years these have been used more frequently in war surgery as their advantages have been observed. . . . Induction of anaesthesia is achieved with a minimum of psychic trauma. . . . There is an absence of struggling, with its attendant strain on the respiratory and circulatory systems, and endocrine function is but little disturbed. Nitrous oxide and oxygen often prove sufficient to complete the balance of anaesthesia, and this is indeed an advantage since research and clinical experience have shown this combination to be the least harmful of anaesthetic agents. This, however, is only true if nitrous oxide is given with enough oxygen to supply the metabolic needs of the body, which is easily possible in conjunction with basal narcosis. . . . Another advantage is postoperative quiet. . . . Use of basal narcotics in war surgery [may be classified into] three groups . . .: (1) Casualties requiring immediate operation; (2) Casualties operated upon after an interval of time; and (3) Patients who are not casualties but who require operations under similar conditions to civilian surgical practice. . . .

"Basal narcotics are numerous and may be divided into three groups: (1) Avertin; (2) Paraldehyde; (3) The barbituric derivatives. . . . The basal narcotics may be administered in one of three ways: (1) By the mouth; (2) By the rectum; (3) Intravenously. The route by which each drug may be given has a considerable influence upon its choice. With such a wealth of narcotics available, each with special merits, it is a mistake to use any particular agent as a routine. Each case should be considered individually and the most suitable choice made. . . . The effects of shock are increased in deep basal narcosis, and recovery may be retarded. This is often due to depression of the respiratory centre, and if pulmonary ventilation is inadequate, sequelae such as massive collapse or hypostatic congestion may occur. Careful nursing is required so that any symptoms of respiratory failure may be dealt with promptly. If cyanosis should occur in the presence of a free airway, a mixture of carbon-dioxide 7 per cent and oxygen 93 per cent should be administered. The antidotes to avertin are ephedrine and colonic irrigation with hypertonic sodium thiosulphate solution. Pierotoxin may be used in the case of paraldehyde or the barbiturates, but the analeptic solutions of camphor, known as nikethamide, coramine, nikamide, anacetadone and corvotone, are more generally used. The nikethamide solution should be given in large doses (coramine 5–10 c.c.) intravenously. Repeated lumbar puncture may also be resorted to in the case of barbituric derivatives." 7 references.

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"The problem of anaesthesia for air-raid casualties differs in a number of important ways from that of battle casualties. . . . Air-raid casualties . . . [include] men and women, very old and very young, anaemic, bronchitic, arteriosclerotic, under-nourished; often cold and very frightened. Their injuries are often multiple, with a high proportion of compound fractures of the limbs and of face or head wounds. In general, however, there is a shorter time interval before they are brought up, and it is found that only one in ten needs any form of resuscitative treatment other than warmth and rest. It is necessary to form an estimate of the patient's condition before deciding on operation and on the type of anaesthesia to be employed. His general appearance is apt to be deceptive; he will usually be covered in dust; he may be pale and sweating from fright,
and cold from exposure. The pulse rate alone is unreliable; but a steadily rising pulse may indicate the development of shock. Blood pressure readings are valuable, especially when taken over a period. A systolic blood pressure of 85 mm. Hg or less indicates the need for restorative treatment before operation. An attempt should be made to judge the amount of blood loss from examination of the clothing and bandages, and by a haemoglobin estimation. Where the patient seems more gravely ill than would be accounted for by the blood loss, a haematocrit reading (the proportion of red cells to plasma after centrifuging citrated whole blood) may show haemconcentration, which is a characteristic finding in fully developed shock. . . .

"Most patients will benefit from a short period of rest with warmth applied from a radiant heat cradle or from hot water bottles. Excessive heat will lead to fluid loss from sweating. They may be encouraged to drink lemonade or tea to within an hour of operation. Where intravenous fluids are judged necessary, saline may suffice, but should not be continued if there has been a poor response to the first pint, or the tissues may become waterlogged. Plasma or serum will replace the lost volume and with it the lost proteins. The first pint should be run in rapidly, one or more hours being taken for the second. . . . Blood should be given to the amount judged to have been lost; it is obviously undesirable where there is haemconcentration. As much as thirteen pints have been given in twenty-four hours, with good effect. Additional oxygen may be valuable. . . . Injections of cortin—extract of adrenal cortex—are said to be effective. . . . Morphine should be given only for pain. It adds to the general depression and tends to aggravate shock. . . . The patient may be regarded as fit for operation if a rising blood pressure has reached 90 mm. Hg or over, and, subject to this, operation should be undertaken as soon as possible. . . . Atropine or scopolamine are advisable. If correct timing is not possible, half the selected dose may be given intravenously in the theatre. Morphine should not be given to the patients who are suffering from shock, but is of great assistance in the remainder. . . . The choice of anaesthetic will depend on available apparatus and upon the experience of the anaesthetist. . . . An air-raid casualty in good condition presents no problems different from those met with in ordinary practice. It must, however, be remembered that a severely injured man with a normal blood pressure may have drawn on all his usual reserves of compensation, and may collapse under a strain from anaesthesia or from the operation, which he would normally have tolerated. Any patient who has recovered from shock must be treated as cautiously as though he were still suffering from it. . . .

"Chloroform and ether both aggravate experimental histamine shock. . . . Anaesthesia with nitrous oxide and oxygen in the C.C.S. in the last war showed a greatly reduced mortality compared with ether. . . . It should . . . be remembered that a grade degree of anoxia may exist in an anaemic patient without any obvious cyanosis. Ideally, cyclopropane would be one's first choice. . . . There is, as yet, no report of the use of trichlorethylene in air-raid casualties, and it should, therefore, be restricted to experienced anaesthetists. . . . Good results have been obtained with pentothal, though there have been deaths from carelessness. . . . The dose should be minimal, and the anaesthesia need be only just deep enough to enable the operation to be carried out satisfactorily. Oxygen should be given throughout. Local analgesia alone or combined with a light general anaesthesia produces excellent results. . . . The wide-
spread vasoelastic paralysis produced by spinal analgesia leads to the complete breakdown of such compensatory mechanisms as are still functioning. It is safest to regard it as absolutely contraindicated in shock. The best compromise, from the point of view of the occasional anaesthetist, is provided by nitrous oxide and oxygen, supplemented, if necessary, with small amounts of ether.

"Facial injuries often present an alarming problem for the inexperienced. It is frequently impossible to apply an anaesthetic mask; in such a case the wounds may be sutured under pentothal, if the surgeon or his assistant will undertake to keep the airway clear, and treatment of any other injuries completed under inhalation anaesthesia. If the jaw is fractured an endotracheal tube is essential, and it may be wisest for the surgeon to use local anaesthesia for urgent cases, others being transferred to a maxillofacial unit. Chest injuries can usually be dealt with quite satisfactorily under nitrous oxide with ample oxygen, supplemented by small amounts of ether.

Abdominal cases should receive a light general anaesthesia, any muscular relaxation being obtained by the use of ½ per cent procaine, which is often best injected by the surgeon as he proceeds. Pentothal is unsuitable, except for induction. Amputations are often accompanied by severe operative shock which may largely be eliminated by the liberal use of procaine, especially into the larger nerve trunks. General anaesthesia should be as light as possible. Burns are successfully treated under analgesia from large doses of morphine. . . . Pentothal is very satisfactory for burns of the face. Patients suffering from the effects of poison gas have impaired exchange across their alveolar epithelium, and must be given a high proportion of oxygen (up to 80 per cent). Where cyclopropane is not available it may be necessary to use chloroform with oxygen; ether is contraindicated. Pentothal, with continuous administration of oxygen, would probably be satisfactory.

"A close watch must be kept for early signs of collapse during the operation; repeated blood pressure and pulse records are essential in any patient suffering from shock or undergoing a major operation. When the blood pressure falls to the danger level—85–90 mm. Hg.—intravenous serum or blood must be started (if not already being given, when the rate of flow may be increased). It is the duty of the anaesthetist to warn the surgeon if the response is not satisfactory, when a part of the operation may be postponed. Anaesthesia must be lightened as far as possible and the oxygen raised to 30 per cent or higher. If respiratory depression is marked, artificial respiration should be carried out, and coramine 1–2 c.cm. or alphalobeline gr. 1/10 may be injected intravenously."

14 references.

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"Shock—before, during and following operation—has always been and still is a major problem. That element of what one could call the total shock factor in a patient, due solely to anaesthesia and to the trauma incident to operation, will obviously be magnified in proportion to the degree of shock present prior to operation. . . . Today’s knowledge may be a paltry thing tomorrow; but limited though it may be, there can be no doubt that we are saving lives today that would have been lost twenty-five years ago. This has a direct bearing on anaesthesia, because it follows that for the unshocked, and to a less degree for those.