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# THE SURGERY OF TRAUMA

Less attention has been paid in research, teaching, and practice to traumatic casualties than to other branches of surgery, and in the past there has been a tendency in hospitals to leave the responsibility for the injured patient, even in serious cases, to junior members of the staff. Much new light, however, was thrown on the subject by the experience gained in the treatment of casualties in the campaigns of World War II and the Korean War, and this branch of surgery is coming to assume greater importance in our civilian hospitals. In the UK, a year ago, the British Orthopaedic Association submitted recommendations for improving the hospital accident service, and in March 1960 an authoritative committee was set up to examine this part of the National Health Service.[1] In his recent article in this *Journal* Schrire[2] has written on the organization of the casualty department of a teaching hospital. He emphasized that the department should be so organized that accident cases are dealt with on arrival by a competent surgeon or team, and that the resources of all departments of the hospital should be fully available for consultation or treatment so far as may be necessary in any particular case.

A symposium[3] sponsored by the Council on Drugs of the American Medical Association has recently been published on the surgery of acute trauma. It comprises a number of articles by contributors on various phases of this subject, and, while these cannot be adequately summarized in one short article, some of the points made in the symposium are here referred to.

It is well recognized that in general the sooner the injured person is removed to a hospital the better, especially in serious cases. Nevertheless, some measure of delay is often warranted in order to protect the patient against the further injury he might suffer in transportation.[4] If possible, any necessary attention should first be given to ensure an open airway and to arrest haemorrhage, and then other injuries may receive attention; fractures should be carefully splinted. If the blood pressure has fallen to a dangerous extent, suitable infusion may be given during transportation.[4] These attentions go beyond the ordinary meaning of 'first aid', and it is obviously desirable that in serious cases a doctor should supervise the attention to the patient at the scene of the accident. The positioning of the patient during transportation may be of great importance, especially if he is unconscious or if, for example, there are signs of injury to the spine.[4] Discretion should be exercised in the giving of morphine or other narcotics (see below).[4,11]

For the patient admitted in shock, resuscitation is the first measure called for. The blood pressure begins to fall when the acute loss of blood reaches about 20% (1,000 c.c.) of the blood volume, and by the time 40% (2,000 c.c.) has been lost the blood pressure becomes imperceptible.[5] The initial routine reported by Schrire[2] is to set up an intravenous saline drip and, after drawing off a sample of blood for cross-matching, to give two 250 c.c. bottles of type-O Rh-negative blood as quickly as possible, by which time plenty of cross-matched blood should be available. 'No patient injured or exsanguinated or in shock should leave the (casualty) department unless his blood pressure is 100 mm.Hg systolic *and rising*'.[2] Howard[5] discusses the value of plasma, dextran and saline as volume expanders, but emphasizes that after haemorrhage blood is preferable for replacement. It is noteworthy, however, that in the initial treatment of burns (in which the fluid loss is in the form of plasma) Wilson and Stirman[6] conclude, after statistical analysis of their results, that saline given by mouth and vein is successful and safe, and that the use of whole blood in the first forty-eight hours after a burn is usually unnecessary and often harmful.

Infection is a major problem in the management of injuries. Prophylactic antibacterial treatment (apart from tetanus) is considered to have had only a limited influence on the incidence of infection, though antimicrobial treatment has been of great value in the control of established wound infection.[8] The most important factor in combating wound infection is sound surgery. In the treatment of various injuries, such as gunshot wounds and open fractures, emphasis is laid on the importance of removing all devitalized tissue (débridement).[7-10] Failure in this respect leads to wound infection, including tetanus. In the management of fractures, the accurate reduction of the fracture minimizes deadspace and this predisposes to healing without infection. In the Korean War it was found that in repair work to major blood vessels it was of primary importance to excise all the injured portions of the vessels, including portions which looked normal but in which injury could be discovered on histological examination.[7]

Beecher[11] contributes to the symposium[3] an interesting article on the control of suffering in severe trauma and on the use of morphine. There are two components to such suffering, viz. (1) pain that is caused by the stimulation of the pain nerve-endings, and (2) a 'reaction component' which is determined by the 'significance' of the wound. Thus, of soldiers severely wounded in battle, mentally clear and not in shock, 'only 25% stated, in response to a direct question, that they had enough pain to want anything done about it'. Yet in civilians with far smaller postoperative wounds the figure was 80%. For the soldiers the wound marked the sudden end of the war and a ticket to safety and perhaps to home. Sedatives like barbiturates may relieve the 'reaction component' in the suffering of an injured patient. Even placebos are known to relieve the suffering in a proportion of cases, especially in those where the stress element is great.[11] Artz[4] writes: 'Emotional stress as well as physical discomfort must be alleviated as much as possible'.

Great care should be exercised in the use of morphine and other analgesics. In the presence of a severe injury a large dose of morphine may be unnecessary or even dangerous. Three reasons are given for this:[11] (1) An exsanguinated patient is extremely sensitive to the depres-

sant effect of morphine. (2) If a pneumothorax is present a small dose of morphine may be fatal. (3) In shock, the peripheral circulation may be almost inactive and morphine deposited by subcutaneous or intramuscular injection may be absorbed so slowly that no effect is produced. A second or even a third dose may then be given, and after resuscitation these deposits of morphine will be absorbed together, which may lead to morphine poisoning or even death. Beecher[11] recommends that if a patient in shock needs morphine an intravenous injection should be given of one-third of the usual dose.

In the management of patients with multiple injuries Artz,[4] like Schrire,[2] urges that a general surgeon should be in charge, calling in consultants representing various specialities as required. Multiple-injury cases should not, for instance, be put in the exclusive charge of an orthopaedic department because fractures are present, or of a neurological department because the patient is unconscious. The injuries which present the greatest danger to life should be dealt with first. 'The restoration of cardiorespiratory physiology must come first, and then treatment of injury to the hollow viscera such as intestines, bladder, and occasionally lung and heart. Treatment of injuries of the liver, spleen or diaphragm may accompany these procedures .... Open injuries of the muscle and bone receive next priority. Usually closed fractures, head injuries, and laceration of soft parts, can wait ...'.[4]

1. News item (1960): Lancet, **1**, 590.
2. Schrire, T. (1960): S. Afr. Med. J., **34**, 825.
3. Council on Drugs, American Medical Association (1960): J. Amer. Med. Assoc., **173**, 509-541.
4. Artz, C. P. (1960): *Ibid.*, **173**, 522.
5. Howard, J. M. (1960): *Ibid.*, **173**, 516.
6. Wilson, B. J. and Stirman, J. A. (1960): *Ibid.*, **173**, 509.
7. Seeley, S. F. (1960): *Ibid.*, **173**, 518.
8. Altemeier, W. A. and Wilson, J. H. (1960): *Ibid.*, **173**, 527.
9. Stafford, E. S. (1960): *Ibid.*, **173**, 539.
10. Hampton, O. P. jr. (1960): *Ibid.*, **173**, 536.
11. Beecher, H. K. (1960): *Ibid.*, **173**, 534.

## KUATZU ... DOELTREFFENDE MANUELE KUNSMATIGE BLOEDSOMLOOP?

Die Japanse opwekkingsmetode, wel bekend onder joejitsoe-deskundiges as ‚kuatzu', blyk volgens onlangse werk[1] die ernstige aandag van ons beroep te verdien. Kuatzu verlang dat die pasiënt op die maag lê soos vir Schafer se metode van kunsmatige asemhaling, maar die arms word sywaarts uitgesprei. Die opwekker stoot nou een of liefs albei polsgewrigte teen die sewende servikale werwel, en wel met al die krag tot sy beskikking, reëlmatig nes 'n skrynwerker met sy hamer; maar, in teenstelling met bloot kunsmatige asemhaling behoort die spoed minstens 70 per minuut te wees.[2]

In die berig waarna ons verwys,[1] word wel 'n tegniek van flink stote aan die hand gegee wat miskien beter bestempel kan word as ‚stampe' teen die sternum met die pasiënt *op sy rug*; en, al is daar geen melding van joejitsoe nie, dui die ondersoeke terdeë, op 'n wetenskaplik gestaafde wyse, daarop dat beoefening van hierdie beginsel 'n toereikende bloedsomloop kan bewerkstellig sowel as handhaaf. Volgens hierdie werk vanuit die alombekende Johns Hopkins-hospitaal slaag die metode sonder uitsondering, in teenstelling met die enkele vuishou teen die prekordium, 'n prik in die miokard met 'n naald of 'n flink opblaas van die longe ... wispelturige metodes gekenmerk deur so 'n mate van mislukking dat die meeste mense vandag hul gebruik afkeur. Kouwenhoven en sy kollegas[1] berig dat met hul metode daar oorgenoeg tyd was om elektrokardiografiese ondersoeke in te stel, en, in die gevalle van ventrikulêre fibrillasie, om elektriese defibrillasie suksesvol toe te pas al was daar meer as 'n halfuur versuim met die soektog na 'n defibrillator.

So 'n doeltreffende manuele kunsmatige metode om die bloedsomloop aan te wakker, is duidelik van die grootste belang. Juis daarom behoort hierdie werk sonder versuim bevestig te word, veral die bewering dat defibrillasie elke keer slaag sonder toevlug tot torakotomie, iets waartoe daar tog te dikwels die nodige moed en veral geriewe ontbreek.

1. Kouwenhoven, W. B., Jude, J. R. en Knickerbocker, G. G. (1960): J. Amer. Med. Assoc., **173**, 1064.
2. Flagg, P. J. (1928): *The Art of Anaesthesia*, 4e uitg., p. 119. Philadelphia: J. B. Lippincott.

## KUATZU ... EFFICIENT MANUAL ARTIFICIAL CIRCULATION?

Kuatzu, or the Japanese method of restoring life, is a definite method of resuscitation used by jiu-jitsu experts. The patient is placed in the prone position with arms extended sideways; the operator descends forcibly with one or both wrists in the region of the seventh cervical vertebra with the regularity of a carpenter wielding a hammer.[1] Although very old, this indirect method of cardiac massage has only now been shown to possess indeed the merit so long denied it generally by the medical profession.[2]

Three members of the Johns Hopkins University School of Medicine[1] have just published a method of 'closed chest cardiac massage'. In contrast to the innumerable existing indirect methods, such as sharp blows to the precordium and forceful pulmonary inflation, which all act fortuitously and are thoroughly unreliable, this new method was shown to provide an adequate artificial circulation allowing time for an electric defibrillator and, of necessity, an electrocardiographic apparatus to be obtained for defibrillation with the chest still unopened, if the circulatory arrest proves to be the result of ventricular fibrillation. As may be expected, these workers apply vigorous pressure intermittently above the xiphisternum with the patient in the supine position, and they make no mention of jiu-jitsu.

The importance of this demonstration of efficient manual artificial circulation without thoracotomy is obvious; it certainly needs to be confirmed, particularly the claim of consistently successful defibrillation without opening the chest. This work should be consulted by all surgeons and anaesthetists because of its promise of circumventing the most trying of therapeutic measures — direct cardiac massage.

1. Kouwenhoven, W. B., Jude, J. R. and Knickerbocker, G. G. (1960): J. Amer. Med. Assoc., **173**, 1064.
2. Flagg, P. J. (1928): *The Art of Anaesthesia*, 4th ed., p. 119. Philadelphia: J. B. Lippincott.