

DECUBITUS ULCER (PRESSURE SORES) IN SPINAL CORD INJURY

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Decubitus Ulcers are constant potential and real problem in chronic disease, specially in the cord injured patient. Consideration of the numerous physical factors, nutrition, anaemia & infection are necessary in order to successfully prevent and to treat this frequent and serious complication. Continued emphasis & training of all personnel involved in patient care, including the physicians, surgeons, nursing personnels, dieticians, physical therapists, occupational therapists and others, is essential. Most important, however, is the training of patient and his awareness of the various contributing factors, since he is the member of the health care team with the deepest interest in the prevention of his problem.

Pressure sore is one of the important preventable complication in spinal cord injury cases. Neglect in the case may lead to repeated ulceration resulting in hospitalisation, loss of mobility and social adjustment. In the spinal unit where proper nursing care is available occurrence of pressure sore minimises.

One of the earliest lesson for the patient to learn is, prevention of complication and adjustment to life pattern. Sometimes it is found in the incomplete lesions at the onset of accidents and thus becomes a major management problem in non- specialised area.

PATHOLOGY

Pressure sore occurs mostly in the region where skin and subcutaneous tissue overlie a bony prominence. The common areas are sacrum, greater trochanters, ischial tuberosities, medial and lateral malleolus, calcaneum, occipital area, kyphotic spine, prominent ribs & shoulder region. Pressure sores can be classified according to a system recommended by the National Spinal cord Injury Data Collection system.

Table : Spinal cord injury classification of Decubitus ulcers.

Grade	Criteria
I	Limited to superficial epidermal and dermal layers.
II	Involving the epidermal and dermal layers and extending into the adipose tissue.
III	Extending through superficial structures down to and including muscle.
IV	Destruction of all soft tissue structures down to bone; there is communication with either bone or joint structures or both tissues may be affected.

ETIOLOGY

The ulcer is caused by constant pressure on the certain part of the body because it results into ischemia in that part. It is reported that in normal individual the osmotic pressure of the capillaries is found to be 32 mm. of Hg pressure, in mid capillary area 20 mm. of Hg, & in the venous limb 12 mm. of Hg. The mean pressure of a hard flat surface over the ischial tuberosities was greater than 300 mm. of Hg & on a hard contoured surface it reaches as high as 700 mm. of Hg. It was

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also found that with the addition of a two inch foam rubber cushion the ischial pressure dropped to 160 mm. of Hg, still far above the capillary blood pressure.

Heat contributes to the cellular metabolic deficiency by increasing the metabolic rate thus increasing the demand for oxygen which may already be compromised.

An increase in moisture, as a result of perspiration & incontinence of urine or faeces, reduce the resistance of the skin, contributing greatly to the risk of development of necrosis & ulceration.

Friction injury with resultant loss of epidermal protection predisposes to infection, oedema & increased moisture by itself, these factors will not destroy the dermis or deeper structures.

The shearing force that occurs when the head of the bed is raised 30 degree or more or if the patient is sitting at a reclining angle, as in a reclining wheel chair, results in an angular force and comprehension between the supporting surface and the skin over the sacrum. This shearing force angulates and stretches these vessels with resulting thrombosis and subsequent ischaemic necrosis.

Hygiene is important in decreasing the bacterial population of the skin, since inevitable decubitus follows a threatened decubitus rapidly if infection occurs.

Poor general nutrition is, of course, frequently associated with chronic illness. The marked loss of weight which so often occurs, in addition to the muscles atrophy often present, results in a substantial reduction in the subcutaneous fat and muscle bulk which reduced the mechanical padding between the skin and underlying bone. The specific nutritional deficiencies hypoproteinemia and avitaminosis, specially ascorbic acid, interfere with the maintenance of normal tissue integrity. A negative Nitrogen balance commonly follows, pre-disposing to edema of dependent parts, decreasing the elasticity, resilience and vitality of the skin, and making more susceptible to minor injury. The development of oedema also promotes the pressure of other physical factors viz. heat & moisture. Healing will not occur when the patient

is in negative balance. Since the rate of diffusion of Oxygen & metabolites from the capillaries to the cell decreases in proportion to the distance from the capillary to the cell. It is clear that oedema will have a profound effect on cellular survival or proliferation.

Anaemia or anorexia, with resulting reduction in delivery of oxygen to the cell, will further embarrass cellular metabolism & tissue necrosis will become more imminent.

An added factor, anesthesia, is present in patient with sensory loss in the more vulnerable areas. The paraplegic, has lost the 'warning pain' of discomfort from prolonged pressure. Motor stimuli to muscle is lost with the inability to change body position, with this loss of muscles contraction, disuse atrophy occurs & venous blood flow is slowed with resultant thrombosis and a decreased oxygen level. In the patient with spasticity, threatened decubitus as result of friction injury are common.

PREVENTION

The prevention of decubitus ulcer is the ultimate goal in all instances but is extremely difficult to achieve. The major portion of the programme is delegated to the nursing services. The task of prevention is great, but the reward is many time the effort & is tribute to good nursing care. Wound must be clean, soft, dry & smooth. The patient is turned frequently, preferably every two hours or less, with constant effort being made to distribute the body weight over as much area as possible in order to lessen the pressure on any one localised area. The position in bed should be observed frequently & the head end of the bed should not be elevated over 30 degrees for any significant period of time to obviate the danger of the shearing force factor. Alternating pressure mattresses are desirable in certain instances but often lead to false security & increased heat.

The skin is frequently inspected and as soon as possible the patient is taught to check his own skin with a mirror for redness or other evidence of the threatened decubitus ulcer.

Urinary & faecal incontinence must be controlled because urea splitting organisms lead

to, rapid skin breakdown. In the early stages, indwelling foley's catheter may be employed. The bowels are controlled by the use of Biscodyl.

The importance of nutrition, a high protein, high vitamin diet is necessary and in some cases a protein & vit. supplement must be added. It is extremely important to mobilise the patient on the tilt table, wheelchair, crutches, braces and to institute an early active physical programme. This has a desirable effect on the appetite, venous flow & moral. Recreational & occupational therapy programme are encouraged to improve exercise tolerances and to increase the general activity level of the patient.

Correct wheelchair prescription and utilisation must not be overlooked, since the greater portion of the quadriplegics or paraplegics time will be spent in the wheelchair. Footrests must be adjusted to a height that distributes the weight over the posterior thigh as well as the ischial area. When footrests are too high than a greater portion of the weight being shifted to ischial tuberosity. The seat must be covered with four inches of foam rubber.

TREATMENT

Most patients with spinal cord injuries admitted to the rehabilitation centre, especially those injured many months prior to their admission present with ulcers in varying degrees or severity. The most common site is the ischial tuberosity in addition, anaemia & malnutrition are frequently present. The treatment programme is essentially the same as that in prevention.

Pressure over the ulcerated area is eliminated completely and dead tissue is debrided manually, the area is dressed with a light coat of streptokinase-stretodornase with strile dressing. If area is large it is often necessary for it to be packed with furacin or normal saline dressing. By using this technique we have been able to keep the wound free of necrotic tissue and infection.

Nutrition plays an important role. As much as 50 Gms. of protien is lost daily from a large open decubitus. A positive Nitrogen balance and Haemoglobin of at least 12 Gramm %, with the replacement of this by fresh transfusion, we can demonstrate the immediate healing response in the ulcerated area. High protein foods with iron, vitamin supplements are indicated since whole

blood administration gives only transient benefit, if oral intake is not maintained at a satisfactory level.

Infections in other areas, specially UTI, must be treated vigorously otherwise lead to chronicity. Increase in spasticity may multiply the decubitus problems.

Systemic antibiotics are widely used in the treatment of decubitus ulcer. 70% of open wounds harbor hemolytic staphylococcus aureus, as well as many other organism of varying virulence and resistance. The dead tissue, serum, exposed tendon, fascia & tissue fluid provide excellent culture media for mixed infections.

Topical preparations have been recommended some time for the treatment of the decubitus ulcer. These are pyruvic acid, starch, salicylic acid, Daken's solution, cod liver oil ointment, gention- violet, acetic acid, boric acid, vitamin-C paste, granulated sugar & Gelfoam to mention only a few. Our experience with any of these agents is limited & no attempt will be made to discuss the merits of any particular topical agents.

The surgical treatment of the decubitus ulcer has been established and well outlined by many authors. Our experience leads us to believe that if surgery is indicated it must be of fairly radical in nature, involving removal of the ulcer & sufficient surrounding tissue, infected bursae & underlying bone. The technique of excision and grafting is beyond the scope of this discussion.

Paul et al (1960) have investigated the use of ultra sound as an additional therapy for this most vexing problem ultrasound was applied with a moving sound head with either oil coupling or under water.

Dose — 1 Watt/Sq. cm./Water coupling
1/2 Watt/Sp. cm./oil coupling

Treatment should be given three times in a week for a total six per series upto 3 series given with rest period time 2 weeks in between. As a result of U.S. treatment the necrotic material at the base of the ulcer had completely disappeared & the base of the ulcer was completely pink & healthy in appearance as was the surrounding skin.

Use of Gold leaf Treatment in Pressure Sore

Gold leaf is available commercially in two forms either with or without an adherent packing

of tissue paper. On the 1st day of treatment the lesion was scrubbed with a detergent solution and all crusted material was removed. After saturation with 95% C₂H₅OH the exposed tissue was then covered with four to eight layers of ordinary gold leaf followed by a light non-sticking dressing which served as a protective covering during activities. Next day the crumbling gold leaf was removed with the aid of Normal Saline rinsing, after wards the ulcer was again prepared with alcohol & new layers of gold leaf were applied. Regeneration proceeded inward from the margins gradually

covering the unchanged ligaments base.

Electrotherapy has also been tried. Locally applied tetanising currents (trains of biphasic, charge balanced current stimuli with the frequency of 40 Hz and amplitude below the visible muscle contraction) was tried and it showed significant improvement in healing.

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