Medical Memoranda

A Case of Blast Injury

An account of this case is placed on record because of its complex clinical character and its significance in relation to other similar cases which may arise.

Blast injuries have been extensively recognized since the Spanish War, and are due to exposure of the effects of big explosions at close range. The clinical findings are well known and require no recapitulation. A more recently recognized type is that met with in sailors who, while in the water, receive the effect of depth charges. Here the lesions are multiple abdominal injuries varying in severity from subserous haemorrhage to rupture of the bowel. The injuries are associated with severe shock and may present the classical signs of a perforated abdominal viscus. The mortality in cases subjected to surgical treatment is exceedingly high, but this in part may be due to the relatively primitive conditions under which after-treatment must be carried out immediately after a naval action. Similar injuries may be met with during landing operations.

The following report of a blast injury presents several very unusual features—in particular a neurological complication which may be the first of its type recorded.

CASE RECORD

The patient was close to a Japanese grenade when it exploded, and he received part of the force of it. He was picked up unconscious, in which condition he remained for about an hour afterwards. On admission to an M.D.S. he was conscious though drowsy. There were several small wounds on the left arm and leg and the left side of the chest, none of which appeared to be in any way serious. They were in fact the "peppered" small lesions very commonly seen. There was in addition a very profound degree of shock, which did not respond to vigorous treatment to any perceptible degree. This was in no manner accounted for by the visible lesions. Nine hours after injury twitching of the shoulder and neck muscles began. It was severe and persistent, but did not spread. Apart from one vomit described as projectile, no new features developed. When seen 24 hours after injury the patient was still profoundly shocked and not complaining of pain in any part of the body. Examination of the nervous system showed no abnormal signs so far as could be ascertained, except the presence of epileptiform attacks of a Jacksonian type. Lumbar puncture gave absolutely clear fluid at 150 mm. pressure.

The immediate problem was to combat shock and stop the epilepsy. Barbiturates very largely achieved the latter, but the former remained, and death occurred about 72 hours after injury. It may be noted that there was no indication for operation on the head, there being no signs of a space-occupying lesion and careful examination of the shaved head revealing no penetrating injury.

The necropsy findings were as follows: *Brain and meninges*:—Careful search revealed no macroscopic abnormality. Attention was paid particularly to the Rolandic area, and neither haemorrhage nor thrombosis could be seen. The C.S.F. was clear and the ventricular system normal. *Abdomen*:—On opening the peritoneum an area of central peritonitis was seen. This was largely walled off by lymph of recent origin. There was a little pus in the central part and some in the right kidney pouch. The cause was sharply localized gangrene of three sections of the terminal loops of the ileum, each about 3 in. long and matted together. There was no perforation of any of this area, but in places all the coats but the mucosa were split. The state of affairs very closely resembled a mesenteric thrombosis, but the vessels were normal. There was no wound on the abdominal wall or any other pathological condition in the abdomen. All other organs were normal, and there was only minimal sepsis around the wound.

COMMENTARY

The diagnosis was obscure from the beginning, and the injury which gave rise to the symptoms did not present a macroscopic lesion at necropsy, while that which was apparent at necropsy and was the immediate cause of death showed no direct signs or symptoms.

When the patient was seen the diagnosis made was multiple grenade injuries and a cerebral blast injury. The profound shock was considered to be the summation of the original shock plus exhaustion caused by the muscular twitching, though on mature consideration these factors did not appear to be sufficient to produce the degree seen, which was remarkable in itself. The further unsuspected abdominal lesion completed the picture. The aetiology of the abdominal injury was undoubtedly blast. The picture is very similar to that seen in naval cases; the affected portions of the gut were in the central part of the abdominal cavity, most exposed to the effects of blast, and there was no penetration of the abdominal or gut wall. The latter feature explains the lack of abdominal symptoms, for peritonitis would develop only as infection

penetrated the bowel wall—a fairly gradual process. The fact that no cerebral lesion was demonstrable is not considered to invalidate the diagnosis: the smallest necessary irritative lesion need be no larger than the few Betz cells involved.

The lessons to be learnt from this case are that blast injuries may arise from relatively small explosions, they may be associated with minimal external wounds, and the effects may be multiple. They should be considered when a patient is shocked beyond the degree expected from the superficial injuries, but full and repeated examinations are necessary—an admittedly difficult ideal in battle conditions. This patient was never fit for operative treatment, but similar lesions are by no means beyond the possible scope of the surgeon.

In conclusion a note might be made that a probable abdominal mortar-blast injury was seen by me. Here the patient was very shocked, though with no external injury. Resuscitation was successful, but for four days he had persistent abdominal pain and distension and persistent tachycardia. Recovery took place after four days, during which time he was in a very much poorer condition than the signs appeared to justify.

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Poisoning by Accidental Drinking of Trichlorethylene

Although poisoning by trichlorethylene fumes is not uncommon it is rarely that one meets a case in which the accidental drinking of this industrial solvent takes place. Two cases are reported below.

CASE I

Mrs. H., housewife, aged 29, had had a cold for a few days. At about 6.45 p.m. on Sept. 25, 1944, a neighbour (Mr. M.) suggested she should take a dose of his medicine (R. Pot. iodic. gr. 2½, ammon. carb. gr. 2½, chloroform water to 1/2 fl. oz.). She drank about half an ounce.

At 7.20 p.m. I visited Mrs. H. in response to a telephone call. She lay on a couch in a coma. Apparently, immediately she had taken the dose of medicine she spluttered. She complained that the smell of the medicine had "gone to her nose," and she had an acute lacrimation. She was given some water, which she vomited, and sneezed about a dozen times. Her legs had gone weak and she had had to sit down, and there was a hammering in the head. The condition quickly passed into unconsciousness. Just previous to the unconsciousness some whisky had been given to her, but was returned in the vomit.

Physical examination showed her colour to be good, there was shallow breathing, and the pulse was of good volume. The heart sounds appeared normal. The pupils were widely dilated and did not respond to light. The limbs were completely flaccid. Reflexes were equal. At 8.15 p.m. the patient roused a little, vomited, and recognized those around her. The odour of her breath was mainly that of whisky, and she complained of frontal headache. She lapsed into a state of drowsiness again, and remained so on and off all night. She herself subsequently did not remember anything of her rousing, and only at midnight did she realize where she was. Progress continued slowly, the main symptom being a frontal headache, which persisted till Sept. 29. Next day she complained of abdominal pain and heaviness in the right subcostal region. Examination showed that there was slight tenderness over the liver, but no enlargement was discernible. Bowels were open normally and the urine was negative in albumin, sugar, and bile. She recovered completely in 10 days.

CASE II

This patient, Mr. M., is a fireclay miner aged 47. At about 6.45 p.m. on Sept. 25, 1944, he took a tablespoonful of his medicine out of the same bottle as he handed to Mrs. H. This left about two doses in the bottle, and he had another "taste," which left the bottle nearly empty. He did not feel any ill effects until about 8.40 p.m., although it was observed, without at the time any particular notice being taken of it, that he stumbled a little when approaching my car at the time Mrs. H. was being visited.

At 8.40 p.m. he complained that he felt drunk, and almost immediately vomited copiously. He was found later by his son some time after 9 p.m. in a dazed, helpless condition, and this was taken to be a bout of alcoholic excess. However, the son on smelling the vomit detected the odour of trichlorethylene. He gave his father salt and water, which produced further vomiting. Mr. M. himself remembered nothing until next morning. He was not seen by me until Sept. 26, when he reported that he still felt "swimmy" in the head and weak in the legs. He had a very dry tongue, but there had been no further sickness. He recovered completely in five days.

COMMENT

It transpired later that the son of Mr. M. had a 10-oz. bottle, containing trichlorethylene for cleaning purposes, similar to that in which the cough mixture was kept, in the same cupboard, the only difference being that the cough medicine had a label giving the directions for taking it and the trichlorethylene bottle

had none. This latter bottle was found to be nearly empty. Both contained at the time of the above events about three or four tablespoonfuls of fluid. It was obvious that Mrs. H. and Mr. M. had between them consumed trichlorethylene in place of the medicine. It is possible that the delayed effect in the case of Mr. M. was related to his accustomed daily consumption of alcohol. He drinks on an average about four pints of beer a day. The bottles, in addition to being of the same size, contained a similar colourless fluid with a similar smell.

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A Sporadic Case of Trichiniasis

During the war at least three outbreaks of trichiniasis have been described (Sheldon, 1941; Lee, 1941; Garrod and Maclean, 1941; Davis and Allott, 1941; Bacon, 1941), the cause being traced to eating raw or undercooked sausages. The sporadic case now recorded is interesting in its full clinical and epidemiological features, and also in showing a positive intradermal reaction; for the diagnosis of trichiniasis in man can sometimes be tedious and uncertain, especially in an isolated case.

CASE HISTORY

Mrs. A., aged 36, an evacuee from London, was admitted to hospital on March 9, 1945; the illness started on March 5 as a cold with general aching in the body, and with headache, sweating, and shivering attacks. It was thought to be influenza.

On admission she had pronounced oedema of the face and eyelids, the tongue was furred, the throat clear, but there was generalized tenderness of the muscles. Temperature was 103°, pulse 100, and respiration 24. In the chest and abdomen nothing abnormal was detected, and there was no rigidity of the neck. A scalding and burning sensation was felt on micturition, and menstruation had been irregular. She felt thirsty, but had no appetite, and was very drowsy and mentally confused.

Course of the illness.—The temperature continued at 100–103° for six days after admission; it then fell by lysis: the oedema of the face and eyelids was severe for three or four days and then gradually cleared. Headache in the occipital and bitemporal regions was marked with buzzing in the head, these symptoms disappearing just before the temperature began to fall; the muscular tenderness also remained for several days. Subungual splinter haemorrhages, often characteristic, were not seen. On March 17 the temperature was normal, there were no symptoms, and appetite was returning; and on March 21 she was discharged to a convalescent home. On March 10 her blood urea was 26 mg. per 100 c.cm. A blood count showed a leucocytosis of 15,000 per c.mm., with eosinophilia of 38%. Urinalysis: Sp. gr. 1018; pH 5.0; albumin, trace; sugar or acetone, nil; centrifuged deposit, a few leucocytes and an occasional red blood corpuscle; no casts or crystals; culture sterile.

Intradermal Test.—Through the courtesy of the Emergency Public Health Laboratory Service Dr. W. D. H. Stevenson, C.I.E., of the Ministry of Health Government Lymph Establishment, kindly sent two ampoules (0.1 c.cm.) of trichina antigen 1:8000; an intradermal test on March 21 (16th day of illness) was negative. The test was repeated on April 17 (43 days after the illness began), a positive reaction being obtained. Almost immediately after the intradermal injection a wheal came up with definite pseudopodia which looked rather like a small starfish, and within about 10 to 15 minutes a zone of erythema surrounded the wheal; the erythema disappeared after a short time, but the wheal remained for several hours; it was about 10 mm. across. The control showed no reaction.

EPIDEMIOLOGICAL NOTE

Mrs. A. ate sausages twice a week—every Tuesday and Thursday; she herself took them uncooked, spread on bread, while her husband and three children ate them well cooked in the usual way. It appears that her mother was told by a doctor years ago to give her underdone meat because she was delicate, and she says she takes other meat rather underdone. The sausages were bought from a small general store which obtained its supplies from a large firm in the South-West; there had been no other complaints, and it was not possible to incriminate any of the pork or any particular batch of sausages. Thus the incubation period could not be obtained, although it is usually stated to be within 7 to 12 days (Beeson, 1941).

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Reviews

THE SCIENCE OF NUTRITION

The Science of Nutrition. By Henry C. Sherman, Mitchell Professor of Chemistry, Columbia University. (Pp. 253. 15s.) London: Oxford University Press, 1944.

This book aims at giving a summary and evaluation of the present status of the science of nutrition and its social importance, with the minimum of technical terms and without any demand for a specific training in science on the part of the reader. At the same time it demands curiosity, and is suited to those who appreciate that science is a changing and expanding structure, based on evidence, and does not consist of a series of *ex cathedra* pronouncements such as are common in many elementary books on nutrition. On the whole the book is highly successful. The author stresses how progress depends on carefully controlled experiments and how it moves from qualitative to quantitative knowledge and thence to further advances. Enough history of the discoveries is given to illustrate the nature and the difficulties of this progress.

If the knowledge that has been gained is to be used for assessing and improving human nutrition we need to know the contributions that various foodstuffs make towards meeting the requirements for various nutrients. This is done in a well-balanced account which gives proper recognition to the value of cereals. Having concluded that the main change needed in American diets is to increase the amounts of fruit and milk, the author discusses different methods by which the public can be educated to make these changes and the national nutrition policy involved in making such changes possible.

The one criticism that can be made of the book is that the outlook throughout is that expressed in the last sentence: "The question, What particular thing does such nutritional improvement do? hardly admits of a more specific answer than that it offers us the option of a more liberal term of years of more efficient life with which to do what we will." Abundant evidence is adduced to show that improved nutrition does offer this prospect to rats. But several studies made during recent years have appeared to show that adult human beings are less susceptible to the ill effects of a defective diet than might be expected from animal experiments. It has proved more difficult than was anticipated to demonstrate, in adults, the chronic suboptimal states (as distinguished from the early stages of gross deficiency) that were looked for. Undoubtedly health improves with improvement of the food supply; but in most cases other relevant factors besides food vary with it. Even experimental improvements of the diet of children whose basic diet was not grossly deficient have not had the effects that were hoped for. Doubtless these experiments have been carried out over too short a fraction of human life to show conspicuous results. But the position is difficult, and ambitious promises, made now to peoples in Britain and the U.S.A. as a whole, may lead to disappointment and scepticism later. There remains, however, no doubt that the poorer sections of the population in these countries—and the population of a great part of the world—would benefit enormously if their diet were improved, and it is on this certain improvement that we should concentrate our energies.

DERMATOLOGY AND SYPHILOLOGY

The 1944 Year Book of Dermatology and Syphilology. Edited by Marion B. Sulzberger, M.D. Assistant Editor, Rudolf L. Baer, M.D. (Pp. 544; illustrated. 18s. 6d.) Chicago: The Year Book Publishers; London: H. K. Lewis and Co.

An atmosphere of bellicosity is not supposed to be favourable to the development of medical science, but the editors of this yearbook are of the opinion that military life and the problems of military medicine have given an unusual stimulus to dermatology. There is no doubt of the importance of dermatology in military medicine, for in certain theatres of war skin diseases account for as many as 74% of all men reporting sick, and sometimes as much as 14% of all military ineffectiveness is found to be due to skin disease. As usual the yearbook finds space to mention all the chief items of dermatological progress and observation which have come to light during the year under review, and the utility of the volume is much enhanced