MANAGEMENT OF BURNS

by

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In all parts of the world in which I have travelled I have found that cases of severe burns are, unfortunately, very common and even this beautiful country of Nepal is no exception. Because we are doctors we are likely to meet and be asked to help in the treatment of these unfortunate people, both adults and children, and it is necessary that each of us should have a knowledge of the basic principles of treatment if our patients are to recover. In order to emphasise a few of these points I present this paper to you, and thank you for the privilege of attending this Nepal Medical Conference.

When a patient suffers from an extensive burn, whether it be a scald or flame accident, there is loss of fluid from three sources: A. From the burn surface itself B. From pooling

of blood in dilated blood vessels in the burned area. C. From the escape of circulating fluid from damaged capillaries into the intercellular spaces resulting in oedema. This loss of fluid causes haemoconcentration, sluggish circulation with reduction of blood volume and loss of urinary excretion, and a condition of surgical shock. This is greatest in the early hours after the accident and is proportional to the surface area of the burn. Thus the shock phase is predictable and it is essential to replace this fluid during the

first 48 hours. To adopt a "wait and see" policy may well result in permanent kidney damage and irreversible changes in other organs resulting in death. Whilst a small burn can be corrected by rest, warmth and oral fluids nevertheless intravenous fluids are required for any burn involving over 15% of the body surface in an adult and over 10% in a child. Clearly then we must be able to estimate the percentage of the body which is burned and this can be calculated fairly simply by Wallace's rule of nine. In this the head is 9% of the body surface, each arm 9%, the front and back of 18% each, each leg 18% and a residual 1% for neck and perineum.

This is fairly accurate for an adult but in a child correction should be made because the head is relatively large and the legs small. Another help in estimating the percentage of burn is to remember that the palm of the hand is 1%. If we then know the weight of the patient we can calculate quite simply the intravenous fluid required during the first 2 days by saying that 3 ml. are required for every 1% burn, multiplied by the body weight in kilograms. For example an adult weighing in 70 kilograms, with 25% burn, will require $3 \times 25 \times 70 = 5250$ ml. in 48 hours. This applies to burns up to 30%, but no extra should be calculated above this level to avoid hypostatic lung congestion. Of this total fluid requirement one-third should be given in the first 8 hrs after burning and if the patient is seen late after 4 hours have elapsed then all this fluid for this period has to be given in the next 4 hrs. Over and above this intravenous fluid therapy the adult patient requires his ordinary daily intake of 50 ml/kilogram every 24 hours. This normal requirement is given by mouth, provided there is no vomiting, or added to the intravenous route. With regard to the type of intravenous fluid to be given the best is plasma if it is available. Dextran is a good substitute but dextran upsets blood grouping and if blood is likely to be required later then grouping should be done prior to giving this high molecular substitute. Ideally plasma and saline can be given alternately, but saline alone is life saving if neither plasma nor dextran are available. Blood is not needed for the shock phase when the burned area is under 30% but it will be needed to raise the haemoglobin level later during the debridement or grafting periods. Once the fluid replacement is under way regular 4 hourly assessment of the patients' general condition should be made and one should observe presence or absence of restlessness, colour, blood-pressure, nausea or vomiting, haemoglobin or haematocrit reading and volume of urine passed. The haematocrit (proportion of plasma and red cells in the blood) is a very useful guide, for if the haematocrit rises the plasma volume is too low. The normal reading for an adult is 45 but in younger age group it is useful to note that it is 68 at birth, 38 at 3 months, and 40 between the ages of 7 and 11. With regard to the urinary excretion all severe burns should have a sterile catheter passed and the flow of urine recorded hourly on the intake and output chart. An adult is expected to pass about 30 ml. each hour and a child 20 ml. If acidosis is present sodium bicarbonate can be given to correct this. It is anticipated that the shock will have been prevented or overcome within 48 to 72 hours and the intravenous therapy discontinued. Oral fluid must still be pushed and the patient brought into a high protein diet, e. g. milk, egg, meat, cheese, peanuts, and the addition of "complan" will be an added help if available.

With regard to the burned area itself nothing should be done until the fluid replacement is taking effect. A sedative can then be given and the burn cleaned with soda and water, or weak solution of savlon or dettol. Treatment of the burn can then proceed along one of two lines: A. Exposure to obtain a dry crust and stop fluid loss. B. Occlusion dressing to avoid infection. The exposure treatment is good for the head and neck, perinium and localised areas on front of trunk and legs. It is also very applicable in hot climates. Closing are better for hands, which should be elevated to avoid oedema, and for areas carrying direct pressure. All circumferential burns should be dressed using hibitane cream or vaseline dressing, to avoid any constricting crusts which can seriously interfere with peripheral circulation. Should such a case be seen in which the constriction is causing difficulty in respiration, or blueness or oedema of hands or feet, the crusting must be widely released by vertical incisions down to the deep fascia. Wrist and foot drop must be prevented by suitable splinting. Primary dressing should be changed in 7 days and a mild antiseptic dressing, applied such as Eusol, 5% Milton or Saline. After 10 days the more superficial burns will nearly be healed whilst the slough of full thickness skin loss will be starting to separate and this separation can be helped by applying Hibitane cream. Around the 14th day desloughing should be carried out, preferably under a general anaesthetic, and at this stage antibiotics will be required to control blood stream infection, and a blood transfusion given to raise the haemoglobin level. Occasionally it is possible to start skin grafting immediately with thin split skin grafts, applied in small squares or strips, but usually it is necessary to apply wet dressing or give a daily bath for a week to obtain clean pink granulations. In any case the majority of the skin grafting must be carried out within 3 weeks of the accident. Provided the infection is ensifional, no haemolytic streptococci are cultivated from the surface and the grafts remain undisturbed for 4 days, there should be a good take of the grafts. Further regular dressings are required until the grafts spread and coalesce. Early mobilisation is then encouraged and oil or cream applied to the grafts to prevent them getting to dry. Pressure dressings are required rather longer for areas liable to contractures. Should contractures develop in spite of splinting they should be left for 3 to 6 months until the scars are pale and less indurated and then overcorrected with thick split skin grafts. *Firm pressure on these grafts is maintained for several weeks until the contractile phase is over.* Physiotherapy and occupational therapy are very useful at this stage.

One type of burn I would like to mention is the localised deep burn of limited size which occurs following an accident, such as an electrical burn of the hand. Primary excision of all the deep area before the onset of infection is the treatment of choice. An immediate thick graft should be applied and this will save weeks' delay and avoid much contracture.

I should like to say how very important it is to keep up the morale of these unfortunate burn patients. A devoted happy nurse, showing care, love and compassion, together with a surgeon who instils confidence unto his patient, will help the patient through many days of darkness and give hope and courage to face the future. The treatment of a case of severe burns can only be successful by the full cooperation of all members of the team, doctor nurse, physiotherapist, social worker, and many others who come into contact with the patient.