SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

PREVENTION AND TREATMENT OF BED-SORES

BY

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A bed-sore is an ulcer or area of impaired nutrition of the skin and subcutaneous tissues due mainly to the too great or prolonged pressure on those parts of the body that are most subject to pressure when the patient lies in bed. The body is not homogeneous in consistency nor does it lie evenly on any ordinary mattress which may support it; some parts of the skeleton project and take more than their fair share of the weight, and it is over such projections that bed-sores form. If the weight of the body could be evenly distributed over the whole of the surface that is in contact with the mattress, bed-sores would be exceedingly rare. The nearest approach to this even support results when a plaster-mould of the posterior half of the body is fashioned and the patient is allowed to lie on the mould. If the plaster be correctly made it is possible for the patient to lie on it for months without changing position or having any attention paid to the back, and at the end of that time the skin of the back will be quite intact and healthy. Consideration of this fact throws much light upon the principles which should guide us in the prevention and treatment of bed-sores.

A bed-sore is really a form of pressure-gangrene, but though pressure is the main factor there are important subsidiary points to be considered. These subsidiary factors may be external or internal. External factors consist chiefly of slight traumata caused by the friction of clothes or irregular rucks in the sheet upon which the patient lies; and the irritation of the skin by urine, faeces, or sweat. Quite apart from the irritation which may be caused by these, the moisture soddens the superficial epithelium and makes it less resistant to pressure. The internal or constitutional factors consist of those diseases which lower the blood pressure or diminish the vitality and blood supply of the tissues. This is a large group of conditions comprising all debilitating diseases and a very important group of nervous diseases (especially paraplegia) in which the absence of sensation and the impossibility of normal vasomotor reaction make the prevention of bed-sores extremely difficult. It is also clear that emaciated patients whose bones project more than usual will be more prone to develop bed-sores.

The most common positions for bed-sores are in the region of the sacrum, over the prominences of the scapulae, the heels, and the back of the head, and over any vertebral spine which may be at all prominent. A sore may develop over the elbow or the iliac spine, and if the patient lies on his side a sore may appear over the great trochanter. It must be remembered that the nutrition of any part which is subjected to continuous pressure may suffer, and the medical attendant must keep watch for the effects, which will vary according to the posture the patient may adopt.

The diagnosis of a well-developed bed-sore is, as a rule, quite easy, for the unhealthy ulcer which often spreads from some focus of pressure tells its own tale. It is much more important to recognize the earlier stages when the

sore either threatens or is inevitable. When a sore is threatening to develop the skin will be found to be slightly reddened and tender; the redness will disappear on digital pressure and will reappear when the pressure is removed. This follows from the fact that the first stage is merely an erythema or congestion and the vascular supply is still intact. When a sore is inevitable the colour changes to a dusky or purplish red, and since the circulation in the part is arrested the pressure of the finger will not be followed by the phenomenon described above: there is capillary stasis. When this stage has been reached it is inevitable that some necrosis of tissue and consequent ulceration will result. In some cases a sore begins as a small crack in the skin from which ulceration spreads.

Preventive Measures

In no department of medicine is the proverb "prevention is better than cure" more applicable than in the case of bed-sores. In the great majority of cases it is possible, and customary, to prevent them; and with well-trained nurses it is usually considered a reflection on their nursing capacity if a sore develop. The nurse prevents bed-sores in three ways: first, by avoiding undue pressure on any one part; secondly, by preventing the infliction of minute traumata; and, thirdly, by improving the circulation and increasing the resilience and elasticity of the skin. It is the doctor's part to improve the general condition and vitality of the patient, and to give advice when sores threaten or form.

AVOIDANCE OF UNDUE PRESSURE

For this purpose it is necessary to see that the mattress is firm enough to prevent the body sinking deeply into it, and yet soft enough to allow it to be moulded to the contour of the patient's body. A firm hair mattress is customary. In those cases of very ill or feeble patients where special care is necessary a water-bed is sometimes used. The water-bed, which is put on top of the ordinary mattress, must only be half filled with water (at 100° F.). A fully filled water-bed would be as objectionable as a very hard mattress, and one less than half filled would allow too much sagging of the body. Water-beds are rather troublesome and many prefer to use a pneumatic mattress or, more commonly, air-cushions instead. Circular air-cushions or circles of sorbo-rubber are used to take the pressure off any particular part; air-cushions must be only half filled with air, and must form a large circle, with the affected part in the centre. Too small a cushion may cause oedema of the included part and actually do harm. Cushions must be well covered with linen. There are on the market some horseshoe-shaped rubber cushions (Dunlopillo) that are designed to avoid oedema of the included part.

CHANGE OF POSTURE IN BED

Normal people always change their position in bed as soon as any discomfort indicates the need for it. Sick patients cannot do this, so the nurse must do it for them in order to avoid too prolonged pressure on any one part. In altering the position of a patient the body ought not to be rolled over, but rather lifted gently so as to effect the change.

AVOIDANCE OF MINUTE TRAUMATA

The greatest care must be taken to avoid slight injury to the skin when the bed-pan is used; in persons who are recovering from an anaesthetic and in those who are paraplegic it needs a careful hand and a vigilant eye to see that the skin is not damaged by hot-water bottles. Dry bread-crumbs or rucks in the sheet or draw-sheet may cause unnecessary friction. The rather rough way in which an abdominal binder is pulled from under a patient who is about to undergo an abdominal operation might cause dangerous friction to the sacral region; in such cases the patient ought to be gently raised while the nurse withdraws the binder.

MAINTENANCE OF NORMAL CONDITION OF SKIN

This is done by keeping it clean and dry, by massaging and in some cases hardening it. In an ordinary patient the pressure-points are attended to twice daily (morning and evening) and after the bed-pan has been used. In feeble patients and in those who are incontinent the toilet must be done every four hours or even every two hours. The special areas, particularly the sacral region, are washed and gently and firmly massaged by the palm of the hand and the pulp of the fingers working in the lather formed from white windsor or other good soap; after five or ten minutes' massage the soap is washed off, the skin dabbed with a dry clean towel, and some form of spirit is then rubbed into the skin. Usually ordinary methylated spirit is used, but eau-de-Cologne, or even brandy may be employed if wished. After the spirit has been well rubbed in, the part is thoroughly dusted with talcum powder or similar preparation.

With incontinent patients it is of the utmost importance to keep the skin dry. The draw-sheet must be changed frequently and frequent attention given to the skin. Usually a preparation of equal parts of zinc ointment and castor-oil is applied with the object of keeping the skin dry, but such ointment is disliked by some in that it may soil the linen; this soiling may be avoided if the ointment be used sparingly. When a bed-sore is threatening every effort must be made to change the position of the patient so that the affected part is relieved of pressure, and the skin must be attended to at least every two hours.

Treatment of the Inevitable Bed-sore

When, by the discoloration of the skin and the demonstrable lack of capillary circulation, it is recognized that a bed-sore is inevitable, it is recommended by Latimer that the area be hardened by means of tannic acid solution. A 5 per cent. aqueous solution is sprayed on at half-hourly intervals and the part dried by warm air provided by radiation from electric-light bulbs or other source of heat. This method of treatment is less likely to be followed by sepsis than when the part is treated by fomentations. The dried slough will ultimately separate and leave an ulcer, which can be treated by one of the methods here described.

When a definite sloughing ulcer is present it must be specially treated in one of the following ways. For small and even moderate-sized ulcers there is no doubt that the application of elastic adhesive plaster, as advocated by Carty, is useful.

"Two pieces of elastic adhesive plaster, one over the other, are applied so that the bed-sore and the skin surrounding it for at least an inch are covered. The elastoplast is left in position as long as it will adhere—usually, in the early stages when the discharge is plentiful, twelve to forty-eight hours. It is then replaced by similar pieces of adhesive plaster, and this is repeated until healing is complete."

If the elastoplast treatment is adopted it is essential to see that the whole of the ulcer and a considerable area of healthy skin round it are completely covered up; *and the plaster must not be removed to see how the ulcer is progressing.* Only when it becomes loose should it be replaced by a new piece or pieces. By means of this treatment large and deep ulcers may sometimes be induced to heal. Latimer points out that the elastoplast method is not suitable for cases in which there is involvement of bone, virulent infection, or profound necrosis of tissue. If the elastoplast treatment is not adopted the above-described tannic acid application may be tried.

There are still many who prefer to treat bed-sores by the older-fashioned methods of astringent or antiseptic applications. There are many to choose from. Dakin's solution helps to separate the sloughs and clean up the surface of the ulcer. Hypertonic saline solution (5 to 10 per cent.) has been recommended. A dilute solution of aluminium acetate is astringent and slightly antiseptic; Burow's preparation is a 5 per cent. solution of this chemical, and is too strong—it must be diluted ten times before application. Good results have been claimed also after application of dusting powders containing rhubarb or catechu, dermatol or aristol. I hold no particular brief for any of these applications, but think that healing may take place with any of them and many others. The chief point is to keep the surface of the ulcer clean and free from pressure. When the ulcer is quite clean the application of lotio rubra hastens healing.

In addition to local applications healing may be hastened by the use of artificial sunlight or ultra-violet rays to the part. When there is a large slough it may be advisable to cut it away, but that is about as much surgical intervention as is ever required.

ANTITOXINS FOR WAR EMERGENCY

MEDICAL RESEARCH COUNCIL'S PLANS

The fact has already been published that arrangements have been made by the Medical Research Council, at the request of H.M. Government, to provide tetanus antitoxin in sufficient quantity, and to ensure its continued supply in the event of war. Similar arrangements of more limited scope have been made in the case of gas-gangrene antitoxin. It is therefore thought that further particulars may be of interest, especially to medical officers who may be called upon to give instructions as to the use of these materials.

Provision of Tetanus Antitoxin

Tetanus antitoxin has been provided both for prophylactic and for therapeutic use. The prophylactic dose is 3,000 international units (= 1,500 American units) and is contained in a volume not exceeding 3 c.cm. During the early part of the war a dose of 500 American units was administered as a routine, and the dramatic effect on the case incidence of tetanus was very striking before the end of 1914. Although there was a great deal of evidence that a dose of 500 American units was highly effective, attempts were made during the later stages of the war to reduce still further the already low case incidence of tetanus by repeating the dose or increasing it¹; and the tendency since the war has been to advocate the administration of 1,000, and, more recently, of 1,500 American units.² The dose to be administered for prophylaxis, in case tetanus antitoxin is again required, has accordingly been fixed at this higher level of 1,500 American units (= 3,000 inter-

¹ *Official History of the War*—"Medical Services Pathology," p. 164.

² *United States Pharmacopoeia*, 11, 61; *British Pharmacopoeia*, 1932, p. 62.