ANAESTHESIA IN GENERAL PRACTICE

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

SPINAL ANAESTHESIA

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Indications and Contraindications

With the qualification that few absolutely rigid rules can be made about the indications for any particular type of anaesthetic, those for spinal anaesthesia fall into four main groups:

Group 1.—Cases in which inhalational anaesthesia usually aggravates existing systemic disease—for example, in patients suffering from diabetes, phthisis, bronchitis, renal disease, hyperpiesis, congestive cardiac lesions, or obstructive jaundice.

Group 2.—Cases in which the performance of the operation is greatly facilitated by the unrivalled muscular relaxation provided by spinal anaesthesia—for example, in intestinal obstruction, lumbar sympathectomy, or abdominal operations in obese subjects. Also in this group may be mentioned anaesthesia for evacuation of the uterus for inevitable abortion and for Caesarean section. Spinal anaesthesia produces excellent uterine contractions, thus diminishing haemorrhage, and also ensures that the infant, when born, is not anaesthetized.

Group 3.—Cases in which the existing lesion gives rise to severe general toxæmia, and in which good muscular relaxation is essential for adequate surgical treatment without the added toxin of ether or chloroform—for example, in acute appendicitis with general peritonitis, and in cases of perforated gastric or duodenal ulcer.

Group 4.—The exigencies of practice—for example, the single-handed emergency. Spinal anaesthesia makes it possible for the single-handed practitioner to undertake manipulations or other required treatment for dislocations or fractures of the leg. It is also indicated for obstetrical emergencies. Tropical climatic conditions and dread of unconsciousness are two obvious indications for the use of spinal anaesthesia.

The idea still unfortunately persists that the poorer the general condition of a patient the more is spinal anaesthesia to be preferred to inhalational anaesthesia. Spinal anaesthesia is almost always the sure means of killing the moribund. It should be a rule of sound practice that if the general condition of the patient cannot be improved by rest, warmth, intravenous saline injections, ephedrine, etc., until the systolic blood pressure has been raised to at least 90 mm. and any pre-existing dehydration remedied, then spinal anaesthesia should not be employed.

Other contraindications are mental instability, organic disease of the central nervous system, a septic lesion in the lumbar region, deformity of the spine, pyæmia, and certain forms of severe cardiovascular disease, profound anaemia, low blood pressure, or severe myocardial deficiency. Children do not well tolerate spinal anaesthesia, and unless there is an overwhelming indication this method is not to be recommended for patients under the age of at least 16 years.

Premedication

Spinal anaesthesia should never be used unless the mental tranquillity of the patient is assured. Patients between the ages of 16 and 60 should be given a subcutaneous injection of omnopon 1/3 grain and scopolamine 1/150 grain forty-five minutes before the time of

operation. The dose of omnopon and scopolamine should be halved for patients over the age of 60. At the same time, except in cases of hyperpiesis, ephedrine 3/4 grain should be given by subcutaneous injection in order to combat the fall in blood pressure which often accompanies spinal anaesthesia. Ephedrine is quite useless if, as popularly but erroneously employed, it is injected immediately before the administration of a spinal anaesthetic. It is a slow-acting drug, and the vasoconstrictors are paralysed long before the ephedrine is absorbed from the subcutaneous tissues.

Half an hour before operation the eyes and ears of the patient should be comfortably but effectively bandaged, and he or she should be left in complete quiet. This premedication is usually sufficient for the phlegmatic type of patient. More highly strung or excitable patients should be given light inhalational anaesthesia during the operation.

Technique

Ampoules of anaesthetic solution, files, needles, and syringes (employed solely for spinal and local anaesthesia) should be sterilized by prolonged soaking in spirit, and should be transferred to a bowl of sterile water at body temperature when required. It is important that no trace of alkali should come into contact with the outfit at any stage of the proceedings, because the slightest trace is sufficient to precipitate and render ineffective both percaïne and stovaine. Fine-bore needles with a narrow bevelled point and fitted stylet should be used. These may be obtained to fit Record syringes, and either this type or that with a simple bayonet catch of the Labat pattern is preferable to those to which the syringe has to be screwed. Rigid aseptic precautions must be observed both in the sterilization of the administrator's hands, and the patient's back, and the administrator should always wear a sterile gown and gloves.

Intrathecal puncture for spinal anaesthesia should always be performed in the second-third or third-fourth lumbar interspace, and never at any higher level. After the selected interspace has been palpated a skin wheal should be raised in the midline by the intradermal injection of a few drops of 1 or 2 per cent. novocain solution, and the skin and subcutaneous tissues pierced by a De Caux primary puncture needle passed to a depth of about three-quarters of an inch and immediately withdrawn. The spinal needle is then passed through the track thus made and pushed on until the point is felt to have pierced the dura mater. The stylet is then withdrawn, and clear cerebrospinal fluid should drip from the needle. If by reason of difficulty in performing intrathecal puncture the cerebrospinal fluid is blood-stained no attempt should be made to inject the anaesthetic solution until the drops become clear.

Barker's solution of stovaine (specific gravity 1025) or the 1 in 200 solution of percaïne (specific gravity 1026) are both considerably heavier than the cerebrospinal fluid (specific gravity 1004 to 1010), and either of these solutions may be used with the same technique of administration. The chief differences between the two solutions are that the 1 in 200 solution of percaïne takes slightly longer to produce anaesthesia, is given in a slightly larger dosage,

and the resulting anaesthesia lasts much longer. Upper abdominal anaesthesia with stovaine rarely lasts more than forty to fifty minutes, whereas heavy percaine is effective for twice as long. Either solution can therefore be employed, the choice depending upon the probable duration of operation and the desirability or otherwise of a speedy recovery from the effects of the anaesthetic. Height of anaesthesia with these two solutions is obtained by the process of gravitational diffusion, which consists of tilting the patient so that the nerve roots that supply the upper limit of the required anaesthesia are, as far as possible, made the most dependent part of the spine, then injecting the solution and leaving gravity to do the rest.

Position of Patient During Administration

For subumbilical surgery anaesthesia should extend as high as the eighth dorsal nerve roots, and for full abdominal anaesthesia as high as the fifth dorsal. The patient is placed on the table with the side on which the operation is to be performed downwards, unless the operation is bilateral, in which case it is immaterial on which side the patient lies. For full abdominal anaesthesia the table is tilted into eight degrees of Trendelenburg position, and for subumbilical anaesthesia into five degrees. At the same time the head and neck (but not the shoulders) of the patient are raised, either by lifting the headpiece of the operating table or else by a suitable arrangement of pillows. This is done in order to prevent the solution from gravitating to a height at which it would anaesthetize the anterior roots of the phrenic nerves (third, fourth, and fifth cervical), thus causing paralysis of the diaphragm and almost instantaneous death. A dose of 1.6 c.cm. of stovaine or 2 c.cm. of heavy percaine is usually adequate to obtain full abdominal anaesthesia.

For operations on the leg 1.2 c.cm. of stovaine or 1.5 c.cm. of heavy percaine should be injected, but the table need not be tilted from the horizontal, although similar precautions should be observed for protecting the phrenic nerves by raising the head. "Saddle-area" anaesthesia is obtained by injecting 1 c.cm. of stovaine or 1.3 c.cm. of heavy percaine with the patient kept sitting upright for three minutes before lying down on a flat table with one pillow under the head. This gives a localized but effective anaesthesia useful for the following procedures: (1) obstetrical manœuvres, including forceps delivery; (2) vaginal and perineal operations; (3) haemorrhoidectomy; (4) operation for fistula in ano, ischio-rectal abscess, etc. When stovaine or heavy percaine have been used the Trendelenburg position cannot safely be adopted until at least fifteen minutes have elapsed for fear of upward spread of the solution towards the phrenic nerve roots.

The Use of Light Percaine

For operations necessitating the rapid adoption of the Trendelenburg position, or performed in the lateral posture, as, for example, in thoracic or renal operations and for "quiet" (but not for urgent) upper abdominal surgery of prolonged duration, the original 1 in 1,500 solution of light percaine (specific gravity 1.00345) in 0.5 per cent. saline is still pre-eminent. The use of this solution necessitates an entirely different technique, which was originally described by the late Howard-Jones. The cardinal feature of this procedure is that a slight degree of Trendelenburg position is essential immediately following the administration of the anaesthetic and for three hours subsequently.

The dose should be varied according to the size and bulk of the patient within the limits tabulated:

	Males	Females
For subumbilical surgery	11-13 c.cm.	10-12 c.cm.
For full abdominal anaesthesia, renal or thoracic surgery	13.5-16 c.cm.	12.5-15 c.cm.

A 20-c.cm. syringe is charged with 2 c.cm. of the solution and the plunger pulled up and down in order to rinse the syringe with the solution. The 2 c.cm. is then ejected and the syringe filled with the requisite dose of percaine. The patient is placed in the lateral flexed posture on a horizontal table without a pillow and with the side on which the operation is to be performed uppermost. Intrathecal puncture is performed as previously described and the requisite dose of light percaine evenly and gently injected, the actual injection occupying twenty-five to thirty-five seconds. After the needle has been withdrawn the table is slightly tilted until the head of the patient is just dependent. The patient is then gently turned over to assume the ventral decubitus for six to ten minutes in order that the light percaine solution may soak the posterior nerve roots. After six to ten minutes the patient is turned on to his back and the operation may be started immediately. If the operation is one which necessitates the lateral posture no alteration (other than slight tilting of the table) is made in the position of the patient after the injection of the light percaine, and the operation may be begun after six to ten minutes have elapsed for the development of anaesthesia.

During operations performed under light percaine anaesthesia the patient may be immediately placed in any degree of Trendelenburg position surgically desirable. As previously mentioned, a slight degree of Trendelenburg position must be maintained for three hours following administration, which necessitates the raising of the foot of the patient's bed on blocks irrespective of the surgical desirability of this procedure. For this reason light percaine is not the anaesthetic of choice for emergency abdominal surgery in the presence of peritonitis, ascites, etc. Light percaine produces anaesthesia in the upper abdomen lasting for a minimum of one and a half and usually for two to two and a half hours.

Management of the Patient

The first important point is to ascertain that the spinal anaesthetic is working well. No attempt should be made to test the efficiency of the anaesthetic upon any site which is not expected to be fully anaesthetized, or before sufficient time has passed after injection for anaesthesia to develop. If a patient is once hurt his confidence is destroyed and is seldom completely restored. In testing anaesthesia a sharp-pointed towel-clip is the most satisfactory instrument to employ. The patient should never be asked if he can feel anything or be allowed to see any test being performed, but the anaesthetist must watch the patient's face carefully. Imperfect anaesthesia will be demonstrated by a contraction of the mouth. The patient should be asked to raise the legs, and also to take a deep breath, then give a cough, while the anaesthetist watches the abdomen. Bulging of the abdomen when the patient coughs indicates that the anaesthetic has produced relaxation of the abdominal muscles. The patient's arms should be placed by the side and comfortably but firmly fixed by a sheet or other suitable device to the table. The hands should never be placed under the buttocks during operations under spinal anaesthesia.

Whether supplementary light inhalational anaesthesia should be given should be decided on the merits of each particular case. Generally it is necessary during upper abdominal surgery; otherwise traction on the upper abdominal viscera or manipulations in the region of the diaphragm cause discomfort, nausea, or vomiting, and a consequent reflex fall in blood pressure. Gas and oxygen is ideal, but if this is not available a satisfactory light and harmless anaesthesia of the midwifery type may be obtained by the use of a few drops of chloroform and ether mixture on an open mask. Inhalational anaesthesia is rarely necessary for procedures other than upper abdominal surgery, except in the case of nervous patients upon whom the preliminary dose of omnopon and scopolamine has not produced its usual tranquillizing effect.

It is the duty of the anaesthetist to protect the patient from being treated to any undesirable dissertation on the state of his or her inside by a forgetful surgeon. Omnopon and scopolamine alone often confer complete amnesia, but it is generally in the wrong case that it fails to do so. If consultations are desirable among those present as to further procedure after the lesion has been exposed, it is usually expedient to administer light inhalational anaesthesia. Similarly, the anaesthetist should ensure that the unanaesthetized chest of the patient is not used as a repository for temporarily unwanted instruments.

Management of the Common Complications

A fall in the blood pressure is a normal physiological accompaniment of all high spinal anaesthesia, and only calls for restorative measures when profound in degree. In the latter cases the Trendelenburg position should be adopted and the patient should inhale sal volatile. Drug treatment consists in the subcutaneous injection of pituitrin 1 c.cm., or, in really alarming cases, in the intravenous injection of 2 or 3 minims of an ampoule of 1 in 1,000 solution of adrenaline. In this connexion the use of a bridge on the operating table almost invariably causes an undue fall in the blood pressure of a patient under spinal anaesthesia. The anaesthetist should politely but firmly deprecate the use of a bridge for operations on the biliary passages unless it is absolutely essential. In the majority of cases the perfect muscular relaxation and comparative stillness of the abdominal contents produced by spinal anaesthesia appear to compensate the surgeon for the loss of one of his "aids." This does not apply to operations on the kidney performed in the lateral posture. In these the use of the bridge has not usually the same obstructive effect on the venous circulation.

Unless there is any surgical contraindication—for example, pelvic peritonitis—and despite any surgical contraindication if the general condition is poor, the foot of the bed should always be raised on blocks for at least three hours after the administration of a spinal anaesthetic, irrespective of the drug used. Subsequently one pillow should be added beneath the head every hour until the patient has been raised to the degree desirable for nursing. In cases of peritonitis, etc., in which the general condition is fair or good, and in which any drug except light percaïne has been used, the blocks should be omitted. The patient should be flat with a small pillow under the head for three hours, and should then be gradually raised in the manner described.

A French society for the study of cardiology has recently been organized by Dr. Laubry and other heart specialists in co-operation with the editorial board of the *Archives des Maladies du Cœur*.

INTERNATIONAL HYGIENE

[FROM A CORRESPONDENT AT GENEVA]

The fires of oratory at the present Assembly of the League do not burn brightly. Whether it is due to the world situation or to the overwhelming effect of the new palace at Ariana Park—rather like an oriental dream—the tribune is unoccupied. Appeals by the president of the Assembly (the Aga Khan) for orators to inscribe their names go unregarded. A single speech, and a morning session is at an end. The commissions also fail to arouse debating enthusiasm. A discussion on the status of women lapsed within an hour. Even the League's budget goes through almost in silence. The only occasion on which there has been any competition in oratory, the debate extending over two sessions, was when the report of the Health Organization came forward for review, and this subject aroused no controversy, only a desire on the part of every delegate to show how progressive was his own country in health matters.

A New Covenant and a New Habitation?

As health seems to be the one subject on which all nations are agreed it might be a wise expedient to divorce the Health Section and perhaps the sections dealing with social questions and the drug traffic from the unstable and weakening political framework of the League, and construct for them a new Covenant and give them a new habitation. Such a non-political League would command the adhesion of all nations, including those at present outside the membership—namely, the United States, Germany, and Japan—as well as indifferent members such as Italy. As there is great sensitiveness with regard to localities the centre of such a League ought not to be at Geneva; perhaps it might be located in a country like Palestine, at the junction of three continents, or in Egypt, the youngest member of the present League, whose delegate, Dr. El Wakil, professor of the Faculty of Medicine at Cairo, declared in the course of the debate that the science of medicine, both preventive and curative, was born and systematized in the land of the Pharaohs, and for centuries practised and taught there before it was practised and taught anywhere else.

In the debate on health questions the Chinese delegate described how the authorities in his country, with the aid of the League, were stamping out epidemics of cholera in the Shanghai and Canton areas. The Finnish delegate spoke at length of the way in which Government authorities and voluntary bodies in Finland were coping with the problem of tuberculosis, and he urged the Health Organization to set up a special committee to deal with that subject. The League, he said, had concentrated rather upon tropical diseases, and had not done much work on diseases which by reason of their incidence, their chronic nature, and their social consequences commanded public attention in Europe. The Indian delegate mentioned some recent achievements in his country in the sphere of public health, including the establishment of a committee for the standardization of therapeutic substances and the inauguration of new anti-malarial measures. The Central and South American delegates all acclaimed the projected conference on rural hygiene which is to be held in Mexico City in December, 1938, and for which fourteen American countries, including Canada and the United States, have already accepted invitations.

Hygiene in the Far East

The report of the conference of Far Eastern countries on rural hygiene, held at Bandoeng, Java, in August, was placed before the Assembly. Its president was Dr. J. Offringa, director of the Netherlands Indian Public Medical Service, and its secretary Dr. L. Rajchman, director of the League Health Section, and fourteen countries were represented, whose populations aggregated to more than half the total population of the world. One of