ANAESTHESIA IN GENERAL PRACTICE

This is one of a series of articles, contributed by invitation

POST-OPERATIVE TREATMENT

BY

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A variety of conditions needing treatment arise after an operation. Some of these result more or less normally from the disturbance produced by the operation and the anaesthetic, while others are due to error in technique or to idiosyncrasy on the part of the patient. An important factor that is often overlooked is the necessity for gentle handling of an anaesthetized patient while he is being returned to bed. A profound change may follow the sudden alteration in position of a shocked patient, as may be demonstrated if after an operation in the Trendelenburg position the table is suddenly restored to the horizontal. Sufficient assistance should therefore be available for all necessary movements to be carried out as gently as possible.

Pulmonary Complications

When in bed the patient's head and shoulders should be raised on pillows, if there is no contraindication to this, as soon as he is sufficiently conscious. He should be encouraged to move himself as much as possible and to expand his lungs fully at frequent intervals. If unconsciousness is prolonged this latter manoeuvre can be brought about by the administration at half-hourly intervals of carbon dioxide in quantities just sufficient visibly to stimulate respiration without it being at all laboured. These measures will do much to combat the incidence of pulmonary complications. Should any such complications supervene—bronchitis, bronchopneumonia, pulmonary collapse—then suitable treatment must be given. In cases of pulmonary collapse from blocking of a bronchiole carbon dioxide inhalation is probably harmful, as it causes the plug to be sucked further in. A stimulant mixture should be used in the hope that the plug may be dislodged by coughing. Bronchoscopic suction may be successful in some cases. In bronchitis and bronchopneumonia expectoration is often interfered with by pain in the wound. Here small doses of morphine repeated four-hourly may, paradoxically, render the coughing easier by making it less painful. The administration of iodides and stramonium will help to loosen the secretion. Ammonium carbonate, 4 grains in milk, is of value, but as it is a powerful stimulant of secretion it should not be given when this is profuse, as in acute ether bronchitis. Hot inhalations may prove soothing and beneficial, especially when there is a tenacious plug of mucus in the trachea that moves up and down with respiration. If there is any dyspnoea or cyanosis oxygen should be given through a nasal catheter or, better still, the patient should be placed in an oxygen tent.

These conditions, however, are best avoided by prophylaxis, which should take into account the three groups into which the causative factors fall. First, the patient's resistance should be at the maximum and sources of focal sepsis removed. Secondly, the position of the patient during the operation should interfere as little as possible with respiration, the operation should be conducted gently and speedily, body temperature should be maintained, and tight bandaging around the chest be avoided. Thirdly, the anaesthetic, including pre- and post-operative sedatives,

should be carefully selected and controlled, and all risk of gross aspiration of blood and vomit prevented during and after the operation.

Pain

Post-operative pain varies widely, not only with different operations but with the same operation in different patients, and it is therefore impossible to lay down any routine treatment. Two principles must be kept in mind: first, the dosage must be adequate to provide relief; and, secondly, overdosage must be avoided as leading to respiratory depression and hindering recovery from shock. Occasionally these two principles will prove incompatible, but in such cases it should be suspected that the drug employed is not the most suitable, and trial should be made with other drugs or different preparations of the same drug. Sometimes lack of success with full doses of a potent narcotic will be followed by complete relief of pain with what is, generally speaking, a much milder drug. Alternatively, tincture of opium may prove more successful than injections of morphine.

It is a good plan to prolong the analgesic effect of the anaesthetic by giving rectally 30 to 60 grains of potassium bromide in saline as soon as the patient returns to bed. This is especially valuable where recovery would otherwise be very quick, and greatly reduces the amount of restlessness, which is often so troublesome. Aspirin, 15 to 25 grains, is frequently given with the bromide, but there is evidence that it is not absorbed through the rectal mucous membrane. It is better to withhold morphine until there are definite signs that it will be needed rather than to order its routine administration while the patient is still fairly deeply anaesthetized. But after a varying length of time the necessity for some more potent drug is evident. When these signs appear—restlessness and pain—morphine should be given promptly, so that it will have its effect before full consciousness is attained. The dose needed varies with the patient and the degree of pain, but usually 1/6 grain for adults is sufficient, and this dose may be repeated four-hourly. When this is necessary for any length of time the possibility of starting an addiction must be guarded against, and the morphine withheld unless there is very real need for it and some other drug substituted. Heroin is sometimes given instead of morphine, but its analgesic action does not appear to be superior, while the amount of respiratory depression is occasionally considerable. Its use is therefore better avoided except in difficult cases where morphine produces little relief. In such cases heroin may be more effective. In many operations the pain can frequently be relieved by less potent drugs. The pain after orthopaedic operations, for instance, often yields to aspirin 10 to 20 grains, phenacetin 2½ to 5 grains. This can, of course, only be used in cases where it is likely to be retained.

Local treatment should not be overlooked. For example, the application of heat or cold and the immobilization of a limb in a comfortable position may produce more relief than the administration of an analgesic drug.

Vomiting

When vomiting occurs it varies in amount from a little retching to copious and persistent vomiting lasting several days and possibly ending fatally. It may follow any

anaesthetic in susceptible patients—for example, those who have made up their minds that they are going to be sick and those especially liable to sea-sickness and other such forms. Some patients never vomit whatever anaesthetic is given. Apart from these extremes the incidence and amount of vomiting vary with different anaesthetics, being infrequent and slight with nitrous oxide, more frequent and greater in amount with chloroform, and most with ether. In some instances the preliminary injection of morphine may be responsible, and inquiry should be previously made as to any such susceptibility.

In its milder degrees the vomiting results from the nausea associated with the elimination of the anaesthetic. In the severer and the more persistent cases the toxic effects of the anaesthetic on the liver are responsible, though it is probable that these changes occur in a less degree in the milder cases as well. It must be remembered that causes other than the anaesthetic may be responsible—for example, manipulation of the abdominal viscera, the swallowing of blood after throat and similar operations, and occasionally the use of radium. The possibility of intestinal obstruction and uraemia must always be kept in mind. In most cases no treatment is required, as the condition clears up spontaneously in a short time. Treatment should be directed locally to the stomach, to hastening the elimination of the anaesthetic, and in severe cases to correcting the metabolic changes, both those producing the vomiting and those produced by it. A large drink of warm water with sodium bicarbonate should be the first thing tried, and is often all that is necessary. It acts by loosening and dissolving the ether-impregnated mucus and producing one copious vomit which clears out the stomach. When sodium bicarbonate is not retained long enough to act properly, a stomach tube should be passed and the stomach washed out with the solution. Tincture of iodine in 1-minim doses hourly should be tried, while half-normal saline is sometimes retained where all else fails. Less vomiting will follow a deep ether anaesthetic if as little ether as possible is left in the patient at the end of the operation. This can be achieved by the administration of carbon dioxide towards the end of the operation, as soon as the peritoneum is closed.

The metabolic changes associated with vomiting are in the direction of acidosis, and result from the toxic action of anaesthetics on a damaged liver, or sometimes on an apparently normal liver if the poisoning is sufficiently intense. Where the liver is known to be damaged, therefore, care should be taken to avoid the use of chloroform, to a less extent of ether, and of more than small doses of barbiturates, using spinal or local anaesthesia if it is thought that general anaesthesia without these drugs would be unsatisfactory. Even when the liver is apparently healthy it must be remembered that lipid-soluble anaesthetics, chloroform especially, can produce structural and functional changes when administered over long periods. This type of vomiting, known by its old name of delayed chloroform poisoning, may start after an interval of a day or two during which there has been little or no vomiting. These disturbances are less likely to arise in a liver well stocked with glycogen, and attention should be directed to this before the operation. Diabetic patients are much more sensitive to these influences, and, quite apart from the question of vomiting, their metabolic equilibrium may be upset by a relatively innocuous anaesthetic. They must be well controlled before operation, and a close watch be kept on them afterwards, by blood-sugar estimations if necessary, insulin and glucose being given as indicated. In addition, while acidosis induces vomiting, the vomiting if severe will increase the acidosis.

The indications are to make good the fluids and chlorides lost and to supply glucose, and if necessary insulin, for the control of the acidosis, although insulin has probably little influence on acidosis not pancreatic in origin, at any rate in part. The glucose is given as a 5 per cent. solution in normal saline per rectum.

Shock

This usually becomes evident while the patient is still in the theatre, and the main lines for its treatment are laid down there. Warmth must be supplied, preferably by an electric cradle, but overheating (indicated by sweating) avoided; and the foot of the bed should be raised on blocks to assist the cerebral circulation. Saline should be given freely, intravenously if urgently needed, followed by a continuous rectal drip. If the urgency is not so great a pint of saline should be run into the rectum and after an interval the continuous drip started. Absorption is slower by this method, but the results are more lasting, and there is less tendency to waterlogging of the tissues and oedema of the lungs. Careful watch must be kept for these. If a suitable donor is available in time a transfusion of 400 to 800 c.cm. of blood, followed by the rectal drip, is best.

Other Abdominal Complications

Abdominal distension is often troublesome, and is usually the result of the handling and exposure of the viscera. The anaesthetic may be partly responsible, for chloroform and ether diminish intestinal movement, while in spinal anaesthesia a reactionary period of quiescence may follow the wearing off of the anaesthetic. It is relieved in most cases by the passage of a flatus tube or a large rubber catheter through the internal sphincter, or, if this is unsuccessful, by a soap enema with half an ounce of turpentine to the pint. The aperient will make the patient feel much more comfortable. He should assist by changing his position frequently and contracting and massaging his abdominal muscles if this is not too painful. The distension may be a sign of peritonitis or intestinal obstruction, and diagnosis in these circumstances is difficult.

Acute dilatation of the stomach is a rare but very serious complication. Here the stomach is completely atonic, with frequent and copious vomiting and the patient in a very shocked state. Keeping the stomach empty by aspiration through a stomach tube, and treatment on the lines of toxic vomiting, should be tried, but the condition is usually fatal.

Hiccup may be troublesome, but it usually yields to the administration of carbon dioxide sufficient to produce deep respiration for several minutes. It may return, but it can be treated any number of times in this way. It is extremely wearing and, where all else fails, needs treating by morphine or by crushing of the phrenic nerve.

Retention of urine may follow any operation, but it happens most commonly after abdominal and pelvic operations, and is more likely after spinal than after general anaesthesia. The patient must be assured that there is no cause for alarm, as this aggravates the condition. The unaccustomed position in bed may be all that is wrong, and if the patient is allowed to sit on the edge of the bed micturition may result. A hot bath when possible or a hot enema is usually successful. If there is no result, 10 grains of hexamine in a cachet should be prescribed, and repeated in half an hour if necessary. Only if these remedies fail should catheterization be done, as if once started it may have to be repeated for several

days. It should not, however, be put off too long, as the bladder will then become overdistended. The extent of the bladder dullness should be watched, and if it extends more than a short distance above the symphysis a catheter should be passed. Ten grains of hexamine or half an ounce of glycerin left in the bladder will encourage subsequent micturition.

TYPHOID FEVER IN THE BASQUE REFUGEE CAMP

BY

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A unique event occurred in May of this year when large numbers of children arrived in England from the scene of the Spanish civil war. Their embarkation from the port of Bilbao and subsequent arrival by the s.s. *Habana* at Southampton have been described already in medical journals.

By May 24 over 4,000 children between the ages of 5 and 14 had arrived at North Stoneham Camp. They had lived for some months in Bilbao and surrounding villages, many of them in bomb-proof shelters and cellars, with contaminated water to drink and very little food. True to its reputation, the Bay of Biscay had been rough, and most of the children had been sea-sick. They were accompanied by 280 Spanish women teachers and fifteen Catholic priests, only four of whom could speak English. The main camp had been hurriedly organized for the reception of 2,000, and the English volunteers had only forty-eight hours' notice that 4,000 were on the way. Including the English staff it was estimated that 5,000 human beings were crowded into one large field. The care of such a large number of alimentary tracts under these conditions constituted an emergency public health problem of the highest importance.

On May 26, two days after arrival, two cases of unexplained pyrexia admitted to hospital in Southampton direct from the *Habana* were diagnosed as enteric fever. It was therefore necessary to take all precautions to prevent the spread of the disease.

Camp Organization

The medical personnel consisted of five resident doctors, a matron, six trained nurses, and about twenty V.A.D.s. The following units were organized, with telephonic communication, a medical officer being in charge of each:

1. *Headquarters marquee*.
2. *Casualty marquee*, to which was attached an Army hospital tent with twelve beds. This unit served as a camp out-patients' department.
3. *Isolation camp*, constructed a hundred yards away from the main camp, provided with a three-foot fence and patrolled. It was divided into two parts; one-half consisted of a second Army hospital marquee for observation cases, and the other half of bell tents for typhoid contacts. It was an independent unit, with its own cookhouse, latrines, and shower-baths.
4. *Moorhill*, an old country house situated four miles away, converted for use as a temporary hospital with fifty beds. Separate rooms were used to isolate suspected cases of infectious disease.

The main camp was divided into three sections. Reveille sounded at 6.30 a.m., with cheerful music from a broadcasting van. It was amusing to watch the little people folding blankets and preparing their tents with great pride and artistry for the morning medical inspection at 7 o'clock. Each child was seen by a doctor accompanied by an interpreter, and the sick were sent to the casualty tent, which acted as a medical sieve. Some were detained under observation, others sent to Moorhill, and

any case suspected of typhoid went direct to the isolation camp, where blood was collected for Widal reactions and specimen stools were obtained. Pathological material was immediately forwarded to the public health laboratories of Winchester and Southampton. Those with positive blood reactions and non-lactose-fermenting stools were admitted to the Southampton Isolation Hospital. In the early days there were hundreds of cases of febrile gastro-enteritis, due to overfeeding, and our pathological friends were kept exceedingly busy.

Sanitation

This proved to be a difficult problem. War conditions had affected the hygienic habits of the children, who deposited faeces and urine everywhere. The latrines were provided with narrow trenches, which were disinfected several times daily with chloride of lime. Hedges and ditches were treated in similar fashion and burnt out. Garbage was collected and burnt in incinerators. Some stagnant pools were drained and a stream which ran through the camp to Eastleigh was made to percolate through a chloride of lime contact-bed. The drainage system of the old manor house at Moorhill was investigated and improved. As a result of these precautions flies were exceedingly scarce.

On May 30 a boy of 12 from the main camp was diagnosed as a case of enteric, and on June 1 another case, that of a girl of 8, occurred at Moorhill. These probably were contacts from the *Habana*. Fortunately, the fear of enteric scared away thousands of curious visitors and many superfluous helpers. A police patrol closed the road to the camp and a strict pass control was organized. Lessons in camp hygiene were given to the Spanish teachers and priests. The children were fed in large marquees and forbidden to take food away. Pails of dettol solution were provided outside all food tents and kitchens. The children and camp personnel were trained to wash their hands before and after meals.

Another case of enteric occurred at Moorhill on June 4. Up to this date evacuations to various centres in England had proceeded normally, but 3,280 children were left. Naturally many medical officers of health and refugee committees hesitated to receive children from a typhoid-infected camp. Finally, Catholic organizations and convents, which had arranged to take 1,400, refused to accept them unless they were guaranteed free from the disease. As the children had by this time recovered from their under-nourishment and fatigue, more specific measures for the prevention of enteric were considered.

Inoculations

A leading article in the *British Medical Journal* of April 10, 1937 (p. 758), summarizes international opinion on the subject of the prophylactic value of typhoid inoculations, but no opinion could be obtained as to the value of vaccine treatment given in the presence of an epidemic. It is known that agglutinins appear in the blood within a week of a single subcutaneous injection of typhoid vaccine, but it is not known when an effective immunity develops. After careful thought it was decided to inoculate the whole camp with two injections of T.A.B. vaccine, at a week's interval. If any child was actually incubating the disease the attack would be precipitated. Widal reactions would not be reliable, but it was decided to diagnose from bacteriological examination of the stools.

The Lister Institute sent 2,500 c.cm. of vaccine and prepared further quantities for the second dose, 1 c.cm. of which contained 500 million *B. typhosus*, 250 million paratyphoid A, and 250 million paratyphoid B. Doses were graduated according to age, small children of 5 receiving a first dose of 0.2 c.cm., while those of 14 and adults received 0.5 c.cm. On June 6, 7, and 8 all the children, including typhoid contacts, and the camp staff were inoculated at the rate of over 1,000 a day. The children had intense faith in the procedure, and neglected cinema