ON
POSTURE IN ITS RELATION TO SURGICAL
OPERATIONS UNDER ANÆSTHETICS

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INTRODUCTION

THE posture of a patient prior to, during, and after a surgical operation under a general anæsthetic is a subject of considerable importance, not only to the surgeon and anæsthetist, but in many cases also to the patient himself. It is, moreover, a subject of some complexity, owing to the numerous circumstances which must be taken into consideration before any definite statement can be made as to this or that particular posture. Possibly this complexity may help to explain the absence from our literature of any systematic and exhaustive monograph on

posture. But be this as it may, the time appears to us to be opportune for opening up the subject and directing attention to certain conclusions at which, after carefully arranging the facts at our disposal, we have been able to arrive. A moment's reflection will show that the questions at issue are by no means so simple as we could desire. We have to consider the various postures which the body and head may be required to assume during surgical operations, and these are exceedingly numerous. We have to inquire what influences these postures are capable of producing upon the respiration and circulation, not only of subjects in a good or fair state of health, but in those with serious affections of the vascular, respiratory, or nervous system. And in dealing with postures during general anæsthesia we have to take into account the kind of anæsthetic employed, its method of administration, and the depth of anæsthesia at the time to which our remarks apply.

The importance of the subject to the surgeon is greater than might at first sight appear, for in deciding upon this or that posture for a surgical operation something more than mere operative convenience ought to be taken into account. It would, of course, be irrational to expect a surgeon to operate upon a patient placed in such a position that the operation would in consequence become a matter of serious difficulty. But if the adoption of a particular posture would prejudicially affect the patient, and if some other posture, although not quite so convenient to the surgeon, would be unattended by such objections, there can be no doubt that the surgeon should, in the interests of his patient, accept the compromise, and place the patient in the safer though perhaps less convenient position. But the subject of posture appeals to the surgeon through other channels; for the position chosen may very materially influence the condition of the parts upon which the operation is being performed. This may come about in one of three ways :—
(1) The posture may be such that, by favouring the

occurrence of jerky and exaggerated breathing, coughing, retching, or vomiting, it greatly interferes with that quietude which is essential to the surgeon ; (2) it may, by impeding or interfering with the respiration, lead to congestion, venous oozing, and inconvenient hæmorrhage ; or (3) it may, in response to the influence of gravity, advantageously or disadvantageously modify the blood-supply to the site of operation.

To the anæsthetist the subject is of equal if not of greater importance. With him the responsibility undoubtedly rests of maintaining or endeavouring to maintain a perfectly free air-way and unimpeded respiratory action from the commencement of his administration until the patient has acquired sufficient consciousness to be left unwatched. If the posture be one in which the trunk weight tells unfavourably upon free lung expansion, or one in which blood, vomited matter, pus, or other adventitious substances tend to gravitate into the laryngeal aperture, serious difficulties and accidents will be liable to arise. In addition to these considerations, recent physiological and clinical observations have shown that in the more or less vertical posture of the body, and especially under certain anæsthetics and in certain degrees of anæsthesia, the effects of gravity upon the circulation may be such as to cause threatening or fatal symptoms.

Lastly, the posture immediately before and after an anæsthetic is given is to the patient himself a matter of importance, not only because some postures are extremely uncomfortable when inhaling anæsthetics, and are really quite unnecessary, but because recovery from the effects of these agents takes place more readily and quickly in some postures than in others. Unpleasant after effects, also, may to some extent be avoided if the posture during the administration has been one in which mucus and saliva have drained away from the fauces, and have therefore not entered the stomach to be subsequently ejected.

It is hardly necessary to draw attention to the fact that a careful consideration of posture is particularly necessary in very obese subjects, in those whose respiration is from any cause embarrassed before or likely to become embarrassed during anæsthesia, and also in patients whose circulation, from functional or organic heart affections, emotional disturbances, loss of blood, shock, or any allied condition, is liable to be quickly influenced by gravity when the body is moved.

Speaking generally, it is far better for the patient to be rendered insensible on the table, bed, couch, or chair which has been provided for the operation than for him to be anæsthetised elsewhere and subsequently moved. The administration is easier, and insensibility is therefore more speedily and successfully produced; anæsthesia is less likely to be disturbed by the vomiting or retching which may be originated by moving a partly anæsthetised patient from one place to another; should struggling or undesirable symptoms arise during administration of the anæsthetic, they can be more easily encountered and managed if the patient be in a convenient position than if, for example, he be lying in the middle of a four-post bed; and, lastly, the patient is not anæsthetised for a needless length of time.

The preceding remarks are merely introductory, and we now propose to consider in detail various attitudes and positions adopted in surgical procedures, pointing out, as far as practicable, the various advantages, disadvantages, or actual dangers attending each. Though many classifications of so large a subject are possible, we think that the matter will be made clear by a consideration of it under the following headings:

I. The posture of the head in its relation to that of the trunk.

II. The influence of the force of gravity upon the circulation and respiration.

III. The postures of surgery individually considered:

(a) the dorsal, supine, or horizontal posture; (b) the dorso-lateral posture; (c) the lateral posture; (d) the latero-prone and prone postures; (e) the semi-recumbent posture; (f) the sitting posture; (g) special postures, viz. (1) the lithotomy, (2) the semi-inverted (Trendelenburg's), and (3) the knee-elbow and knee-chest postures.

IV. The posture of the patient after the operation.

I. THE POSTURE OF THE HEAD IN ITS RELATION TO THAT OF THE TRUNK.

Observations extending over several years have convinced us that a faulty position of the head either before, during, or after the use of an anæsthetic may and occasionally does lead to serious difficulty. A patient is sometimes said to have "taken the anæsthetic badly," when the fault has lain not with the patient but with the surgeon or anæsthetist. Not only may difficulties, such as repeated swallowing, coughing, laryngeal spasm, general movement, cyanosis, venous turgescence, and the production of large quantities of mucus, arise from faulty postures of the head, but complications of an asphyxial character may readily supervene from this cause. It is therefore important that the circumstances which may contribute to these events should be understood.

(a) *Extension of the head and neck upon the trunk.*—Before an anæsthetic is administered, *i. e.* whilst the patient is conscious, extension of the head for more than a few seconds is attended by considerable discomfort, partly because the position is an unnatural and constrained one, and partly because swallowing becomes difficult or impossible, so that if an inclination to swallow should arise, that inclination cannot be gratified. Anyone, by throwing the head well back, and trying to swallow, may prove this for himself. It is not uncommon, especially in dental surgical practice, for a patient to sit or to be placed, as a matter of supposed necessity, in this very uncomfortable posture during the adminis-

FIG. 1.—Sitting posture, with head extended. Faulty.

tration of the anæsthetic (see Fig. 1). The administration is then very likely indeed to prove unsatisfactory, simply on account of the faulty posture of the head. If the nature of the operation be such that the head must be thrown back, the body should be thrown back also, *i. e.* into the semi-recumbent posture, so that the head is not extended. Extension of the head is equally uncomfortable, and, as a rule, equally unnecessary, when the patient is placed in the supine posture immediately before the administration of an anæsthetic.

In partially established or moderately deep anæsthesia—such an anæsthesia, for example, as that often regarded as advisable in some mouth and nose operations—head extension is very liable to be attended by difficulties, no matter whether the patient be sitting, semi-recumbent, or supine. It is hence advisable, if this extension be desired, as may be the case in some operations upon the neck, to secure deep anæsthesia. Sometimes, when the head is extended and the anæsthesia is not deep, the presence of blood, mucus, saliva, &c., at the superior

aperture of the now unprotected larynx may not only readily excite retching, coughing, and futile deglutition movements, but the patient's general muscular system may share in the spasmodic efforts to close the larynx, or to expel what has entered it. Usually all that is needed in such cases is to put the patient more deeply under the anæsthetic, and the extension of the head will no longer cause the difficulties referred to. This matter is of such importance that we should like to bring it into prominence by an illustration. Let us suppose that a powerfully built man, of alcoholic habits, rather bloated in appearance, with thick neck and well-developed jaw muscles, is about to have a trivial operation performed, such as the removal of a tooth and the opening up of the antrum for drainage. The operation is not regarded as of sufficient gravity to warrant the patient going to bed, or to call for the use of an operating table. He is accordingly placed upon a couch, in the semi-recumbent posture, with his face in the mid-line and his head ex-

FIG. 2.—Semi-recumbent posture, with head extended. Faulty.

tended over the sloping end of the couch (see Fig. 2). Now this posture is one of the worst that can be chosen ; and whatever anæsthetic be employed, and whatever method be adopted, difficulties will be certain to be encountered under the circumstances here narrated. The anæsthetic will be "taken badly" ; the patient will be

almost certain to struggle and to become opisthotonic; and unless very skilled assistants be at hand, delay will be experienced in introducing sufficient quantities of the anæsthetic to keep such a patient deeply under its influence. Moreover, the larynx being comparatively unprotected by reason of deglutition movements having been rendered difficult or impossible, the anæsthetic vapour, mucus, pus, and possibly blood will be liable to excite innumerable reflex troubles. It is in such cases as these that one of two things is liable to happen: either the operation has to be abandoned because the patient cannot be properly anæsthetised, or he becomes so asphyxiated that the medical attendant vows he will never give him chloroform again. All that is needed in such a case is to anæsthetise the patient whilst he is lying in a comfortable posture (*i. e.* either upon his side or upon his back, with the head turned to one side), to secure a very deep anæsthesia before the operation is begun, to keep the patient well under the anæsthetic till the end of the operation, and to see that his head remains turned to one side throughout to facilitate drainage. Some surgeons operate for adenoid growths, cleft palate, and other conditions, with the head very completely extended over the

FIG. 3.—Dorsal posture, with head completely extended over end of table.

end of the table (Fig. 3); but if this be done the patient should be previously thoroughly anæsthetised, otherwise difficult breathing, often erroneously attributed to the presence of large quantities of blood, will be liable to arise for the reasons already given. The nasal passages, moreover, must be free, otherwise breathing may not proceed.

Extension of the head has different effects from those just narrated when the patient is thoroughly anæsthetised ; for the larynx is now incapable of being excited by irritants. It must not be forgotten, however, that the larynx is all the more prone to be quietly invaded by blood or vomited matter, supposing that the posture is such that these substances would gravitate towards its orifice. A little reflection will show that there are three principal postures in which the gravitation of fluids towards the larynx is most likely to arise, namely the dorsal, the semi-recumbent, and the sitting, always supposing that the face is in the mid-line. The entrance of blood into the larynx in considerable quantities is liable to occur when there are several conditions present at the same time, these conditions being—

- (1) A deep anæsthesia ;
- (2) The dorsal, semi-recumbent, or sitting posture ; and
- (3) The face in the mid-line and the head extended.

When all three factors are present, and hæmorrhage is free, the entrance of large quantities of blood into the larynx is inevitable unless repeated sponging be practised. If either factor is absent, the chances are greatly lessened, or perhaps entirely removed. Thus if the anæsthesia be light, and the laryngeal and pharyngeal reflexes intact, coughing and swallowing, if the latter can possibly take place, may prevent the invasion. Again, if the patient be in any other posture than those mentioned, or be in the dorsal posture with the head on the side, blood will escape from the mouth. In the semi-recumbent, and more especially in the sitting posture, this turning of the head to one side does not have the effect of facilitating the escape of blood, so that the chances of this fluid entering the larynx become greatly augmented. This helps to explain, in our judgment, the difficulties and fatalities which have been recorded in connection with mouth and nose operations in these postures ; and we would strongly urge their abandonment in such procedures, except under certain

circumstances, to which we shall allude when dealing specially with the sitting and semi-recumbent positions. Lastly, if the third factor—head and neck extension—be absent, the larynx retains its natural protector, the epiglottis; and although embarrassed breathing from the presence of blood may still arise, yet there is not that risk of blood entering in such quantities as when the laryngeal aperture is unprotected.

(b) *Flexion of the head and neck.*—As pointed out by Bowles,¹ this has the effect of lessening the calibre of the air-way, and of favouring stertor and respiratory embarrassment. If the patient be supine, the use of several pillows under the head (and not under the shoulders) is open to objection; for when insensibility is established, asphyxial symptoms from the cause just mentioned will be liable to complicate the anæsthesia. This is especially observed in patients with short thick necks, and in those whose air-passages are naturally narrowed by such causes as glandular swellings, adenoid growths or enlarged tonsils. Recovery from the effect of the anæsthetic will similarly be retarded if such a posture be permitted.

(c) *Rotation of the head upon the trunk.*—This has little or no influence upon respiration, so that when the patient is in the supine posture the head should invariably be kept turned to one or other side throughout the administration, provided that such a posture is convenient to the operator. Lives have more than once been lost by want of attention to this simple precaution. If the patient be lying in the dorsal posture with the face turned upwards, difficulties in the administration will be more liable to arise than if the face be kept to one side: mucus and saliva will tend to induce cough, and will, when swallowed, favour retching and vomiting; the apparently abnormal tendency towards return of consciousness on the part of the patient leads to the use of a large quantity of the anæsthetic; and disturbances

¹ 'On Stertor, Apoplexy, and the Management of the Apoplectic State,' 1891.

both of respiration and of circulation attend or follow the inconvenient symptoms displayed by the patient. It is highly probable that the comparatively large number of deaths which have taken place in ophthalmic operations under anæsthetics may be partly explained on these grounds. If the head be turned well to the side (see Fig. 5) mucus and saliva tend to flow out of the corner of the mouth, so that coughing, swallowing, retching, and vomiting are far less likely to arise than if the face be in the mid-line. Moreover, if a loose tooth should become dislodged, or hæmoptysis or epistaxis arise, difficulties which might otherwise occur will be avoided. But the greatest argument, perhaps, for this particular posture is, that should vomiting take place, as is often the case, for example, in cases of intestinal obstruction, the vomited matter will be ejected from the mouth, and will not be sucked into the larynx, as has so often happened, with fatal consequences.

II. THE INFLUENCE OF THE FORCE OF GRAVITY UPON THE CIRCULATION AND RESPIRATION.

The influence of the force of gravity upon the circulation has long been recognised, although no precise and systematic research upon the subject has, until quite recently, been accomplished. The observations of Snow will be referred to when dealing with the sitting posture. The Hyderabad Chloroform Commission found that the blood-pressure in the carotid arteries of lower animals was considerably modified by posture, in obedience to the force of gravity.¹ When the hind feet were lowered to the floor, so as to place the animal in the vertical position, a considerable fall of blood-pressure in the carotid artery occurred; when the animal was placed horizontally the pressure was restored. Inversion of the body had exactly the opposite effect to elevation, the blood-pressure in the

¹ See Report, p. 28.

carotid rising, but falling again to its previous state when the animal was placed horizontally. The most complete work on the effect of gravity upon the circulation is that of Dr. Leonard Hill.¹ In this paper the author gives the results of his investigations on the "Influence of the Force of Gravity on the Circulation." Dr. Hill made a series of observations upon the normal intra-cranial tension in a patient of Dr. Clay Shaw's who had been trephined. Similar experiments were also carried out upon animals, and similar results obtained from all. The animals were anæsthetised and placed upon a board, with the limbs fully extended in the longitudinal axis of the body. The results obtained by this physiologist are too numerous to mention in detail, but some of the more important may be here enumerated :

1. The force of gravity must be regarded as a cardinal factor in dealing with the circulation of the blood.

2. The splanchnic vaso-motor mechanism has the important duty of compensating for the simple hydrostatic effects of gravity in changes of position.

3. When the compensatory power of the splanchnics is damaged by paralysis induced by severe operations, injuries to the cord, asphyxia, or some poisons, as chloroform or curare, then the influence of gravity becomes of vital moment.

4. In the feet-down position, when the compensatory power of the splanchnics is destroyed, the blood drains into the abdominal veins, the heart empties, and the cerebral circulation ceases.

5. The feet-up position at once restores the action of the heart and the cerebral circulation, and firmly bandaging the abdomen has the same effect.

6. So long as the heart remains normal the blood-pressure cannot fall if mechanical pressure be applied to the abdominal veins.

7. If the heart be affected, as by chloroform or curare, the restoration of pressure is incomplete, and the

¹ 'Proc. Royal Society,' vol. lvii, No. 342.

heart may be stopped by the inrush of a large quantity of blood, caused by too rapid an application of pressure on the abdomen. More work would be thrown upon the heart than in its impoverished condition it could perform.

From Dr. Hill's researches it would, therefore, appear that chloroform can, by destroying the compensatory mechanism, rapidly kill the animal if it be placed with the abdomen on a lower level than the heart. He advises elevation and compression of the abdomen in chloroform collapse. Ether, on the other hand, only slowly paralyses the compensatory vaso-motor mechanism, and this when given in enormous doses.

Dr. Hill also finds that in animals the feet-down position inhibits respiration, and the feet-up position accelerates it, and that these results are abolished by dividing the vagi. He believes, therefore, that they depend upon the stimulation of sensory nerve-endings by changes of tension, brought about by the alterations of position. He also observed that in the feet-down posture the respiration was thoracic in type, and the abdomen was retracted; whilst in the feet-up posture the respiration was diaphragmatic, and the abdomen was freely expanded. Dr. Hill concludes by pointing out that these types of respiration tend to compensate for the effects of gravity on the circulation. The retraction of the abdomen in the feet-down position must tend to support the abdominal veins, whilst the free thoracic inspirations aspirate blood towards the heart. In the feet-up position, the full and free expansion of the abdomen withdraws all obstacles to the compensatory dilatation of the abdominal veins. The practical application of these researches is obvious. In chloroform syncope, in severe shock, or dangerous hæmorrhage, the feet-up position should be assumed, and the abdomen should be bandaged. The results of this physiologist, so far as the effects of chloroform upon the circulation are concerned, will be seen to agree largely with those of Macwilliam, and to be opposed to those of the Hyderabad Commission.

III. THE POSTURES OF SURGERY INDIVIDUALLY CONSIDERED.

(a) *The dorsal, supine, or horizontal posture.*—The purely dorsal posture is not, perhaps, the best for the induction of anæsthesia. Most persons pass into natural sleep either in the dorso-lateral or lateral, not in the purely dorsal position. The customary dorsal posture

FIG. 4.—Customary dorsal posture. Head slightly extended. Face turned upwards. Faulty.

with the head slightly extended (Fig. 4) is certainly open to objection for reasons already given. As will be subsequently mentioned, the dorso-lateral posture is usually the best in which to commence the administration of an anæsthetic. If the patient prefers to lie horizontally, the head should be turned to one or other side.

When the patient has been placed under the anæsthetic we may say that, with the exception of special cases, the dorsal posture is the best, provided that the head is neither flexed nor extended, and that it is kept

FIG. 5.—Dorsal posture. Face turned to one side. Correct.

turned to one or other side (Fig. 5).. The main argument in favour of this posture as the most appropriate in ordinary surgical cases is that it is the one least likely to

prejudicially influence the respiration and circulation of an anæsthetised patient, always supposing that no abnormalities in the respiratory functions are present. In the absence of such abnormalities, chest expansion will take place more freely in this than in all other postures, save perhaps the semi-recumbent and the sitting. But if the respiration be principally or wholly diaphragmatic, as is often the case in very stout subjects, the dorsal posture may not be the most satisfactory, owing to the abdominal viscera having to be raised with each contraction of the diaphragm. It is an interesting fact that during general anæsthesia respiration is often to a great extent diaphragmatic, even in healthy subjects, the chest wall and sternum actually receding during the inspiratory phase, and rising slightly during expiration. Under such circumstances as these it is clear that the diaphragm would have more work to do than if the patient were lying partly or completely upon his side. But when the respiration is chiefly thoracic, and the chest expands with inspiration, the dorsal posture would certainly be preferable to the lateral. So far as the modifying effects of gravity upon the circulation are concerned, the dorsal posture is obviously the best.

A few words must here be said concerning mouth and nose operations upon anæsthetised patients lying in the dorsal posture. Should this position of the body be required, the head should, if possible, be kept turned to one side to facilitate the escape of blood. Should it be necessary, for the convenience of the operator, that the head should not be turned to one side, it should either be fully extended, in which case a deep anæsthesia is permissible and, as has been pointed out, advantageous, or it should be allowed to retain its natural relations to the trunk, under which circumstances repeated sponging with large coarse sponges will be needed, and the anæsthesia should only be moderately deep, in order that coughing and swallowing may persist. Considerable skill, experience, and judgment are needed for keeping up

anæsthesia during such an operation, for example, as that of removing adenoid growths from the naso-pharynx, when the patient is lying in the dorsal posture with the face turned upwards and the head not extended. In conducting such cases to a successful termination everything depends upon careful sponging and upon keeping up a particular degree of anæsthesia.

FIG. 6.—Dorso-lateral posture.

(b) *The dorso-lateral posture.*—This posture (Fig. 6) is a particularly appropriate one during the initial stages of the administration of an anæsthetic. It is more comfortable to the patient than the purely dorsal, and is less likely to interfere with thoracic expansion than the purely lateral posture. When everything has been prepared in the room in which the operation is to take place, and the patient is ready to be anæsthetised, he should be encouraged to adopt this posture on the operating table or bed, unless special circumstances are present rendering such a posture unadvisable or impossible. It is a simple matter, when once anæsthesia has been produced, to turn the patient either into the usual dorsal or into the lateral position. The dorso-lateral posture is, however, an excellent one for a large number of operations, being equally as good as the purely dorsal, and in many cases more convenient from the surgeon's point of view,—as, for example, in operations upon the breast, axilla, neck, face, mouth, nose, &c. It is, moreover, a very useful posture when respiration is wholly diaphragmatic.

(c) *The lateral posture.*—The lateral or side posture is one which is deserving of a wider application in surgery

than that which it at present enjoys. In this position, as was forcibly and clearly pointed out by Dr. R. L. Bowles¹ as far back as 1857, the air-way is less likely to be obstructed than in the dorsal posture, because the tongue tends to gravitate towards the dependent cheek. As the Fellows of the Royal Medical and Chirurgical Society are aware, Dr. Bowles has very successfully treated the coma of cerebral hæmorrhage by placing patients upon the side, a procedure which has the effect of stopping stertor, facilitating the escape of mucus, saliva, or vomited matters, and keeping one lung free from congestion, and therefore able to carry on respiration satisfactorily. The lateral posture is hence an excellent one, as a general rule, for patients recovering from the effects of anæsthetics (*vide infra*, IV).

Although it is clear that in the lateral posture full expansion of the subjacent half of the thorax cannot take place, this does not seem to constitute any great objection to the position, at all events in the great majority of cases, in actual practice. We have already drawn attention to the fact that respiration during anæsthesia is often to a great extent diaphragmatic, which in itself is sufficient to explain the usual absence of any respiratory embarrassment when patients are placed upon the side. Indeed, in very obese subjects, and in those with a distended abdominal cavity from ascites or other causes, breathing will be found to take place better upon the side than in the dorsal posture, owing to the fact that in the former posture the work of the diaphragm is considerably lessened.

Patients are often said to be lying in the lateral posture when this is not really the case. The hip and shoulder of one side should both be in contact with the operating table or bed, and the knees should be flexed. The mistake is often made of turning the shoulders but not the hips, and the body then gradually tends to return to the dorsal posture.

¹ Op. cit.

When the patient is lying wholly upon the side one cheek naturally rests upon the pillow, and in this posture many operations upon the jaw, mouth, pharynx, and nose may most advantageously be performed without any fear of embarrassed breathing from the blood which escapes into the upper air-passages. When it is anticipated that the hæmorrhage will be free, the head should be brought well to the edge of the table, and the face turned towards the floor (Fig. 7)—a position in which drainage takes place

FIG. 7.—Lateral posture. Head brought to edge of table. Face turned towards floor.

very readily. The lateral posture is an excellent one for such operations as the removal of the upper jaw, the whole or a portion of the tongue, naso-pharyngeal polypi, adenoid growths, nasal polypi, &c. Some operators, recognising the advantages of having the head upon the side in these cases, attempt to secure this end by turning the head whilst the patient's trunk is in the dorsal posture; but the result is not so satisfactory, owing to the tendency of the head, in the moderately deep anæsthesia usually advisable in such cases, to regain its natural relations to the trunk.

The lateral posture being one that is often advisable in operations for empyema, it will be convenient to make some remarks here upon the posture of empyema patients in general. After a very large experience, Dr. Goodhart informs us that a patient with pus in the pleural cavity may assume for choice any position, the special intra-thoracic conditions of the case prompting the adoption of

that posture in which respiration can be carried on with the least possible exertion or distress. Concomitant pulmonary or bronchial disease may thus explain apparently unusual postures. Before proceeding further, a word may be said as to moving these patients from the bed to an operating table. Although this may be attended by some inconvenience, it is certainly the best plan in most cases. The patient should, however, be moved with great care and caution. He should not be permitted to raise himself, but should be carried *horizontally*. Then comes the question as to his posture during the induction of anæsthesia. Speaking generally, empyema patients should be permitted to assume that position which is most comfortable to them; and the surgeon, even though he may be inconvenienced, should endeavour to operate without changing the posture to any considerable extent. There can be no doubt that when nature dictates the best posture in a particular case, any marked deviation from that posture should, if possible, be avoided. The most rational plan certainly appears to be to administer the anæsthetic to the patient lying in the most favourable position, and then, should the exigencies of the operation be such that this must be modified or changed, to effect the change subsequently, vigilantly watching the effect. Should the patient choose to lie on his non-affected side, he will fortunately be in a convenient posture for the operation. This, however, is not common. Supposing that he experiences no greater discomfort in one posture than in another, he should be placed ready for the operation, so that when sufficiently anæsthetised no delay need arise. But should he experience discomfort or distress when an attempt is made to place him in the posture most convenient for the operation, some compromise should be effected, otherwise alarming symptoms may ensue. There are some cases in which the patient lies on his affected side, unwilling or unable to move, and in these the operator's convenience must give way to other considerations. The anæsthesia should only be partial.

the patient's trunk should be drawn over slightly beyond the edge of the table or bed, and the surgeon, sitting upon a low chair, will then be able to operate either without altering the posture of the patient or without disturbing him to any undesirable degree.

To make this most important matter clearer, let us suppose a patient to be lying on his right side, and the right pleural cavity to be full of pus. Dyspnoea being present, the patient should be gently lifted on to a high table, the affected side still being kept dependent. If the surgeon wishes to operate in the anterior axillary region, the thorax and abdomen of the patient must face the operator. Should the posterior axillary region be selected, the back of the patient faces the surgeon. But in either case it is essential that the thorax projects over the edge of the table, the patient being carefully held by assistants, with his shoulders and hips upon the table, and the affected side of the thorax projecting over its edge. When orthopnoea is present, it is better to operate without altering the patient's position than to lower the body.

Whenever the operation is such that the lateral or latero-prone posture will be required (as, for example, for operations upon the kidney, colotomy, &c.) the patient should be anæsthetised in the lateral posture, so that little or no subsequent alteration in position will be needed.

We have recently met with a minor complication attendant upon the lateral or latero-prone posture which deserves passing notice. We refer to pressure upon the brachial nerves. The musculo-spiral especially may suffer, and wrist-drop, with weakness of the extensors, arise. The causation of these cases is pressure, and they are analogous to those of wrist-drop seen in persons who have gone to sleep with the arm hanging over a chair. So far as we know, the symptoms are temporary, but they are apt to cause inconvenience and alarm to a nervous patient. In the lateral and latero-prone postures,

therefore, the position of the arm should be studied, and pillows arranged to take off pressure.

(d) *The latero-prone and prone postures.*—The experience of recent years has somewhat altered prevalent views as to these postures. The Chloroform Committee of the Royal Medical and Chirurgical Society of 1864 state in their Report,¹ "The prone position is inconvenient to the administrator, but entails no extra danger." With this statement we cannot, however, agree; and, as the subject is one of great importance it is well that the fallacies of former teaching should be recognised, and that teaching abandoned. The late Dr. C. E. Sheppard, in an able article on "The Administration of Ether in Operations requiring the Lateral or the Prone Position,"² deals *in extenso* with this subject; and no one can deny the correctness of his views. He quotes the observations of Dastre, who found that whilst it required the weight of 75 kilogrammes applied to the sternum to stop the respiration of a dog of 12 to 13 kilogrammes not under an anæsthetic, a weight of 58 kilogrammes would effect this when insensibility was produced, and that after one hour of chloroform anæsthesia a weight of 25 kilogrammes was all that was needed to arrest breathing. He further refers to certain experiments made by the Hyderabad Chloroform Commission, in which the animals rapidly succumbed under chloroform when their chests were encased in plaster-of-Paris jackets and the respiratory movements restricted. Dr. Sheppard then points out that in the semi-prone and prone postures (Fig. 8) the trunk weight must necessarily prevent free thoracic and abdominal expansion, and that, especially when anæsthesia is deep and respiration is in any way hampered, very undesirable symptoms of an asphyxial character may supervene. In his own practice he met with two cases in which, under chloroform, breathing came to a standstill as the direct result of the semi-prone posture, respiration

¹ 'Med.-Chir. Trans.,' 1864, p. 353.

² 'Brit. Med. Journ.,' July 11th, 1891.

FIG. 8.—Latero-prone posture.

again starting when the patients were placed in the dorsal position. Dr. Sheppard speaks strongly in favour of ether as an anæsthetic in cases requiring the prone or semi-prone posture. Clinical experience seems to point to the fact that respiratory difficulty is most marked when the patient is placed in such a position that the weight of the body falls on the anterior axillary line and in front of it. The weight of the superincumbent arm must not be overlooked when the limb is bulky and the chest walls weak. In the latero-prone posture, therefore, the uppermost arm and shoulder should be kept raised from the trunk by means of a pillow or some appropriate contrivance.

From the above considerations it follows that fat, bloated persons, whose abdominal muscles are flabby, and whose chest walls are weak, can only be anæsthetised in the prone or latero-prone posture with some risk. This point should be borne in mind in connection with prolonged operations upon the kidney, and in the performance of laminectomy for spinal tumour or disease.

Marion Sims's posture, which is often employed in gynæcological practice for such operations as dilatation of the cervix, curetting, vesico-vaginal fistula, &c., is ordinarily termed the left lateral, but a more accurate definition would be the left latero-prone position; for the right knee is drawn upwards until the patient can be tipped over on the left breast ('American Text-book of Gynæcology'). It is plain that in this posture the left chest cannot freely expand, and the right must be embarrassed by the weight of the superincumbent upper

limb. The diaphragm, moreover, might be prevented from acting freely, owing to pressure upon the abdominal contents. In a very stout woman, and in a very long operation, the Marion Sims posture may, therefore, prove embarrassing to respiration.

The purely prone posture is rarely if ever really necessary, the latero-prone being nearly if not quite as convenient to the operator, whilst it is certainly preferable from the anæsthetist's point of view. Should the operator wish, however, that his patient should lie almost or completely prone, the anæsthetist may with advantage place a couple of small but firm pillows under the shoulders in order to facilitate thoracic expansion; or the pelvis may be similarly raised with the object of rendering abdominal movements easier of performance. We have found that by adopting this plan respiration has undergone distinct improvement.

(e) *The semi-recumbent posture.*—By the semi-recumbent posture we mean that in which the patient's body is about halfway between the vertical and the supine positions (Fig. 9).

FIG. 9.—Semi-recumbent posture. Head neither extended nor flexed.
Correct.

It is a posture which is often adopted, to suit the convenience of the surgeon, for operations about the mouth

and throat,—as, for example, in the removal of tonsils and the extraction of teeth. We regard it, however, as an unsatisfactory one, except under certain circumstances, for the following reasons:—(1) Should the patient struggle or become rigid, the struggling and rigidity are more difficult to restrain than if he be lying horizontally upon his back, or sitting nearly vertically in a chair. (2) The tongue tends to gravitate towards the pharyngeal wall, and thus to favour stertor. (3) Mucus, saliva, vomited matters, and blood cannot so readily be made to flow from the mouth as in the dorsal and sitting postures. In the dorsal posture this object is readily achieved by keeping the head turned to one side, or by occasionally turning the head and shoulders to one side; in the sitting posture it is attained by tilting the whole body forwards from time to time. In the semi-recumbent posture, however, such procedures are difficult of execution, from which it follows that repeated swallowing movements, coughing, retching, and obstructed breathing are very liable to arise during mouth and nose operations upon a semi-recumbent patient. (4) *Chloroform* cannot be given with safety to patients in this posture (see II).

We have already alluded to the importance, as a general rule, of avoiding head and neck extension; and the remarks which we have made forcibly apply to the posture now under consideration. Whenever the semi-recumbent position is needed, the head should be kept as far as possible in a line with the trunk. Indeed, if this be done, difficulties will be far less liable to arise than if the head be permitted to become extended. The hypothetical case to which we referred when dealing with head and neck extension will fully illustrate our meaning.

Although the semi-recumbent posture is not a good one in most cases, it is nevertheless very suitable in a few special instances. For example, the removal of tonsils under general anæsthetics is more difficult, especially in children, than is generally supposed; but if the patient, who has been placed under ether, be propped up in the

semi-recumbent posture in front of a window, a better chance of successfully performing the operation will be afforded the surgeon than in any other position. Immediately after the removal of the second tonsil the patient should be lowered into the latero-prone posture, or tilted well forwards till the head is over the knees (see Fig. 11). In either of these postures all blood will flow out of the mouth, and will in no way embarrass breathing. Moreover, should it be necessary to remove any adenoid growths which may be present, this can be readily effected in one or other of these latter postures. Any brief nose or mouth operation may be similarly performed with the patient in the semi-recumbent posture; but longer operations upon these parts, for reasons which will be sufficiently clear from what has already been said, are not so satisfactorily accomplished as in other postures.

The semi-recumbent posture is to be preferred to others, at all events for inducing anæsthesia, when it is the only posture in which the patient can breathe with comfort. Thus it is not unfrequently adopted by patients suffering from extreme obesity, pulmonary affections, cardiac diseases, great abdominal distension from tumour or fluid, intra-thoracic aneurysm or tumour, and other conditions attended by dyspnoea. If such patients have to be anæsthetised at all, the anæsthetic should be given, with every care and precaution, in that posture which is most comfortable and in which respiration seems most freely to proceed. It is often possible, in many cases of this class, to substitute the dorsal for the semi-recumbent posture when once unconsciousness has been produced. This change, however, must be cautiously effected. In the case of extreme abdominal distension, capable of being relieved by operation, the body should be lowered as respiration improves by reason of the reduction in size of the abdomen.

We cannot conclude our remarks upon the semi-recumbent posture without venturing to hope that such a posture will, for the future, be abandoned in grave

operations upon the mouth and nose. A case recorded in the 'British Medical Journal' for February 25th, 1882, well illustrates the dangers of this posture. The patient, who was under ether, died during the removal of the upper jaw, the fatal symptoms being attributable to the entrance of blood into the trachea and bronchi, a complication largely dependent upon the semi-recumbent posture in which the operation was performed. We cannot too strongly deprecate the practice of performing these grave operations when the patient is in the semi-recumbent or sitting posture, more especially when experience teaches that the lateral position, although a little less convenient for the surgeon, renders the administration of the anæsthetic perfectly simple, and practically abolishes all risk from the entrance of blood into the air-passages.

(f) *The sitting posture.*—In the sitting posture the body of the patient is more vertical than in the semi-

FIG. 10.—Sitting posture. Head neither extended nor flexed. Correct.

recumbent position (Fig. 10). The trunk may be quite vertical if desired, though this is usually not necessary,

a very slight inclination backwards being more comfortable and convenient. The remarks which we have already made in a previous part of paper, on the posture of the head in relation to that of the trunk, apply in no small measure to the sitting posture. The combination of this posture with more or less extension of the head and neck is very liable indeed to give trouble, more especially in operations upon the mouth and nose.

Most of what we have said regarding the semi-recumbent posture will apply to the posture now under consideration. The sitting position is, however, preferable in most respects to the semi-recumbent. The only disadvantage which it possesses as compared to the latter is that the more vertical position of the trunk is favourable to the occurrence of syncope. This point will be specially referred to below. The sitting is a somewhat better posture than the semi-recumbent, because, should excitement or muscular rigidity arise, they can be more easily kept in check. Moreover the posture is a preferable one for most mouth and nose operations, because it is extremely easy from time to time to tilt the whole body forward in order to empty the mouth of blood or vomited matter. Thus, in long dental operations, when the patient has to be kept under ether for a considerable time in order that numerous difficult teeth may be removed, the ether inhaler, preferably one of Ormsby's pattern, may be kept applied to the face with the body tilted forwards for the escape of the blood (see Fig. 11). In this way there is not the objection to re-applying the ether that there undoubtedly is when the oral cavity contains blood, and the body is thrown back. This bent-forward posture is similarly advantageous during the removal of adenoid growths from the naso-pharynx by means of the natural or artificial nail. When a proper degree of ether anæsthesia has been secured, a mouth gag is inserted, the patient's body and head are bent forwards (Fig. 11), the operation is proceeded with, and all blood and detached vegetations escape freely from the mouth. The sitting

FIG. 11.—Bent-forwards posture.

posture has another advantage over the semi-recumbent, namely, that during the induction or maintenance of anæsthesia the tongue is less likely to gravitate towards the pharyngeal wall and to obstruct breathing.

Opinions have for many years been divided as to whether anæsthetics should be given to patients in the sitting posture. The point is one of great importance. The truth appears to be that it is safe to give certain anæsthetics by certain methods to certain patients whilst they are thus placed; whereas with other anæsthetics, other methods, and other patients the risk may be considerable.

Snow¹ held that there was no objection to the sitting posture when it was most convenient to the operator, provided that should faintness occur, the usual plan of placing the patient in the horizontal posture was adopted. He seems, however, to have had some slight misgiving in expressing this view, as he also states that he considers the horizontal posture the best for the patient. He administered chloroform to 949 patients in the sitting posture without any serious result.

¹ 'Chloroform and other Anæsthetics,' pp. 75 and 76.

The Chloroform Committee of the Royal Medical and Chirurgical Society state,¹ with regard to the administration of this anæsthetic, "In the erect or sitting posture there is danger from syncope." As we have stated above, the Hyderabad Chloroform Commission found that very considerable variations in the blood-pressure of animals were to be brought about in response to alterations from the horizontal to the vertical posture and *vice versâ*; but with regard to the possible combined effects of a surgical operation and the vertical posture, this Commission state,² "Various operations were performed on animals in the vertical position, but in no case was anything resembling dangerous shock produced."

Coming to more recent work still, we have fully referred to Hill's researches, from which we learn the important part played by the splanchnic vaso-motor mechanism in compensating for the simple hydrostatic effects of gravity in changes of posture—effects which have been long known to the profession. Dr. Hill has shown that it is damage to the compensating power of the splanchnics which is to be feared—a damage which may be brought about by conditions which are not infrequently at work in surgical operations under anæsthetics, *e. g.* severe operations, injury to the cord, asphyxia, the use of excessive quantities of chloroform, &c.

Speaking in general terms, we may say that with nitrous oxide and with ether there appears to be no objection, so far as the anæsthetic itself is concerned, to the sitting posture. We need hardly say, however, that in the case of an exceedingly feeble circulation being present from any cause, either before, during, or after the administration, the sitting posture should not be permitted for an instant, but the patient should be placed horizontally. With regard to chloroform the case appears to be different, and there is good ground for the rule that

¹ 'Transactions' of the Society, 1864.

² 'Report of the Hyderabad Chloroform Commission,' p. 28.

during the use of chloroform patients should be lying down.

(g) *Special postures*.—Special positions are sometimes adopted by surgeons for certain operations, the principal of these being as follows :

- (1) The lithotomy posture.
- (2) The semi-inverted (Trendelenburg's) posture.
- (3) The knee-elbow and knee-chest positions.

(1) Although patients placed in the lithotomy posture do not, as a rule, display any unfavourable symptoms during operations under general anæsthetics, a few remarks on exceptional cases may perhaps be made. In very obese subjects, and in those with wholly abdominal respiration, the flexion of the thighs upon the abdomen may have the effect of driving the intestines towards the diaphragm and preventing the free descent of this structure. Care must therefore be exercised in adapting any appliance such as a Clover's crutch in these cases ; and should its application caused any marked respiratory embarrassment, it will perhaps be advisable for assistants to hold the patient's flexed knees apart in such a way that the thighs do not touch the abdominal walls. When Clover's crutch is used, it should invariably be adapted so that the neck-strap passes obliquely across the back of the neck, one end of the strap being made to pass under one shoulder. There is often a tendency, when the patient is placed in the lithotomy posture, either for the head to become acutely flexed upon the sternum or for it to be extended : but by a little management such a tendency, the disadvantages of which have already been fully considered, will be averted. The neck-strap and pillows should be so adjusted that, as far as is possible, the head retains its natural position with regard to the trunk. Very serious and sudden syncope has been known to occur in excision of the rectum or lateral lithotomy, from the sudden loss of large quantities of blood ; and we are informed by Mr. Cripps that, recognising the importance of keeping the head low in excision of

the rectum, it is his practice to have the buttocks well raised by an appropriate pad, so that the trunk and head of the patient are on a somewhat lower level than the pelvis. This particular posture, which can be adopted without flexing or extending the head to any inconvenient degree, has the additional advantage of lessening the tendency to hæmorrhage from the valveless abdominal veins. A real though very remote danger of the lithotomy posture, is the possibility of injuring brittle and atheromatous arteries, in old and feeble persons, by prolonged and acute flexure at the knees. We are informed by Mr. Treves that a case has been reported to him in which gangrene of the leg followed the use of a Clover's crutch in such a subject.

(2) By the semi-inverted posture, in the strict sense, is meant that in which the whole body, retaining the usual relations of its parts, is sloped head downwards, so as to make with the horizontal plane an angle of about 45° . Such a posture is obviously a very difficult one to put into practice, except in the case of infants and young children, whose bodies can easily be made to lie in this position by arranging a graduated system of pillows from the neck to the feet (see Fig. 13). In the case of adults, Trendelenburg's posture, which is, for all practical purposes, identi-

FIG. 12.—Trendelenburg's posture.

cal with the above, is the best. In this (Fig. 12) the body is placed as above described, except that the knees are flexed. This flexure of the knees to about a right angle tends to prevent the slipping of the body which would otherwise occur. Special operating tables for the maintenance of Trendelenburg's posture are now made. The patient is first anæsthetised in the customary position, and the table is then adjusted so that the body assumes the desired posture. Many surgeons regard the position of Trendelenburg as very convenient for all cases in which it is desirable to allow the intestines to gravitate towards the diaphragm away from the pelvis, and thus facilitate the removal of a deeply seated pelvic tumour, a stone from the bladder, or the return of a voluminous hernia. In such cases it may be needful to very considerably lower the upper part of the trunk. In the absence of a specially constructed table, the best plan is to raise the end of an ordinary operating table by two blocks of wood of appropriate height and with holes cut in their superior surfaces. When anæsthesia has been produced the table is tilted, and the legs of the patient are then bent over the end of the table. An ordinary chair, fixed upon the operating table so that the front edge of its seat and the top front edge of its back rest upon the table whilst its legs are turned upwards so as to form an angle of 45° , will also make a good extemporised substitute for a Trendelenburg's table. The inverted chair is covered with blankets, and the already anæsthetised patient is so placed upon it that his back is in contact with the back of the chair and his legs are flexed over the under surface of the seat. The chief, if not the only objection to Trendelenburg's posture is that in patients whose respiration is already impeded, and especially in patients with wholly diaphragmatic respiration, the pressure of the abdominal contents upon the diaphragm may lead to undesirable embarrassment of breathing. It must be admitted, however, that this does not occur to that extent which one might anticipate. We have on several occasions given anæsthetics (both ether

and chloroform) to middle-aged and rather obese subjects without this posture in any way interfering with breathing. Moreover, mucus and saliva tend to flow away from the larynx and pharynx, so that coughing, swallowing, and subsequent vomiting are to some extent averted. It should be borne in mind, at all events when employing ether in this posture, that the augmented arterial pressure may favour the occurrence of cerebral hæmorrhage in patients already predisposed to this accident.

A semi-inverted position of the head and trunk is well adapted for many operations within or about the upper air-passages, and it is not unlikely that this posture will gain ground in this branch of surgery. Thus it was adopted by Marsh¹ in the removal of a foreign body from the larynx by splitting the thyroid cartilage. The position allowed the blood to gravitate into the nasopharynx, and thus obviated the necessity for low tracheotomy. We question whether this position has received sufficient recognition for operations upon the larynx. It is certainly a convenient one in operations for harelip in

FIG. 13.—Semi-inverted posture.

young children (Fig. 13). The child may be placed as shown in Fig. 13, or the legs may be tied together and fastened to the raised end of the table.

(3) The knee-elbow posture, which is used by obstetricians, is not often employed in this country. When it is desired to place an anæsthetised patient in this posture, which is a very inconvenient and unsatisfactory one in which to administer an anæsthetic, the patient should be

¹ 'Journal of Laryngology,' vol. viii, 1894.

first anæsthetised in the ordinary position, and then made to lie face downwards, with soft pillows under the abdomen. By a little management the weight of the trunk may be prevented from impeding thoracic expansion by keeping the elbows resting upon the operating table. We have known this posture adopted under anæsthetics for replacing an impacted fibroid, and pushing forwards and upwards a retroverted gravid uterus ; but it is now rarely used.

In the knee-chest posture, which is largely employed by certain American gynæcologists, the patient kneels near the edge of the table, the arms are thrown back, and the head is turned on the side, the chest sinking down just in front of the knees. This posture is obviously only admissible when anæsthesia is not required.

IV. THE POSTURE OF THE PATIENT AFTER OPERATION.

In the consideration of the posture of the patient after operation we may say that our remarks particularly apply to the time between the termination of the operation and the re-establishment of sensibility, and that we do not propose to discuss any special postures that the surgeon may afterwards advise for facilitating dressings or drainage. We may point out that the important matter of the after-posture of cases of operation is usually entirely ignored, patients being placed in bed upon the back, with no regard to the points we propose now to enunciate and illustrate.

The application of bandages and dressings so often involves or leads to the adoption of certain postures that a few remarks may not be out of place upon this subject. Thus after breast operations it is customary to raise patients almost or completely into the sitting posture—a proceeding which we cannot regard as altogether free from risk, especially in certain cases. Should ether have been employed, and should the circulation be strong and

the colour good, there is no objection to the trunk being raised. But should chloroform have been used, and should the circulation be feeble, the body should either be raised very slightly or not at all, and any tendency to pulse failure should at once be met by lowering the trunk. Raising the body into the vertical or sitting posture is undoubtedly attended by considerable risk when there are signs of faintness. Thus a case is recorded in which a dentist attempted to administer nitrous oxide to a nervous female patient, but without success. The operation of removing seven or eight loose teeth was accomplished without any anæsthetic, and the patient fainted. She was kept upright in the chair, and the syncope proved fatal.¹ After severe and protracted operations upon the breast it is not an uncommon event for the circulation to be considerably depressed, and under these circumstances the dressings and bandages should be applied without raising the trunk. A many-tailed bandage, previously placed between the shoulders, obviates all raising of the body, and is far more convenient to adapt than an ordinary bandage.

It is always advisable to allow patients to emerge from deep anæsthesia before the thorax is constricted by bandages,—a point which not only applies to cases of removal of the breast, but to all other cases in which the thorax requires bandaging after operation.

A word may here be said as to the after-posture of breast cases. It is customary to place these patients in the dorsal posture after the bandaging is finished; but we are inclined to prefer the lateral or the dorso-lateral position, principally because mucus, saliva, and any vomited matters can far more readily escape in these postures than when the patient is horizontal, and respiration is therefore less likely to be interfered with during the recovery from the effects of the anæsthetic. We have found that patients are more likely to pass into a quiet

¹ 'Brit. Journ. Dental Science,' 1872, p. 270; 'Lancet,' vol. i, 1872, p. 727.

and refreshing sleep when placed as we have suggested than when left lying upon the back. Moreover, by arranging the patient so that the side of operation is uppermost, painful pressure is prevented.

The customary plan of applying dressings and bandages after operations for empyema also appears to us to need some modification. It is usual for the whole thorax to be bandaged more or less tightly, and for the patient to be placed in bed in the dorsal posture. Now by bandaging the whole thorax the healthier lung is prevented from expanding freely. It appears to us that some form of dressing should be applied which can be retained in position by strapping or other means. Moreover, if the patient be turned on his affected side, instead of into the dorsal position, drainage freely takes place, the dressings are kept in position, and the healthier side, not constricted by bandages, can expand with the utmost possible freedom.

There is one remaining group of cases in which the question of bandaging needs a few remarks. We refer to cases of operations upon the neck and root of the neck. It is often necessary after these operations to tightly bandage the parts, and attention should be paid to one or two points. Firstly, the patient should be allowed to come out of the anæsthesia to a considerable extent—in other words, to pass through the period of possible vomiting and coughing—before the bandages are applied. In the next place, should any impaired breathing from enlarged tonsils, adenoid growths, &c., exist, a piece of cork attached to a piece of string should be placed between the teeth to keep up free breathing. And, lastly, the patient should be turned upon the side with the head in that position which is most favourable to breathing, and careful watch must be kept over him till consciousness has returned. The tight bandaging, more especially if associated with previously impaired respiration, greatly retards the elimination of the anæsthetic; and, if the posture of the head and body be not attended

to, asphyxial symptoms may with the greatest readiness be initiated.

The position of the head with regard to the trunk is of considerable importance during the recovery from anæsthesia. The practice is too prevalent in our hospitals of sending patients out of the theatre in a semi-comatose state, with the head and trunk in those very postures which are most favourable to the development of arrested breathing. It is, therefore, not surprising that alarming symptoms sometimes arise on these occasions, symptoms which are often erroneously attributed to other causes. When the head is in the mid-line, the patient is recovering muscular power, and the ejection of mucus and saliva is about to take place, there is every chance of impeded breathing arising, more especially in certain types of subjects. Suspended respiration thus taking place is very liable to be quickly followed by pallor and other evidences of circulatory failure; and the grave mistake has over and over again been committed of supposing that the patient is in a state of faintness from loss of blood, surgical shock, an overdose of the anæsthetic or other causes. In private practice the anæsthetist and surgeon should pay special attention to these points, and should see that the patient's head is kept in that position which is most favourable to recovery from anæsthesia and to the escape of all fluids from the mouth.

Speaking in general terms, we may say that the lateral posture is preferable to all others for patients recovering from anæsthetics. Directly the administration is at an end, and the dressings are applied, the patient's body should be turned into the lateral position, his knees bent up, and his head allowed to regain its natural position with regard to the body. Without here entering into the whole question of vomiting after anæsthetics, we are of opinion that one important exciting cause of this troublesome condition is the entrance of mucus and blood into a stomach already prone to evacuate its contents. Accordingly we may enunciate a general rule, which may

thus be cited : After the conclusion of an operation, unless special circumstances forbid, turn the patient upon his side, clear the mouth and fauces of anything they may contain, and allow him to maintain this position until sensibility has returned. The side after-position is very useful for all operations attended by much after-oozing of serum or blood into the mouth, as after removal of the tongue, cleft palate, hæmorrhagic palatal or naso-pharyngeal growths, or large and vascular tonsils ; and in such cases it should, in our judgment, be invariably adopted.

Children, after chloroform administration, often pass into a deep sleep which may last for an hour or more. Dr. Leonard Guthrie, in his paper on some fatal after-effects of chloroform in children, refers to the vital importance of keeping the head on the side, lest vomit or mucus enter the air-passages. "Once," notes Dr. Guthrie, "after an operation, when a child had been put to bed without these precautions being taken, I chanced to look round whilst washing my hands, and saw that she had stopped breathing. Her jaw had dropped, and she was rapidly becoming black in the face. The head was at once turned on the side, the chin was raised, and the danger was over; but in another minute it might have been too late to save her life."¹

There are some operations after which the dorsal posture is considered essential. This is notably the case in abdominal surgery. But even in such cases it is generally possible, by placing a pillow under one shoulder and by turning the head to the opposite side, to provide for the escape of mucus, &c., from the mouth without disturbing the horizontal posture of the pelvis. This is an extremely important matter, the simple arrangement of the patient in the posture described making, in many cases, a considerable difference as regards the quietude of the abdominal contents.

After a great operation, such as amputation for railway

¹ 'Lancet,' January 27th, 1894, p. 193.

injury, the removal of an adherent and large abdominal tumour, and the like, the head should be kept low and the feet somewhat raised, the trunk being in the slanting posture. The head and shoulders should, however, be turned towards one side to facilitate as far as possible the escape of mucus and vomited material. The greater the loss of blood the greater the reason for keeping the head low—a point too often neglected in the hurry of applying warmth, galvanism, stimulants, and other active remedial measures.

It does not often happen, in modern surgery, that persistent bleeding occurs after operation; yet this troublesome condition may be met with, especially after operations upon the throat and nose,—as, for example, after removing a naso-pharyngeal growth. In such cases the posture of the patient for the first hour or so may make all the difference, for if he be kept in the sitting posture, obstinate oozing, which is often merely congestive, will very generally cease. This posture cannot, of course, be adopted should the patient display very marked symptoms of faintness. The sitting or semi-recumbent posture after such operations is more particularly appropriate when the hæmorrhage persists, and the general circulation of the patient, though possibly somewhat feeble, is not so feeble that there is risk in slightly elevating the trunk. The surgeon and anæsthetist must steer very carefully between the opposite dangers of inducing fatal syncope and encouraging bleeding from congestion in lowering the head. Raising the trunk and head may prove of great value in treating the severe venous oozing which sometimes follows operations upon vascular growths of the bones of the skull when sinuses or large diploic veins have been wounded.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. viii, p. 6.)