Operation.

On the morning after admission the general condition was less reassuring; the temperature remained high—100°; the pulse-rate had increased; there was a complaint of pain in the

Case IX.—A, Date of admission; E, eusol dressing; O, operation.

trance and exit wounds; and the discharge was foul smelling.

Under a general anaesthetic the wound was thoroughly opened up. The subcutaneous tissues had a dry gelatinous-looking appearance, as though infiltrated with coagulated lymph; gas could be displaced from this situation. The depth of the wound contained foul-smelling blood clot; the muscles which were cut in the opening up of the wound had the pale avascular appearance of commencing necrosis. Gas originating in the wound had infiltrated downwards in the retroperitoneal tissues as far as the anterior superior spine of the ilium. The wound was syringed out with eusol; its interstices were lightly packed with gauze wrung out of eusol; drainage was secured by means of two large rubber tubes passing downwards into the depths of the wound.

Progress.

As regards the subsequent progress of the case, the dressing was changed at intervals of six hours for two days and thereafter at intervals of eight hours. From the date of operation the condition improved and the improvement was progressive. After the first twenty-four hours all trace of foul smell disappeared and no further evidence of gas could be found. On the fourth day healthy granulations had already made their appearance.

REFERENCE.

¹ *Lancet*, August 21st, 1915.

A HOSPITAL SHIP IN THE MEDITERRANEAN.

BY

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THIS article is somewhat discursive. My aim has been simply to give a description of the kind of work with which a hospital ship is called upon to deal, and of the conditions under which this work is carried out.

The ship is extremely well fitted, and is capable of carrying, without undue crowding, 350 cot cases, and an equal number of "walkers."

There are two excellent theatres—the one large and containing two operating tables, the other smaller and provided with one table. Our medical staff at present consists of a fleet surgeon, a consultant surgeon, and nine surgeons. One of the last belongs to the R.N., the remainder are drawn from the R.N.V.R., or hold temporary commissions. We carry four nursing sisters. There is also a sufficiency of sick bay ratings, and of St. John Ambulance men.

Fortunately our work has been carried out in security. It has never been hampered by any disregard, on the part of the enemy, of the Geneva Convention. The Turks are, from all accounts, remarkably clean fighters. They certainly respect hospitals and hospital ships, and they never put any impediment in the way of the rapid evacuation of our wounded from the shore. Hospital ships are allowed to anchor quite close to the land, and embark their cases unmolested. Of course if they get in the line of fire shells may burst unpleasantly near them, and they may have to clear out. Similarly, in certain situations, spent bullets from the nearest trenches create a certain element of danger. Shrapnel fired at aeroplanes occasionally falls on

board, or a floating mine may prove a menace. These are, however, unavoidable incidents of warfare, and no fault of the Turks.

Having anchored, then, in a convenient spot, the ship is ready to take in wounded. Cases are usually brought off from the shore in barges towed by picket boats. When these come alongside, the walking cases are first taken off; the cot cases are then placed, stretcher and all, in "cot-carriers" and are hoisted on board. As a rule the majority of the "walkers" are only received for a few hours. They are fed, dressed, and then taken off in trawlers to the shore hospitals. Those of them who are likely to require lengthy treatment are, however, retained on board.

The more severely wounded men are nursed in swing beds and service cots. Any requiring immediate operation or dressing under an anaesthetic first pass through the theatre.

When as many cot cases as possible have been taken on board, the ship may complete her complement with walking cases, or she may proceed to one of the nearest hospitals and fill up there. The ship then goes on to Alexandria, Malta, or England, discharges her patients, takes in stores, coals, cleans ship, and returns to the scene of action.

When there is much activity ashore, and casualties are heavy, every available ship may be required on the spot. In these circumstances the routine may be modified, and all the cases discharged at the nearest hospital. This enables the hospital ship to return to the scene of action within a short time of leaving it. When things are quiet a ship of our size may take four or five days or even longer to fill up. On the other hand, we have taken in our full complement in eighteen hours, while during that time more than four hundred additional walking cases were dressed, fed, and sent away. Between seventy and eighty of these patients passed through the theatres, many of whom required multiple operations.

The condition in which the wounded arrive on board depends almost entirely upon the distance of the firing line from the beach, and upon the nature of the intervening terrain. Where the front trenches are within easy reach of the shore the wounded are received within a few hours of their having been injured. In these circumstances wounds when irrigated and, if necessary, freely opened up and drained, do quite as well as similar injuries treated in a civil hospital at home. Severe sepsis is the exception and spreading gangrene practically unknown. On the other hand, where the trenches are some miles from the shore, there is inevitably considerable delay in evacuating the wounded. Often this cannot be effected for twenty-four hours or more. When this is the case septic infection in a very large proportion of the wounds is firmly established, and has spread widely. Amongst such patients spreading gangrene, both with and without gas formation, is common, and many of the wounds are maggoty. Flies are incredibly numerous, especially at the southern end of the peninsula. Immediately a trace of blood is spilt down they come in swarms. In a moment a wound, unless protected, is lost to sight beneath a black crawling mass of these insects, and the same applies to a soiled dressing. One can only hope that things may improve with the advent of the cooler weather.

I feel considerable diffidence in speaking of individual injuries and their treatment, as so much has been written on the surgery of the war by more competent pens than mine. I will touch, however, lightly upon a few classes of injury, mentioning any points which have appealed to me personally. In military surgery every medical man suffers from the disadvantage of being unable to follow his cases up. In a hospital ship the cases upon which one individual operates may get scattered through several wards, and lost to his sight. On the other hand, he may have to undertake the after-treatment of cases originally under the care of his colleagues. At best the cases are seldom under his supervision for more than a few days before they are transferred to a shore hospital.

In spite of this I will endeavour to give a brief account of some injuries as they appear during the short time they remain on board.

Of the different kinds of wound, those inflicted by shell are comparatively rare except at Cape Helles. Shrapnel and bullet wounds largely preponderate everywhere. Injuries inflicted by bombs are very common where the

opposing trenches lie close together. We met with them chiefly at Anzac. Bayonet wounds are very uncommon. The Turk does not seem to love the bayonet.

Head Injuries.

Let me commence my account by referring to cerebral injuries. Penetrating bullet wounds inflicted at short range are generally quickly fatal, and are rarely seen on a hospital ship. Injuries by partially spent bullets, on the other hand, are common, the bullet usually remaining lodged within the cranium.

When seen such patients frequently present signs of compression. When such cases are met with the scalp and wound should be thoroughly cleaned and the edges of the latter excised. The wound is then enlarged, or a flap of scalp is turned down. The opening in the skull is increased with the aid of nibbling forceps, and any loose fragments of bone are removed. This is followed by a rush of blood and disorganized cerebral matter. Patients thus treated often improve markedly, and life is undoubtedly prolonged. Unfortunately, I understand that the majority of them succumb later to septic complications.

Tangential wounds of the skull are much more amenable to treatment. The skull when exposed may present an appearance of bruising only; a slight groove may be apparent, or a linear portion of the skull may have been carried away. Cases in which the entry and exit wounds of a bullet lie close together in the skull may be included in the same category.

Even in the first cases trephining almost invariably reveals a depressed fracture of the inner table, while in the remainder the dura is torn, and pieces of bone may be found driven into the cerebral substance. In some cases the dura must be opened, even if it has not been torn, owing to the presence of a large haematoma beneath it. As long as the cases remain aseptic their prognosis is favourable. They usually present signs of cerebral irritation and are very troublesome to nurse in a crowded ward. The same principles govern the treatment of injuries due to pieces of shell or bomb.

Spinal Injuries.

In cases of spinal injury one can rarely hope to do any good by surgical interference.

Wounds of the Face.

Wounds of the face often present a terrible appearance, but if thoroughly cleansed and carefully stitched up, with provision for adequate drainage, they do well. I have seen nothing of the ultimate results. These are almost the only wounds into which one dare insert sutures.

Shattered jaws are frequently met with. Here again I am unable to speak of final results. In the early days the whole mouth becomes very foul. The only treatment consists in frequent irrigation. Such patients are difficult to feed, but can almost all swallow fluids given to them in a feeder to which a rubber tube has been attached. This tube must be passed well to the back of the tongue.

Wounds of the neck when septic are liable to be followed by oedema of the larynx. This sometimes manifests itself with alarming suddenness, and may necessitate the performance of a hurried laryngotomy.

Wounds of the Thorax.

Bullet wounds of the chest are common. When the heart or big vessels have been injured the patient rarely reaches the ship alive. Patients with wounds of the lungs who have lived long enough to reach the ship usually do well. Haemothorax and haemoptysis are of frequent occurrence, but all the symptoms subside quickly, save in rare instances, if the patient is kept sitting up in a restful position. Morphine is invaluable in these cases. Operative interference is rarely justifiable. Occasionally a large haemo- or pneumo-thorax may require to be tapped in order to relieve dyspnoea.

Abdominal Injuries.

On the subject of the treatment of abdominal injuries I cannot pretend to speak with authority. Few patients have reached us who were not already moribund, either from internal haemorrhage or general peritonitis. A few have, however, arrived in a rather better plight. They

have almost all been treated by starvation, opium, and rectal saline infusion, and have been kept propped up in Fowler's position. Of these a fair proportion have made a complete recovery. In a very few cases of recent injury operation has been deemed advisable, but the results have proved very discouraging. Unfortunately, I can give no statistics in the case of either operative or expectant treatment. I am, however, strongly of opinion that the latter holds out a better prospect of success in all but exceptional cases.

Injuries to the Limbs.

Clean bullet wounds of fleshy parts, uncomplicated by other injuries, give little trouble. The skin round about should be painted with iodine and a simple dressing applied. They almost invariably heal by first intention. Shrapnel wounds frequently become septic. Should any signs of inflammation develop they must be opened up, irrigated, and freely drained. Shell wounds are almost invariably infected, and must be freely drained and washed out from the first.

When nerves are injured early interference is not indicated. Many cases recover completely without operation. Nerve suture cannot safely be performed till the wound has completely healed. Occasionally a bullet presses on a nerve, causing intense pain, and may require early removal.

Large vessels are frequently wounded. Many such cases bleed to death on the field. Those which reach the ship may present signs of a large haematoma, or may be bleeding freely from an external wound. Even if the bleeding has temporarily ceased it is apt to recur later. Finally, if the vessel has not been tied, aneurysm, or arterio-venous aneurysm, frequently develops. Early operative interference gives excellent results. As the wound has been well flushed with blood it may almost always be closed, and usually heals by first intention. Bleeding is commonly found to proceed from one of the main arteries which has been button-holed. A free incision, good light, and good retraction greatly facilitate the operation. Many patients are collapsed from loss of blood, so that speed in operating is essential, while intra-venous infusion may be required.

One of the most frequent and troublesome complications of penetrating wounds of the limbs is a compound fracture. When the wounds of entry and exit are small and aseptic the fracture may be regarded as of the simple variety and may be treated as such.

Unfortunately such cases are rare. When the bone has been hit its fragments, together with the bullet, usually act like an explosive and tear a large hole in the soft parts. Any such extensive wound tends to become septic, and is generally markedly so by the time the patient arrives on board. Such cases should be given an anaesthetic and treated in the theatre at once. The wound must be opened up freely and thoroughly irrigated. Any completely detached fragments of bone are removed. My endeavour always is to convert such wounds as far as possible into craters, in which every part is freely accessible and pocketing of pus an impossibility. To secure this end muscle may be freely divided—transversely if necessary—and any bruised or lacerated portions cut away.

I shall not speak of the various ways of putting up compound fractures, as so much has already been written upon this subject. There are only three things to consider—the comfort of the patient, ready accessibility of the wound, and immobilization of the fractured bone. Correct apposition of the broken ends is of little importance in the early days, as no union can take place till much later.

Sepsis in a badly drained compound fracture is a most deadly complication. It is in such cases that one sees so much spreading gangrene. Particularly in septic compound fractures of the femur the mortality has been very high. Undoubtedly this is due to the difficulty in securing free drainage. There must be no hesitation about sacrificing a large amount of muscular tissue in order to secure this end.

This leads me to speak of spreading gangrene, though I am afraid I can add little of interest to what has already been written upon this subject. Whether accompanied by gas formation, or not it has proved, in my experience, to

be a most hopeless condition. By the time the patient has developed an anaemic toxic appearance I believe he always dies, whatever surgical treatment is adopted. Gangrene is usually either present when the patient reaches the ship, or makes its appearance within the first twenty-four hours. In gangrene of the upper limb, which has not spread much above the elbow, a few lives are saved when circular amputation is performed through the shoulder-joint. The wound is left absolutely open without a single stitch. In the case of the lower limb our results have been bad. A thoroughly toxæmic and exhausted patient, such as a gangrene patient generally is, seldom seems to survive the shock of a high amputation through the thigh. I am inclined to think that in these cases free incision, followed by frequent deep injections of hydrogen peroxide, is a more hopeful line of treatment. So far spreading gangrene has never occurred in the case of a patient who has reached the ship within eight hours of the receipt of his injury.

One cannot fail to be deeply impressed with the way in which the whole clinical aspect of the wounded varies with the length of time they have taken to reach the ship. When they come late they are absolutely exhausted on arrival, and withstand the shock of operation very badly. Almost all the wounds are extensively infected, and surgical treatment consists almost entirely in incisions and amputations. The mortality from septic infection and from shock is high. When they come early, the mortality from sepsis is low, and the cases, as a whole, run a much more benign course. The difference in the general condition of the patients in the two cases must be seen to be believed.

Before I close I must make some reference to the use of "antiseptic paste." I approached the question with an open mind, having met and talked with Sir Watson Cheyne. I used it freely on our first two trips, and I have come to the following conclusions: If a wound is freely drained, it does not require paste. It will do all right without it. When a wound is once obviously septic, paste is powerless to clear up the infection. I have met with no evidence that it can prevent septic infection occurring, while, once it has developed, there is plenty of evidence that the use of paste is unjustifiable.

In conclusion, I wish to pay a tribute to the energy and organizing power of Fleet Surgeon Dalton. He alone has made it possible for the work on board to be carried through, even in the busiest times, without a hitch. I must also express my personal gratitude to him for much valuable advice and assistance.

ACUTE RENAL DISEASE AMONGST THE TROOPS IN FRANCE.

A CLINICAL NOTE BASED ON NINETY-FIVE CASES.

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THE health of our troops serving in France is at present fortunately excellent; there have, however, occurred a number of cases of acute renal disease, the causation of which is not at present fully understood. The whole subject is undergoing thorough investigation; pending the results of this inquiry, it may be of interest to give a brief clinical account of 95 cases which have come under the writer's personal care.

General Characters.

The disease exhibits the features of an acute nephritis; it presents oedema, the passage of albuminous urine containing granular casts, febrile reaction, and uraemic symptoms.

The majority of the cases occurred in previously healthy young or middle-aged men, in whom no evidence of pre-existing renal disease could be found. In a small minority of cases the previous history or the presence of cardiovascular changes led one to suppose that the condition was superimposed upon previously damaged kidneys.

Symptoms.

Onset.—In some cases the onset was sudden; in others the symptoms were little marked during the first few days, but became progressively worse. Swelling of the face,

especially of the eyelids, was one of the earliest symptoms; it was usually accompanied by headache and pain in the back and limbs; sometimes febrile symptoms preceded the swelling of the face by several days. Bronchitis with irritative cough occurred in many cases; in others abdominal pain, diarrhoea, and vomiting. Of the initial symptoms headache was the most constant; shortness of breath was also frequent. In only very few cases was tonsillitis present.

Oedema was constantly present; it was absent in only one doubtful case. The face was always markedly affected; the trunk and limbs frequently so. Pleural effusion was present in two cases; ascites in four. The usual duration of the oedema was one or two weeks; in only three cases was it obstinate, rendering it necessary to transfer the patients to England in an oedematous condition. The last relics of the disappearing oedema were usually to be found in the parotid and lumbar regions. The cases with ascites ran a severe course, probably owing to the injurious pressure of the fluid on the renal vessels.

Uraemic Symptoms.—Headache, often severe, was a constant symptom. Convulsions occurred in three cases; amaurosis in one. Vomiting and paroxysmal nocturnal dyspnoea occasionally occurred. The tongue was usually furred, sometimes dry and brown.

Febrile Reaction.—Many of the cases exhibited a temperature of 100° or 101° for one or two days after their admission to hospital; in others the history suggested that fever had been present at the onset. Two cases relapsed while in hospital; in each the temperature rose to about 101°. One case ran a febrile course for about a fortnight. Shivering was sometimes complained of, but an actual rigor was not witnessed. Since the cases were not generally admitted to hospital until several days after the onset, it was not possible to say whether fever was invariably present at the commencement.

Urine.—The volume passed was much diminished in the bad cases; complete suppression was present in several instances. The amount of albumin varied from a light cloud to a quantity sufficient to render the urine nearly solid on boiling. The amount diminished under treatment, but only in a very few cases did it clear up altogether prior to the patients' transfer to England. Granular casts were constantly present during the acute phase; hyaline and blood casts were also found. Red blood cells were present microscopically in the large majority of cases; obvious haematuria was frequent, and sometimes persisted when the patient was approaching convalescence.

Blood pressure was usually high during the acute phase, as evidenced by an accentuated aortic second sound. Means were not at hand for obtaining an exact record of the arterial tension.

Other Symptoms.—The bronchitis occasionally proved persistent and troublesome. Severe epistaxis occurred in several cases. Rarely did nephritic anaemia show itself.

Diagnosis.—Various forms of albuminuria were distinguished by the absence of oedema and uraemic symptoms and by the characters of the urine. In several cases not included in this series the symptoms were due to an infection of the lower urinary tract by the *B. coli communis* or a related organism. So far as the writer's observations go, only in a very few cases could the condition be regarded as an exacerbation of a chronic nephritis.

Prognosis.

None of the patients died. After a stay in hospital of from one to three weeks, 92 of the patients were transferred to England free from oedema. In a few of these cases the albumin had also disappeared, in several others it was reduced to a trace, but the majority were still passing a fair amount of albumin. Three cases assumed a chronic aspect, and were transferred to England with persistent oedema. Only time will show how far the condition will lead to chronic renal disease.

Treatment.

The patients were nursed between blankets and were warmly covered up. They were given milk, barley water, and lemonade; these were administered warm every two or three hours, a total of 7 or 8 pints being given in the twenty-four hours. A daily morning purge of half an