DRESSINGS USED IN A CASUALTY CLEARING STATION.

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TEN months in a casualty clearing station gives one an opportunity of trying the various methods of dressing wounds as they have been from time to time suggested, and of comparing their efficacy in cleaning damaged tissues, in preventing the spread of infections, and in adding to the comfort of the patients. If, as happens in my case, the surgeon is not identified with any of the newer disinfectants, a fair trial may be assured for each of them. The surgery of wounds, as distinct from the method of dressing, is not meantime under consideration, but it must be stipulated that, for real comparison, the surgical technique should not change coincidentally with the method of dressing. To change both at the same time introduces two factors, either of which may alter the whole picture.

In published writings on the treatment of wounds in the present war one meets with assertions that antiseptics have failed us; that previous experience in, say, South Africa, does not help us; and even the suggestion that the dressing of wounds is more the province of the physician than of the surgeon; and, further, that all previous knowledge of the treatment of wounds must be a bar to success out here. Such statements must be taken *cum grano salis*, even though the writers are experienced and men of note.

It is true that a surgeon's methods in civil practice become more or less stereotyped. Older men unlearn old methods with difficulty and assimilate new ones with difficulty, but one is still left with the feeling that the surgeon of experience who possesses the virility to be at the front is a valuable asset to the army. His civilian dogmas get a rude shock at first, and his confidence in his well-tried methods may be shaken, but he soon recognizes the new elements he has to contend with, and will certainly learn of them before, if rarely or at least will be familiar with most of them from his knowledge of the history of surgery. The fact is that it is merely his memory that needs refreshing, and his fixed habits that need reforming.

Few even of the older surgeons have seen hospital gangrene, and they do not always recognize that this serious scourge of surgery throve on a lack of scientific knowledge of bacteriology and antiseptics, which is now taught to and understood by every medical student. The present gas gangrene is identical with the old hospital gangrene, and the mixed infections we see so frequently were in olden times, as sometimes even now, introduced in the dressings themselves. The greater number of shell wounds, and the high-velocity rifle bullet at close range, produce effects that are of daily occurrence here, but were new at first to surgeons who had been through the South African campaign. But all these effects have been met with before, and are, in fact, matters of history.

The one new feature is the trench warfare, and its effects on wounds. The soldier's skin, clothing, hair, every part of him which a missile has to traverse, is covered with mud, which is carried to the depths of every wound. Highly fertilized soil may contain every conceivable pathogenic and putrefactive organism. Such germ-laden wounds are unusual in civil life, and were so also in the South African war. They are, however, met with in accidents from agricultural districts, which are admitted mostly to small provincial hospitals, though they are also seen by surgeons attached to medical schools. The badly damaged and dead tissues at once putrefy and smell badly, and their treatment becomes more a question of sanitary science than of modern surgery, and has been more successfully dealt with by the disinfectants used in sanitation than by the commoner surgical antiseptics. To get rid of the smell and putrefaction in the wound has been to get rid of the unusual in the disease. What is new, then, in the surgery of this campaign is old in sanitary science, and older still in the history of surgery, which, being the older science, had dealt with the grosser infections much earlier.

Among the many methods of dressing wounds one comes across, none are really new, but one recognizes many an old friend in new war paint, habilitated with elaborate word-painting more or less accurate and convincing. A dip

into a good textbook of surgery in use, say, about the early part of last century will convince any sceptic, though it is a thankless task to recommend such a perusal. The names of drugs are less mystifying, but a good description of the treatment of foul wounds with chlorine, iodine, and saline compounds, and even of gas gangrene itself, will be found and will well repay the ardent student. Attention has already been drawn to this by other writers. The cruder drugs produced then, as now, in a short time very candidly stated, a clean surface from which exuded laudable pus—that transition in the discharge from the nauseating putrefactive debris of decaying tissues to the odourless creamy pus, then, as now, considered laudable. This pus comes from living tissues in which are to be found the ordinary pyogenic germs alone. Putrefactive organisms can attack only dead tissues or those weakened by pyogenic processes or mechanical traumatism. To get rid of the putrefactive organisms and to prevent the ingress of the pyogenic has been the problem of wound treatment for surgeons in the present campaign, and it is yet to a great extent unsolved. Towards this objective I offer my experiences in a casualty clearing station.

I. Hypertonic Solutions.

Wright's saline treatment has received perhaps more praise than any other. In theory it seemed excellent, but in practice the results are various. When used properly and in suitable cases they are good, but the cases require careful selection, and its application requires more skilled watching than can usually be given with the means at one's disposal so near the front. The method and choice of cases cannot be left to the discretion of a dresser or even to the average medical man attached to a casualty clearing station, and if used as a routine dressing the results are more often positively bad than passably encouraging. In the majority of places where hypertonic salines are used as a routine dressing they are either too long continued for bad lacerations or are applied to many cases almost clean, where they are unsuitable.

To living tissues strong salt solution is extremely irritating, and causes pain for a very considerable period after each application. This does not depend on the patients. The action of salt on wounds was well known in history, when it used to be rubbed into the cuts made by the lash, not for its healing power but it noted. I have personally experienced its smart, for it was a favourite dressing in hypertonic solution in my boyhood. I owe the preservation of a perfect finger joint to its use, yet I well remember the happy change to a soap and sugar ointment which completed the treatment.

The hypertonic method does well for joints, when they have not been laid open too freely, and probably lacerated wounds where the explosive force of the missile has killed the tissues for a considerable distance beyond the bullet track. The salt preserves these dead tissues from putrefaction (a well-known use of salt), for it is an absolute bar to the growth of putrefactive organisms, while its irritating effect on the living tissues sets up a more or less severe discharge, which helps to prevent the ingress of pyogenic germs. But such a dressing should not be covered by non-permeable tissue, which will check entirely such outward flow of serum. The tabloid and gauze pack is perhaps the best for dirty wounds in casualty clearing stations, as it can be left for a considerable time without attention. There is at first practically no pain following its application, for even the tissues that will ultimately live are rendered analgesic by the blow. But once the dead tissue separates, and the hypertonic dressing becomes painful, it soon produces purplish, waterlogged, shining granulations, which at one and the same time form a barrier to the exit of discharges, and to any feeble antiseptic action it might exert on the cooped-up pyogenic germs below. Absorption begins, and abscesses in the depths are not unusual.

How often are these pyogenic organisms present from the start? I am inclined to believe that even nowadays they are sometimes introduced much as they were by the surgeons in pre-antiseptic days. I have seen in hospitals out here the pernicious habit, which had almost disappeared in the best civil hospitals, of wringing gauze from antiseptic solutions with the bare hand. The result is that all the germs present in the previously dressed cases, are inoculated into the wound. Rubber gloves

prevent this patient-to-patient infection, and when combined with the method I adopt of dressing all the serious cases myself and leaving the bandaging to an assistant, often an orderly, and washing the gloved hands well with a cotton-wool dab in a strong antiseptic after each case, time is saved and perfect safety from multiple infection is assured.

Before the wound shows the purplish granulations described, and before the patient complains of the smarting, and in all wounds where the exposed surfaces are living tissues, hypertonic solutions are contraindicated. The saline method of Wright requires careful watching by the surgical specialist, who must see every case so dressed daily. It is not, therefore, suitable for routine work in a casualty clearing station, nor even in a base hospital. I have said nothing of the normal saline, with which everyone is familiar.

II. Hypochlorous Acid.

Hypochlorous acid has been used in the forms eusol and eupad. The deodorizing effect is sometimes magical, especially when the dry eupad is applied to stinking, bruised, and dead tissues. But eupad so used is very caustic and very painful, and should only be applied by the surgeon himself. Eusol solution, on the other hand, is seldom painful, and is a good routine application, but some skins are very susceptible to it, and it must not be applied for long periods to wounds of the back of the hand, dorsum of foot, and of the neck, forearm, and wrist. It should always be freshly mixed, applied once or exceptionally twice daily, and should not be covered by protective. The drip method is specially useful in compound fractures, and in all lacerated wounds of the limbs where there is gas gangrene and foul smelling sores. Eusol is one of the best methods we have tried, and it need not be continued after the wound is fairly clean and free from smell. A sterile dressing is then quite sufficient.

III. Iodine.

Iodine in spirit or watery solution acts pretty much like hypochlorous solutions as a deodorant, while the spirit preparations act like the hypertonic salines, by inducing a serous flow. Iodine is very irritating to most skins, and the pain continues for some time after the dressing is applied.

IV. Spirit: Glycerine.

Methylated spirit or glycerine, alone or charged with antiseptics—for example, biniodide spirit, glycerine and ichthyol—both act like the hypertonic saline in producing free discharge, and require frequent changing. They do not cause so much pain, but are expensive to use in routine work.

V. Carbolic Acid.

Carbolic acid, when used pure, cauterizes the surface, and is only feebly antiseptic, as its combination with albumin dams back all discharges. It is a useless application where there is deep destruction of tissue. It runs over and destroys the skin, and cannot be recommended as a first treatment for wounds of any kind. In solutions of 1 in 60 on double cyanide gauze it is quite good in a rush. Large quantities of the gauze can be kept moist in this solution in small enamelled marmites, as recommended to me by Colonel Wallace, and this method is specially useful in busy times. It is painless, can be applied to most wounds indiscriminately, and the dressing can be left entirely to nurses and even to orderlies in emergencies without risk. But carbolic is a weak destroyer of putrefactive organisms. The greatest danger in its application is the wringing of the gauze with the bare hand; this can be avoided by gloves or by applying the dressing moist with sterile forceps.

VI. Sterile or Double Cyanide Gauze.

Dry sterile gauze or the double cyanide gauze are both quite good dressings for visibly clean wounds, and if removed by hydrogen peroxide when too adherent are suitable for dressing such cases, and convenient for rushes. They are safer than moist dressings when applied with the bare hand carelessly.

VII. Hydrogen Peroxide.

Hydrogen peroxide cleans a cavity or surface quickly, and is a good deodorant, but is not satisfactory as a wet

dressing applied on gauze. The under layers become clogged and non-absorbent. It is a weak antiseptic, which at once produces its total effect if thus applied. Like protective, it checks drainage of discharges and promotes absorption. Its mechanical effect is practically its only recommendation as a lotion for dressing. It is quite good as a bath for foul-smelling wounds, either alone or with boracic.

VIII. Continuous Irrigation.

I have not said much regarding continuous irrigation of wounds, as only exceptional cases in quiet times can be so treated in casualty clearing stations. This is especially true in a tented unit.

IX. Vaccines and Serums.

Injections of polyvalent serum has seemed to do good in many cases, especially when used before an operation on a granulating wound where bone has to be removed or a plastic operation done. There is less local reaction and less general disturbance if a full twenty-four hours is allowed to elapse between the injection and the operation.

CONCLUSION.

It is not so much the antiseptic dressing used as its intelligent application that matters. Almost any one of the methods we have tried will give average good results, but there are cases in which one application is more suitable and more easily applied than any of the others, and it is right here, to use an Americanism, that the specialist in surgery in a casualty clearing station comes in. He should never become an enthusiast in any one method of dressing, as he is then a danger to his patients and an embarrassment to his colleagues, to whom freedom of choice is as necessary to secure their intelligent interest as a change of method of dressing may be to the patient. No surgeon or dresser in a casualty clearing station should try to drive a one-horse shay and so become a menace to the recovery of not a few of his patients.

ACUTE URINARY INFECTION WITH PARATYPHOID B BACILLUS.

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It is now generally recognized that the differentiation between typhoid and paratyphoid fevers is a problem that can only with certainty be solved by the bacteriologist. It has been said that some distinction may be made clinically, in so far as cases of paratyphoid fever usually run a much milder course. Recently, however, several deaths from paratyphoid fever have been reported, and it is probable that this clinical distinction will prove unreliable; further, with the more detailed study of all febrile cases, it seems likely that anomalous forms of the latter will be recognized.

The case herein reported illustrates acute urinary infection with the *B. paratyphosus B.*, and, while exhibiting little in common with ordinary paratyphoid infection as hitherto recognized, presents several additional interesting features worthy of record.

The patient, a private in the A.S.C., aged 17, was admitted to hospital on December 31st, 1915, for "abdominal pain and incontinence of urine." He had had no previous illnesses, and had never been abroad. He was quite well up till the morning before admission, when he was seized with intense and frequent desire to micturate, but was unable to pass more than a small quantity of urine at frequent intervals. This condition persisted throughout the day, and he experienced a certain amount of pain across the lower part of the abdomen. During the night he was unable to sleep, and felt "shivery." The following day the abdominal pain was rather more severe, and the slightest desire to micturate was always associated with inability to control the flow. There was no vomiting, no diarrhoea, and he complained of only slight headache.

On admission, the skin was hot and dry, the tongue very furred, the temperature 103° F., and the pulse 112. There was some tenderness in the region of the bladder, but nowhere else in the abdomen, and a quantity of albumin was found on