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TREATMENT OF TRAUMATIC SHOCK.

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The index symptom of shock is the temperature of the patient. Those having much to do with this condition, come to place in it the greatest confidence as a means of determining the degree as well as to measure the effect of treatment upon the condition. With a temperature rising towards the normal, we are assured that our remedies are efficacious, while the reverse informs us that more active measures are indicated or that our efforts are to prove unavailing. But if the causative factors are not manifestly beyond our power to remove, it is a good rule never to abandon active treatment until recovery or death ensues.

The most characteristic symptom of shock—although, of course, unreliable alone as a diagnostic sign—is, therefore, the lowered temperature. This largely if not entirely results from radiation of heat by the surfaces of the body because, probably, of peripheral nerve inhibition and to feeble circulation resulting from the same inhibi-

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tory effect upon the heart. These then are the influences or conditions to which our attention must be largely devoted: to prevent further loss of heat and to stimulate the heart and heat forming and regulating processes.

Also where shock has largely resulted from loss of blood, the replacing of that fluid by artificial means is imperatively indicated. With these ends in view, we will discuss those measures which in our experience have best answered the requirement.

External application of heat easily takes precedence of all measures for treatment of shock. If the clothing be wet it should be hastily removed. If not, it may be removed from one part at a time, while to others warmth is continuously applied. The apartment in which the patient lies should be heated to 90° or even 100° if possible. He should be placed in proximity to fires if impracticable to remove him to more suitable surroundings. Blankets should be heated to a high degree in an oven or otherwise, and be wrapped about each part, while more blankets should be tucked in over all. Hot water bottles or cans should then be packed in all about, but scrupulous care must be taken that the patient be not burned by them. Burns from this cause are distressingly frequent even in the best conducted hospitals. The tissues during shock ap-

pear to be far less resistant to heat than in health, while the sensations are benumbed, hence very severe burns may result in an incredibly short time from even moderately heated bottles. An additional safeguard is to wrap each bottle in a separate piece of blanket and never to permit them to come into immediate contact with the skin. A hot bath, if attainable, is a most efficient means of combatting shock. This may be made of 90°, the patient put in, and then more hot water added until a temperature of 100° to 110° is reached. For measuring this a thermometer should be employed. If a water-bed is available, it may be filled with water of 120°, a light blanket thrown over, and the patient placed upon it. To prevent shock during operations, steam and hot water operating tables have been devised.

Rectal injections of water of 110° are exceedingly useful. Large amounts of caloric may thus be thrown into contact with the great viscera and abdominal nerve plexes, if the injection is slowly given, and particularly if the rectal tube (inserted beyond the sigmoid flexure of the rectum) is employed.

Very hot drinks are also useful in amounts not exceeding two ounces, frequently repeated if the patient can swallow, but are neither so efficient in relieving shock and thirst nor in supplying a circulating medium

in cases of hemorrhage, as are the enemata.

A method of applying hot air to a shocked person which can readily be adapted, and is exceedingly efficient, is to raise the bed clothes by a few half barrel hoops. Then procure a couple of pieces of stove pipe with a right angle joint. Insert the horizontal end of the pipe under the bed clothes at the foot of the bed well above the patient's feet (which otherwise might be burned) and under the vertical end place an alcohol or other lamp. The heated air from the lamp will ascend through the pipe and surround the patient to his neck with a heated atmosphere. A more elegantly constructed appliance of this description has done valiant service in the Polyclinic Hospital.

While heat is being applied frictions may also be resorted to with good effect. For this a hand is inserted under the snugly tucked in blankets, and one extremity after another is rubbed and kneaded towards the heart. Several persons may be thus employed upon different parts; caution being urged that no cold air meanwhile be admitted under the covers. To make these manipulations more efficient in stimulating the cutaneous circulation, a little table salt, mustard or turpentine may be rubbed in.

Large mustard plasters or turpentine stupes placed over chest and abdomen like-

wise greatly aid in restoring the shocked subject.

Where hemorrhage has been marked, transfusion of hot saline solution (common salt $\frac{1}{10}$ per cent. in distilled water, boiled and cooled to 105°) is imperatively called for. It may be slowly thrown into a vein to the amount of 1 to 3 pints, according to the quantity of blood lost, by a syringe or from an ordinary sterilized douche-bag and canula. The internal saphena vein as it crosses the internal malleolus is a favorite point for its introduction. This vessel is difficult to locate in a collapsed subject, but may generally be made to stand out sufficiently to be identified by the application of a band or tourniquet loosely to the lower thigh or by depression of the member over the side of the bed. The pulse or heart action must be the guide for the amount to be injected. Prompt response by that organ is the rule, but if no cardiac response takes place, not more than three pints should be employed at one time; the canula may be left in place and more solution be used at a later period if required.

The heart may also be stimulated, and the circulation of the nerve centres and great viscera be improved by elevation of the lower extremities. We have known success to follow almost complete inversion by tying the feet to the end of the bed and

then raising the footboard to an almost vertical position. Bandaging all of the extremities has a similar effect. Artificial respiration also is occasionally efficient in prolonging the vital spark until the equilibrium of the nervous and vascular systems is reestablished. Electrical stimulation of the heart may be tried.

Operations, transportation, or other manipulations calculated to renew or prolong shock should never, except under the most exceptional circumstances, be undertaken until reaction is fully established and the temperature has reached normal, or better, gone considerably beyond. Violation of this rule is accountable for the terrible mortality of major operations for traumatism in the hands of those doing but occasional surgery.

Food should not be administered until reaction has well advanced (as shown by a temperature rising toward the normal) as digestion is suspended during shock, and prompt vomiting or decomposition would quickly result. It is questionable whether the benefits of irrigation of the stomach with hot water are not counterbalanced by the additional shock induced by the passage of the stomach tube unless much food is present and can be removed at the same time. When reaction is almost established (temperature 98° and over) hot beef tea and two

drachm doses of diffusible stimulant, as brandy or whisky, well diluted, are permissible and efficacious. But for some time after reaction, food must be of the most absorbent character, that it may be handled by the enfeebled digestive organs. Peptones, peptonized milk, beef tea, and strong coffee, always hot, then become available. These may also be administered by rectum, at intervals of not less than 4 hours and considerably diluted. For the latter purpose we have found the following formula satisfactory: liquid beef and bread peptonates $\frac{1}{2}$ ounce, peptonized milk 2 ounces, hot water $3\frac{1}{2}$ ounces. To this 2 drachms of stimulant (brandy or whisky) may be added in addition to the sherry found in most of the liquid peptone preparations on the market, if the rectum proves retentive.

Of the drugs which we have come to rely upon in treating shock may be mentioned atropia, strychnia, ammonia, digitalis, morphia, oxygen, ether.

If pain is present, a sixth of a grain of morphia with $\frac{1}{160}$ gr. atropia hypodermatically, is efficient—the atropia is always called for; with a smaller dose of morphia in cases where pain is not a feature.

Strychnia may be given in $\frac{1}{80}$ gr. dose by hypodermic in conjunction with the above and is certainly a powerful stimulant.

Digitalis we have used in 10 m. subcuta-

neous doses more as the effect of the previously administered drugs begins to pass away, in order to maintain the effect upon the circulation for a prolonged period.

Pure ammonia is very useful as an inhalant. A few drops upon a little absorbent cotton being held to the nostrils for an inspiration or two several times a minute, until other remedies begin to take effect. Oxygen, if at hand, is one of the most powerful yet safe remedies that we possess; through a mask or tube the patient is permitted to inhale the pure gas for a half dozen or more respirations in each minute.

For very quick but transitory effect, a hypodermicful of ether or brandy or even aromatic spirits of ammonia is very satisfactory, unless the patient has been under ether anesthesia. In this case I never resort to the two former agents, believing that overstimulation by ether can only be made worse by exhibiting drugs having approximately similar effects.

It is important in treating shock that too many drugs or too much of individual remedies be not employed. Poisoning must frequently take away a last chance from the patient, where repeated doses of powerful medicines are indiscriminately given in the excitement incident to a desperate case. Remedies even here must be used with discretion and doses be graduated by effects.