

consuming large quantities of sugar tends to lessen the amount of protective foods in the diet and is to be regarded with concern.

The League of Nations' Technical Commission considers that although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food.

White flour is deprived of important nutritive elements in the process of milling. Its use should, therefore, be decreased, and it should be partially replaced by lightly milled cereals and above all by potatoes.

Milk should form a conspicuous element of the diet at all ages. The Technical Commission commends the tendency manifested in some countries to increase the daily intake of milk to one litre per day for pregnant and nursing women, and to provide an abundant supply for infants, children of all ages, and adolescents. The practice of providing milk either free or at a reduced price to these groups is highly recommended.

In the past, skimmed and separated milk has often been treated with contempt, being thrown to pigs and calves. But the Commission draws attention to the high nutritive value of such milk. Though it is deprived of its vitamin A through removal of the fat, it retains the vitamins B and C, as well as the protein, the calcium, and other mineral elements.

The normal mixed diet should always contain fresh vegetables or fruit, preferably both. Extra vitamin D is much needed wherever and whenever sunshine is not abundant, especially in the periods of growth and pregnancy.

The Commission issues a warning with regard to the indiscriminate use of so-called irradiated foods. They are sometimes advertised in flamboyant terms calculated to mislead the unwary purchaser anxious to assure her household of an adequate supply of vitamins, but lacking discrimination in her judgment. When the appropriate rich foods are not available, the choice of special vitamin preparations should be confined to those that are officially controlled and approved.

*(Communicated by the Secretariat of
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TREATMENT OF BURNS AND SCALDS

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I am very glad to have this opportunity of talking to industrial nurses about the treatment of burns and scalds, for you probably see a good many such cases in your work.

Why Do Burnt Patients Die ?

The first thing we will investigate is why patients die after they have been burnt or scalded. We can take these two types of injury together, for after all the only difference between them is that burns result from dry heat and scalds from moist. Now death is due to three factors. The first is that the damage to the tissues causes the formation of poisonous bodies which are absorbed into the circulation and produce very intense collapse. These bodies are partly histamine bodies from the damaged tissues themselves, and are partly of another nature. There is some dispute as to their exact nature, but there is no dispute about the fact that they cause profound collapse. The second reason is that there is a very great escape of serous fluid, not only from the damaged cells but also from some of the capillary vessels. The

third reason is that the irritation of the nerve endings of the damaged tissues and the pain resulting therefrom cause this intense collapse. So we find in all three factors the recurring fundamental—very intense collapse. Death, we can say, is due to collapse, and collapse only. There is no other cause of death occurring immediately after burns and scalds but that. Collapse takes place in from 6 to 36 hours, that is, within the first two days from the time of the burn, and it accounts for quite 80 per cent. of the deaths ; so that treatment of collapse is of the very first importance.

Death from Infection

The other 20 per cent. of deaths occur some time afterwards and are caused by the presence of infection in the burnt area. Unless the area is very carefully cleaned sepsis supervenes three to ten days after the burn has been inflicted. But the first treatment must be to remedy collapse.

Now it is obvious that the larger the burnt area the greater the likelihood that your patient will die from collapse, and the graver the outlook. Roughly speaking, any burn which involves more than one-third of the body surface is very serious, and practically always fatal unless properly treated.

The ideal treatment is to administer some substance which will stop those three causes of collapse—the absorption of poisons from damaged cells, the escape of serous fluids, and the pain from the nerve ends. There is one thing that can do all these things, and that is tannic acid, for tannic acid coagulates damaged protein tissues. Thus, first it solidifies and therefore immobilises the poisons and prevents their absorption ; secondly it induces clotting in the capillaries whence fluid might escape, and thirdly it seals up and soothes the nerve endings. It is, therefore, the best substance for the treatment of burns. Many other methods have been used. Some years ago a fashion rose for using picric acid. This certainly coagulates the proteins, and more quickly than tannic acid, but it only affects the surface tissues, and the deeper tissues are left untouched, so that the absorption of poisons and the escape of fluids go on underneath.

The Use of Tannic Acid

There is one important point in relation to the use of tannic acid. Do not prepare a strong solution. If you do the surface of the burnt area will coagulate too quickly, and, like picric acid, it will not have had time to penetrate the deeper tissues. You would certainly achieve a beautifully polished coagulum, but death would follow, and it is far better to see a coagulum with less glaze about it and know the patient is alive beneath it and not dead ! Never use a stronger solution than three to five per cent. I know some of the medical schools are advocating 20 per cent., but I believe many more patients can be saved by using a weaker solution. I only use a two per cent. strength.

Tannic acid is made from oak apples, and is therefore very easily obtained, as oak apples are growing on oak trees all over the world. It is made simply by grinding the oak apples. Put up in the form of a solution tannic acid soon starts to decompose, and a wonderful selection of moulds appears. To check this development of moulds various antiseptics are added. Now do not let the word 'antiseptic' mislead you. *You must on no account depend on the antiseptic property of tannic acid to help you in cleaning your burn.* The amount of antiseptic added to tannic acid is not enough to check sepsis in any burn, however small. It is added solely to prevent the tannic acid from growing moulds. Flavine is a very favourite antiseptic, but it has the disadvantage of staining the affected part bright yellow for six weeks or so, and is also painful to apply. I always use perchloride of mercury, which is quite painless. A solution of 1/2000 is required and the

only disadvantage about it is that it is included in the Poisons Schedule, and is therefore not so easy to obtain. But every other organic antiseptic when applied with tannic acid may cause pain.

First Aid Treatment

The treatment of burns resolves itself into first-aid treatment and final treatment. The first-aid treatment should be immediate, because the sooner you stop the pain the less collapse you will get. But, you may say, there are very few homes which keep tannic acid. Yes, but there are very few homes that do not keep tea. Tannin and tannic acid are practically the same. All you have to do is to make tea, and surely there is not a nurse in the world who cannot make tea! Do not, of course, use it hot. I once saw a terrible case of a scald that had been treated with scalding hot tea. Cool an ordinary infusion of tea, or use warm tea if it is available. Soak a piece of clean linen in the tea and apply it to the burn. If the patient is a child, and restless, tie the linen on. This treatment to relieve the pain of burns has been used in China for 5,000 years, and now we have discovered it!

Oils, flour, or butter should have no place in the first aid treatment of burns. They do indeed stop the pain, but that is all they can ever do, and sepsis is sure to follow if the patient survives the collapse.

After the application of the tannic acid, or tea, wrap the patient up to keep him warm and give him plenty of fluids to drink. Do not hurry him into an ambulance and rush him off to hospital. He will do much better if he is left lying quiet for half an hour before being transferred to a doctor or a hospital for treatment.

Final Treatment

Now the final treatment—the application of tannic acid. First the burnt area must be thoroughly cleansed. This must be done under anaesthesia. Burnt patients are liable to broncho-pneumonia, so you should avoid giving them inhalant anaesthetics. A heavy dose of opium or morphia should be used to produce the necessary effect. This, of course, can be given only by a medical man, and should be administered half an hour before the cleaning is attempted.

The Essential Cleaning

When the patient is well under the morphia the first-aid dressing is removed and the area of the burn and the skin round the burn are cleaned. It is the skin round the burn which is most likely to be septic as it has not been properly burnt, so it must be cleaned with especial care. On this cleaning depends the entire treatment of tannic acid, and I venture to say that *if your treatment fails it will be because the area has not been cleaned properly, and for no other reason whatsoever.* All dead skin must be removed. All blisters must be pricked and the raised skin cut away. For this cleaning a flannel or sponge is best. When the area is thoroughly clean—particularly round the edges—it should be sponged with ether. Then the tannic acid dressing is applied. Tannic acid can be used in two forms.

The Compress

The compress.—Into two per cent. tannic acid made up with weak perchloride of mercury dip a dressing of three layers of sterile lint or six layers of sterile gauze cut to extend three inches beyond the obvious edge of the burn. Take it out dripping and apply loosely and evenly over the burnt area. Then bandage the dressing firmly into position and leave it to dry. It is perfectly simple, and keeps the patient warm. If the burnt area is large a cradle is used, and extra heat must of course be applied to warm the patient; but do not let this be too strong. An electric lamp a little way off, or a hot

water bottle held at a little distance from the dressing will be sufficient to dry the compress slowly, and, incidentally, not concentrate the solution.

Avoiding Scars

The dressing should then be left untouched for two weeks. For the first twenty-four hours at least the burnt area must be fixed so that the coagulum of tannic acid can solidify. If the burn is in any of the flexures of the body the limb must be extended by splints, so that there will be no contraction and subsequent deformity from destroyed subcutaneous tissue or muscle. A burn all over the hand, for instance, would entail separating the fingers with rolls of bandage between the knuckles so that they will not become webbed at the base and leave the hand deformed.

At the end of two weeks cut the bandages and the coagulum will lift away from the burn. Any areas that may be inclined to stick should be left a day or two longer, when they too will come away neatly.

The Spray

The Spray.—This is an earlier method and is just as good as the compress method, the only proviso here being that it must be carried out in hospital. The burnt area is cleaned in the same way as for the compress dressing, and then by means of a throat atomiser the area is sprayed with two per cent. tannic acid. This process must be repeated each hour for 18 to 20 hours to obtain a satisfactory coagulum, and all that time the coagulum must be exposed to the air and the patient kept warm and covered so as to prevent collapse. The only way, obviously, is to fix up a cradle for a limb that has to be treated so often, and that is why the whole treatment is only possible in a hospital, where skilled nursing is available.

Although the compress method would therefore seem of much greater utility, there are some cases where the spray method is more desirable. For instance, it would be very tedious for a patient to have his face covered with a compress for two weeks. The neck, too, is better sprayed, but in spraying any part of the head always be careful to protect the eyes. Speaking of this exposed type of coagulum I should mention that children have been known to pick bits off and eat them, for, being dark brown and sweet to the taste, it is not unlike chocolate to them. As this habit results in sepsis it must be prevented by protruding splints along the forearms, or by otherwise securing the hands.

The Fall in the Mortality Rate

For your interest I will quote some of the mortality figures for burns at St. Thomas's Hospital. In the old days of grease, ointments and baths, it was 30 per cent. Under picric acid it fell to 14 per cent., and now under tannic acid treatment it has dropped to four per cent.

Up till now I have only discussed with you fire and water burns and scalds, but as you will know there are many very bad chemical burns. Tannic acid is equally good for chemical burns, but the chemical that has inflicted the burn must first be neutralised before the tannic acid is applied. An acid burn must be neutralised with an alkali—bicarbonate of soda, for instance. An alkaline burn should be neutralised with two per cent. citric acid; this is the best, as it penetrates the tissues, while most of the other acids only act on the surface.

Electricity Burns

Electricity burns are very difficult indeed to treat. They are often fatal and so the need for treatment does not even arise. Only a very small burn shows—a sort of stab in the flesh where the current has entered. The patient should be moved away from the current at once—even before

it is switched off, but of course the rescuer must take the greatest care not to become electrocuted himself. The patient must be treated for collapse, and the small burn with tannic acid, but very little else can be done. Pain will be intense through all the nerves. A certain amount of relief can be achieved from veronal tablets, but morphia must on no account be given.

Mustard Gas Burns

In the case of burns from mustard gas the nurse must protect herself by using rubber gloves, and, of course, by wearing an overall and respirator. The first thing to do is to neutralise the gas with two per cent. bicarbonate of soda. Then wash the area with plenty of water, and put on a tannic acid compress. In the Italo-Abyssinian war tannic acid treatment was proved to be the best, provided always the mustard gas had been neutralised first.

For lime burns in the eyes, irrigate the eyes first with a neutral fluid such as weak acetic acid, and then instil sterile castor oil.

Sunburn

Lastly I will just mention sunburn, which, after all, is a burn and often requires specific treatment. The popular idea for getting sunburnt is to put on grease and lie out in the sunshine. Of course as a result the patient is very nicely fried, and suffers all the pain of a fire burn. Here is a prescription I have found very beneficial when camping :—

Calamine	...	...	400 grains
Zinc oxide	...	...	400 „
Tannic acid	...	...	100 „
Glycerin	...	...	1 ounce
Water	...	...	1 pint.

This should be applied at hourly intervals until the irritation is relieved. Incidentally the lotion has itself a pleasantly tanning effect on the skin.

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THE HEALTH VISITORS' LEAGUE SECTION

The Honorary Secretary of the League, Miss M. E. Rawson, Lady Reading Health School, Bara Hindu Rao, Delhi, will gladly receive reports and articles for insertion in this section.

TOLL OF DISEASES IN INDIA—(concluded)

Dysentery and Diarrhoea. Of the total number of deaths, about 285,000, from dysentery and diarrhoea, 148,000 occurred among males and 137,000 among females.

Conditions of urban life seem to favour the spread of these diseases and amongst these mention may be made of defective conservancy arrangements, bad water supplies, and overcrowding of the city life. Except in Delhi Province, the urban death-rate was higher than the rural in every Province, the urban rate for the whole of British India being 2.1 and the rural 0.9. In the Punjab most of the municipalities which were content to entrust their conservancy arrangements to contractors, record a comparatively higher dysentery death-rate than those which carried out the work themselves.

Enteric fever. Deaths from enteric fever numbered about 86,000. The disease is said to be endemic in the urban areas, where it is ascribed to infected water supplies, contaminated food and flies. The generally unsatisfactory condition of water supplies, conservancy and drainage are all important factors in this connection.