TWO THOUSAND SPINAL ANAESTHETICS

BY

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SUMMARY

A series of 2,000 spinal anaesthetics is presented, having been personally administered in the state of Kuwait over the past eleven years. The techniques described have been directed to reducing the discomfort of the procedure, providing sedation for the anxious patient, and avoiding contamination of the cerebrospinal fluid. The method has given every satisfaction, and has been free from serious complications. Those of a neurological nature include one case of sixth-nerve paresis, and one of a mild cauda equina lesion, both of which recovered within a few months. Headaches occurred in 12 per cent of cases. The present-day role of the spinal anaesthetic is obviously limited where trained personnel and modern equipment hold sway. In less favourable conditions, however, it assumes an entirely different position: its undoubted value in these circumstances should not be overlooked or discredited.

Spinal anaesthesia has experienced a varied career since its discovery and use in the human subject at the turn of the century. The reasons for this fluctuation in popularity may be attributed to several factors. As a rule it is limited in application to the trunk and lower limbs and is thus denied the right of being a general-purpose method. The marked advances of inhalational anaesthesia in the past twenty years have overshadowed it; in particular, the advent of the muscle relaxants, the outcome of which robbed the spinal of its unique advantage—complete muscular relaxation. The toxicity of drugs and the crippling complications which occasionally occur have damaged its reputation. It is not unusual to find an aversion to its use amongst Western people, either on account of a previously painful lumbar puncture, the fear of remaining conscious throughout an operation, or of permanent paralysis. From the surgical standpoint, retching, vomiting, or restlessness during the procedure is unwelcome and, furthermore, a violent spinal headache may outlast the original complaint.

Its advantages lie mainly, though not entirely, in the circumstances attending its administration when compared with other forms of anaesthesia. It has been and still is, the great standby in difficult situations, be they geographical, climatic or economic (Farman, 1962). The uncomplicated technique, in part familiar as the diagnostic lumbar puncture, and certainty of action may well commend it to the untrained or inexperienced anaesthetist, in whose hands it probably has a greater margin of safety than a general anaesthetic. This does not imply that the method should be embarked upon lightly, or that scrupulous attention to details of asepsis and cardiorespiratory function may be neglected. It is a boon indeed to the anaesthetist working alone in a busy hospital, both during an operating list and postoperatively, especially if there be a shortage of trained nursing staff. It is no exaggeration to say that the amount of work undertaken in the writer's particular instance would have been impossible without the use of spinal anaesthetics.

This paper deals with the administration of 2,000 spinal anaesthetics in the Magwa and Southwell Hospitals of the Kuwait Oil Company, Kuwait, over the past eleven years. Many different nationalities drawn from Company employees, their families, and maritime patients are included, each with their individual ideas on anaesthesia. Very few, apart from British and American subjects, object to the spinal form. The majority have been healthy young adults who have been
TABLE I
Agent used and type of spinal block produced in 2,000 patients over an 11-year period.

<table>
<thead>
<tr>
<th>Type of spinal block</th>
<th>Agent used</th>
<th>Type of spinal block produced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amylocaine (Barker’s solution)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Piperocaine 10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procaine 1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypobaric cinchocaine 1:1500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hyperbaric cinchocaine 1:200</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>–</td>
<td>10</td>
</tr>
<tr>
<td>High</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>Mid</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Low</td>
<td>89</td>
<td>109</td>
</tr>
</tbody>
</table>

Table I shows the drugs and type of spinal block employed in this series.

TECHNIQUE

To achieve the most favourable results the techniques employed have been modified to suit individual cases and ensure that they are as acceptable as other forms of anaesthesia. This is a particularly important consideration in a small isolated community; since no patient is forced into accepting this type of anaesthetic the survival of the method depends upon its reputation. The quantity of drugs used has erred on the generous side to secure analgesia of sufficient height for the painless insertion of towel clips, and the abolition of disagreeable sensations arising from peritoneal traction, etc. The following simple regime, using hyperbaric cinchocaine 1:200, has been found to answer these requirements and is an explanation of the terms used in the table.

Low spinal block. Anaesthesia for surgery of perineum, bladder, and rectum; achieved by the use of 1 ml of solution in the lying position with the spine horizontal.

Mid-spinal block. Anaesthesia for surgery up to umbilical level including the legs; achieved by the use of 1.2 to 1.6 ml of solution with a 5-degree head-down tilt.

High spinal block. Anaesthesia for surgery above the umbilicus, including renal operations; achieved by the use of 1.75 ml to 2 ml of solution with a 5-degree head-down tilt.

Details of the spinal puncture, using hyperbaric cinchocaine, are as follows:

Premedication consists of papaveretum 20 mg, hyoscine 0.4 mg in the average age/weight group. The lumbar puncture is performed in the lying position, affected side dependent, with a head-down tilt if applicable. Full sterile precautions are observed, and, as far as possible, a no-touch technique. The back is prepared with 70 per cent alcohol, followed by 5 per cent tincture of iodine; any surplus is carefully wiped from the area before proceeding.

The interspinous space chosen for lumbar puncture is between the second and third or third and fourth lumbar vertebrae depending solely on the ease of recognition of the bony landmarks, and disregarding the height as a factor governing the extent of anaesthesia. Seldom is it necessary to stray outside these limits.

A skin weal is raised in the midline, using part of the spinal anaesthetic solution, and the needle is advanced through this to infiltrate the ligaments. Recognition of the correct position of the needle, sometimes difficult in the obese, is confirmed by the resistance to injection.

A transverse stab incision is then made using a No. 11 blade, and the wound edges separated by retracting with the left thumb. A gauge 20 spinal needle may then be introduced directly into the wound avoiding skin contact; it is contended that further progress of the needle is facilitated by the preceding infiltration, and rarely is it diverted from a straight course. The bevel is advanced to split rather than cut the dural fibres, the stilette withdrawn, and the shaft rotated. Only when there is a free flow of clear fluid, or bloodstained fluid which clears rapidly, can one be assured of success. The anaesthetic solution is now injected fairly rapidly without barbotage and, after a pause, the needle is withdrawn and the patient is returned to the supine position. Tingling of the affected area, noticed particularly in the legs, appears shortly and the block is complete within 5 minutes. All patients are maintained with a head-down tilt throughout the operation, and remain horizontal for 24 hours postoperatively.
In those of placid temperament and with good premedication, surgery of the lower abdominal wall, perineum, sacral region, and lower limbs, has been performed under spinal block alone. Apprehensive patients, and those undergoing intra-abdominal procedures require supplementary sedation. The latter modification has been used with increasing frequency, the technique adopted being as follows.

The initial block is performed with the patient conscious. Once this has taken effect, an indwelling needle is introduced into an ankle vein and through it a mixture of pethidine 50 mg, promethazine 50 mg, in 10 ml of sterile water, is administered until the patient falls into a quiet sleep. A dose of 6 ml given rapidly will usually suffice to achieve this state, after an interval of a few minutes, and maintain it throughout an operation of reasonable length. Repeated doses are given should the need arise. The patient may be roused at any time, if necessary and, indeed, commonly wakes as he is lifted from table to trolley at the close of the case.

The use of part of the anaesthetic solution for raising a skin weal and infiltration of ligaments is considered to be well worth while. This reduces the discomfort of the spinal puncture appreciably, rendering it no more unpleasant than the venepuncture prior to a general anaesthetic.

Piercing the skin by a stab incision minimizes the chance of needle contamination and of carrying flakes of epidermis into the subarachnoid space (Dickson, 1944). The value of this precaution has been demonstrated by piercing a portion of intact skin by a spinal needle and examining the tip before it is withdrawn; particles of epidermis up to 0.5 mm diameter may be found adherent to the crevice between barrel and stilette. It has been found unnecessary to use an introducer, for much of the strain on the needle shaft is eliminated by the above manoeuvres. Intravenous infusions are not used as a routine, being reserved for cases of sufficient magnitude or when the block is of such an extent that a marked hypotension is likely.

**Sterilization of equipment.**

The agent most commonly used has been hyperbaric cinchocaine 1:200; this has been included in a spinal set as advised by Macintosh (1957) autoclaved at 20 lb./sq.in pressure for 15 minutes (256°F). Ampoules of cinchocaine have been discarded if unused after one sterilization.

**Complications**

No deaths, either immediate, or postoperative, have occurred in this series.

**Immediate.**

A fall in systolic blood pressure to 80 mm Hg has been recorded in the majority of mid-spinal blocks. Falls in excess of this have been treated by vasopressor drugs such as ephedrine 100 mg, or mephentermine 15 mg, injected intramuscularly into the thighs; in higher blocks the fall has been anticipated by their use. Profound hypotension with marked peripheral stasis has followed general anaesthesia, necessitated by inadequate spinal blocks in two cases of nephrectomy.

**Postoperative.**

**Headache.** The frequency of this complication varies widely according to different authors. Thorsen (1947) quotes figures ranging from 0.1 to 72 per cent. In his personal series of 2,493 patients who replied to a questionnaire, the incidence was 24 per cent. Dripps and Vandam (1954), adopting the same method of enquiry, record 14 per cent in over 10,000 cases. Much lower incidences have been reported by Grady, Stough and Robinson (1952) (1.21 per cent in 2,300 cases) and by Arner (1952) (1.6 per cent in 1,774 cases).

In the present group spontaneous complaints of headache occurred in 12 per cent of patients; these were usually of a transitory nature. A notable feature of the headaches was that they occurred in batches but careful enquiry into technique, sterilization, and proximity of patients, failed to reveal an explanation. This phenomenon has been commented on previously by Hadfield (1933) in a discussion of Ashworth’s paper.

A curious similarity exists between this periodicity and the couplings noted in graver neurological complications. Thus Payne and Bergentz (1956) list two cases of arachnoiditis resulting from spinal anaesthetics given on the same day. Terp (1950) described five cases of arachnoiditis occurring within a space of 6 months. Grady, Stough and Robinson (1952) found three cases of cauda equina lesions in a similar period. Rosenbaum et al. (1952) reported six cases of arachnoiditis; five had received spinal anaesthetics within a 4-month period. In each case these incidents occurred after, maybe, years of uneventful
anaesthesia. It has been suggested by a number of observers (Brock, Bell and Davison, 1936; Terp, 1950; Payne and Bergentz, 1956) that the cause of such complications is a virus invasion of the nervous system whose resistance has been lowered by a spinal anaesthetic. However true this may be, the above evidence suggests that a more definite explanation exists than that of chance drug idiosyncrasy.

Backache arising from the puncture site occurred in 6 per cent, but was briefer and of less consequence to patients than headache.

Anaesthesia of the anal region and impotence followed the treatment of anal fistula in one case. This occurred after the use of amylcaine and passed off in 3 months.

One case of external rectus palsy associated with a severe headache of 7 days duration resulted from the use of hyperbaric cinchocaine for a ureterolithotomy. Recovery was complete in 2 months.

Two cases of herpes zoster were noted 6-10 days after mid-spinal blocks. In each case the eruption was confined to the buttock and lower limb unilaterally.

Two cases of severe pain in the hard palate, unaccompanied by physical signs, occurred on the day following spinal anaesthesia. These identical complaints fell within a week of one another, and drew attention to what otherwise may have passed unnoticed as a complication.

In keeping with the incidence following any anaesthetic method in Kuwait, chest complications after spinal anaesthesia have been low, amounting to one case of acute bronchitis in an aged man. The climate, build of the people, and relative freedom from chronic chest conditions, other than tuberculosis, are largely responsible.

Spinal blocks repeated on patients at intervals as short as 2 days have been found to have no harmful effects. Sullivan (1932) cites a patient to whom five spinal anaesthetics were administered within 38 hours. Examination of the cerebrospinal fluid at the time of the second operation in the writer's cases has shown insignificant variations. This confirms the findings of Rendell (1954) who compared the cerebrospinal fluid following spinal anaesthesia using chemically sterilized, and later boiled, syringes. In the latter cases the changes were negligible.

**Selection of cases.**

In the writer's opinion there is little place for the high spinal block, renal cases excepted, when a comprehensive anaesthetic service is available. The amount of sedation necessary to abolish visceral reflexes from the upper abdomen, the likelihood of hypotension, and the associated respiratory depression combine to render the method fraught with difficulties.

In accordance with established practice, spinal anaesthesia has been avoided in the severely ill or shocked patient. On the other hand, it may be usefully employed in cases requiring surgery soon after the ingestion of food, or in those whose history regarding meals is unreliable with less risk of vomiting or the hazards arising therefrom.

Patients suffering from diabetes, chronic heart and chest conditions, and open pulmonary tuberculosis benefit from the conscious state and freedom from irritation of the pulmonary tract. With due regard to the above, it is well suited to surgery below the umbilicus. It has been found of especial value in the following types of case: all genito-urinary surgery, a frequent necessity in this climate; conveniently it allows ascending pyelograms to follow cystoscopic examinations without awaiting the recovery of consciousness which is otherwise necessary. Caesarean section and obstetrical emergencies: most satisfactory results have been obtained in these cases, one being impressed by the healthy condition of the infant particularly in neglected cases who have not received adequate antenatal care.

**COMMENT**

It would be difficult to justify any absolute indications for spinal anaesthesia where all modern facilities exist. Even in the latter circumstances, however, occasions arise when the method may be used to advantage as suggested above. Its regular use in short-term cases is open to question solely on the grounds of the relatively minor complications of headache, vertigo, and the like. Should these be sufficiently severe to prolong a patient's stay in hospital, it may well jeopardize his wage-earning capacity unnecessarily. Rarely have such complications proved incapacitating to this degree, and, in fact, recovery time has compared favourably with other anaesthetic methods. The problem
is unlikely to arise in longer-term patients. Other complications have been sufficiently few and free from serious outcome to encourage the continued use of this technique. The latter is a most important consideration when discussing this controversial subject and happily coincides with the findings of a number of authors in recent series (Arner, 1952; Dripps and Vandam, 1954; Grady, Stough and Robinson, 1954).

In conclusion it is felt that the spinal anesthetic has still a useful part to play in the field of anesthesia, particularly in the underdeveloped countries.

The present view in Great Britain is such, however, that students from home and abroad are endowed with a deep distrust of the method, generated as much by the fear of litigation as by the actual risk of neurological complications. The unfortunate result of such widespread belief is to discourage a method ideally suited to the diverse conditions prevailing in many other parts of the world.

REFERENCES


DEUX MILLE ANESTHESIES SPINALES

Sommaire

L'auteur presente une serie de 2000 anesthesies spinales, faites par lui-meme dans l'Etat de Koweit au cours des dernieres onze annees. La technique decrite a eu pour but de reduire les inconvenients pour le patient, de l'amener, lorsqu'il est anxieux, dans un etat de sedation et d'eviter la contamination du l.C.R. Cette methode s'est averee tout a fait satisfaisante et elle n'a pas donne lieu a des complications serieuses. Celles parmi ces dernieres qui interesseraient le systeme nerveux comprirent un cas de paraparese du sixieme nerf et un cas de lesion legere de la queue de cheval. Toutes deux guerirent en quelques mois. Des cephalies furent notees dans 12% des cas. Le role actuel de l'anesthesie spinale est evidemment limite, lorsqu'on dispose d'un personnel specialise sur et d'un equipement moderne. Dans des conditions moins favorables, il occupe cepenant une place forte differente et sa valeur indisputable dans ces circonstances ne doit etre ni negligee ni discredite.

ZWEITAUSEND LUMBALANÄSTHESIEN

Zusammenfassung