharyngeal carriers and possibly 12 hand carriers. It is also possible that the wound may be infected from his own throat and hands. At the base he may be infected from his neighbours whose wounds have already suppurred. Fleming showed that strains from any of the cases in his wards were all agglutinated to titre by sera made from any one of them. Thus the evidence suggests that many infections of wounds at the base were hospital infections. Fleming and Porteus found that when the patient had been kept at the C.C.S. for more than three or four days, *Streptococcus pyogenes* was present in nearly every case. When

the patient was sent straight on to the base *Str. pyogenes* was found in only 15 out of 75 cases. After a stay of over a week at the base 90 per cent. were found to have *Str. pyogenes* in their wounds.

The evidence suggests that hæmolytic streptococci which infect wounds before the men arrive at the C.C.S. are exogenous and probably derived from the nasopharynx of someone in attendance. Hare suggests that two lines of attack may be followed to reduce the incidence of these infections. The first should be to prevent the transfer of micro-organisms from the hands of every person from regimental aid post to base hospital. The ideal would be that every person who attends to a wound should be efficiently masked and wear sterile gloves. At least masks might be worn by all attendants. Sterile rubber gloves in forward areas may be impracticable, but gloves moistened with adequate antiseptic would do as well.

The second line of attack consists in the segregation of infected cases. A medical officer conversant with modern methods of isolation and classification of the hæmolytic streptococci on the staff of a base hospital would undoubtedly be of assistance, but his recommendations about isolation must be acted on by the medical officers in charge of the cases. The most efficient prophylactic measures in the forward areas may be completely nullified by their non-adoption at the base.

Excision of War Wounds. *Lancet*. February 3, 1940.

In the annotations in *The Lancet* there is an account of the suggestion of Roux and Leriche, who watched the evolution of the methods of treating wounds in 1914-18. They believe that in the present war the treatment of wounds will be in the hands of the younger surgeons who have had no war experience and may not operate with the rigour that in 1918 was considered essential, and may put too much faith in chemotherapy. There is a respite of about twelve hours before infection sets in, and if the wound can be operated on within this period there is a chance that it will heal cleanly. Antiseptics play no part in the régime.

Leriche considers that if primary excision has been skilfully carried out the wound can be encased in plaster, but he does not agree that it is the ideal method for all wounds of soft parts. All deep wounds of muscle should be left open, and if after fifty-four hours the wound is clean, secondary suture may be done.

Roux describes the stages in which excision should be carried out. Hæmostasis should be perfect so that no blood-clots are left in the depth of the wound. Two sets of gloves and instruments should be used, the first set being discarded when the initial cleaning up is finished. Liquid soap is used for cleaning; the soap is removed with sterile water and ether used to remove grease. Iodine is painted on the skin only. The second stage consists in excision of the skin edges. The knife is kept perpendicular and if possible $\frac{1}{2}$ to 1 cm. removed from the skin in one piece without the knife being allowed to enter the depth of the wound. No subcutaneous

dead space must be left. If the skin is undermined it must be opened up by branch incision or counter drained. Next the aponeurosis is excised with scissors, leaving a smooth continuous edge. The fourth stage consists in the removal of foreign bodies and of damaged muscle. All injured or ischæmic tissue should be removed, but excessive mutilation should be avoided. The cavity of the wound should never be curetted. The foreign body, the tissues enclosing it, and those which it has traversed, should be removed *en bloc*. When important structures such as nerves or vessels are in the depth of the wound these should be seen. When there is an entrance and exit wound, these, if superficial, should be excised. When the two orifices are far apart or when the tract goes through inaccessible parts, entrance and exit wounds should be excised and drainage left for the deeper part of tract. Under no circumstances must through drainage be promoted by drawing gauze through on the end of forceps, or by irrigation under force. Leriche says that wounds should never be closed by primary suture if they involve large vessels, if they have gone through the middle of a deeply placed bone, or if they have traversed the substance of a muscle where the surgeon can never be sure of satisfactory excision. Every stage of the operation must be carried out definitely and directly and under direct vision.

SAVAGE, SIR WILLIAM. **Canned Foods in Relation to Health.** *Lancet*, November 4, and *Public Health*, February, 1940.

Sir William Savage has performed a service by contributing to *The Lancet* of November 4 an article entitled "Canned Foods in Relation to Health," in which he discusses and gives an authoritative pronouncement on every aspect of the subject.

Over 350 different commodities are marketed. Home production is now considerable but, apart from milk and vegetables, 85 to 90 per cent of canned foods consumed in this country are imported. In 1937, imports exceeded 10 million hundredweights.

Very high standards of cleanliness and care in production are essential if unsoundness and, therefore, economic losses are to be avoided. The author considers three health problems in relation to canned foods: (1) Is the nutritive value adversely affected? (2) Are any chemical substances prejudicial to health added in the preparation of the food or from the container? (3) Are such foods more liable than similar fresh foods to cause or convey disease of bacterial origin?

On the nutritive side canned foods compare favourably with cooked, fresh foods, even as regards their vitamin content. Vitamin A is insoluble in water and heat stable in the absence of oxygen, so that canning is less destructive of this vitamin than ordinary cooking. Vitamin B₂ complex is very heat stable and is water soluble. The only loss, therefore, is in the preliminary washing. Vitamin D is heat stable and there is no destruction in canning. Vitamin B₁ is water soluble but has considerable resistance to

heat in an ordinary acid medium. There is some loss in canning, but not more than in domestic cooking. Vitamin C is readily affected by heat, washing, and storage; therefore all cooking processes, whether domestic or canning, cause material loss of vitamin C, and a high vitamin-C intake can only be obtained from fresh, uncooked foods. But many canned fruits and vegetables have an adequate amount and canning is not more prejudicial to the vitamin-C content than ordinary cooking.

As regards chemical contamination, the author has been continuously on the lookout for cases of tin poisoning, both in the literature and in his own experience, and has only come across one possible case, which was associated with a 3-year-old consignment of tinned apricots where the tin content reached the quite exceptional figure of 5.6 to 8.8 grains per pound. As regards lead, the modern can needs a minimum amount of solder, and in the few instances where abnormal quantities of lead have been found, the fault has been in some stage of the preparation of the food before canning.

Canned foods, in common with all other foods, have been responsible for three kinds of food poisoning, viz. botulism, infection with living bacteria of food-poisoning type, and the toxin type of outbreak. No cases of botulism have occurred in Great Britain from tinned foods, and though formerly outbreaks occurred in certain parts of the U.S.A., scientific investigation and careful control of processing temperatures have now eliminated all risk from commercially canned foods.

Canned foods play a very minor part in outbreaks of illness due to infection with living food-poisoning type bacilli, and undoubtedly these foods are very much safer in this respect than ordinary foods. In the toxin type of food poisoning, canned foods are more often the vehicle, because though the processing temperatures are sufficient to kill the bacilli, they do not always destroy the pre-formed toxins. Fortunately the case mortality of this type of poisoning is very low, less than 0.5 per cent. The number of outbreaks associated with canned foods is decreasing. They now very rarely occur from corned beef and arise mostly from fish products.

After considering all the data, the author is of the opinion that as a source of food poisoning, canned foods are at the present time definitely safer than ordinary foods. Medical officers of health will no doubt welcome such clear and definite statements from one whom they have long recognized as an authority on all questions of food in relation to health.

SLAUGHTER, W. B. Lymphogranuloma Venereum, with Special Reference to Head and Neck Lesions. Collective Review. *Surgery, Gynaecology and Obstetrics with International Abstract of Surgery.* 1940, v. 70, No. 1, 43-51 [97 refs.].

In this review Slaughter draws attention to the protean manifestations of this disease which exist under a wide variety of names, and points out that though it occurs in all parts of the world its existence is often overlooked ;

there is little doubt that it is far from uncommon in America, especially amongst the coloured population.

The causal organism is an ultra-microscopic filtrable virus which sets up pathological changes characterized by giant-cell formation and reticulo-endothelial hyperplasia.

Diagnosis depends chiefly on the Frei test and treatment is very unsatisfactory; the most promising results have been obtained with Frei antigen given intracutaneously or intravenously. (No mention is made of the sulphonamides which have recently been reported as giving encouraging results.) There is a comprehensive bibliography. T. E. O.

Reviews.

SYNOPSIS OF SURGERY. Eleventh Edition. By Ernest W. Hey Groves, M.S., M.D., B.Sc.Lond., F.R.C.S.Eng. Bristol: John Wright and Sons, Ltd. 1940. Pp. viii + 714. 195 illustrations. Price 17s. 6d.

The tenth edition of this book was reviewed in the *Journal* in December, 1933. It requires no fresh introduction. The new edition has been brought up to date by the inclusion of Böhler's technique in the treatment of fractures and the addition of a chapter on surgical treatment of fractures of the neck of the femur.

For revision of the large and growing subject of surgery it is an excellent book of ready reference.

TREATMENT BY MANIPULATION. By H. Jackson Burrows, M.D., F.R.C.S., and W. D. Coltart, M.B., F.R.C.S. London: Eyre and Spottiswoode, Ltd. 1939. Pp. xii + 36. Price 5s.

A useful little book for "many members of the medical profession (who may) know too little of the selection of cases for manipulation, its technique, and the results which may be expected from it." D. C. M.

A POCKET MEDICAL DICTIONARY. Fourth Edition. Compiled by Lois Oakes, S.R.N., D.N.Lond.&Leeds, assisted by Thos. B. Davie, B.A., M.D.Lpool. Edinburgh: E. and S. Livingstone. 1940. Pp. xix + 409. Price 3s. 6d.

This small dictionary, now in its fourth edition, is evidently fulfilling its purpose of being useful to medical students during their early years. It will probably be found of most service to the student commencing his clinical studies. Only two years have elapsed since the publication of the previous edition, and in the present edition a useful Appendix on First Aid has been added.