SPINAL ANALGESIA, WITH SACRAL ESCAPE *

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In the ordinary type of spinal analgesia, whether induced by hypo, hyper, or isobaric solution, the result is a complete paralysis of all sensory and motor nerves from the toes right up to the segment desired. Hence in an abdominal operation, besides the abdominal area all the lumbar and sacral nerves get paralysed. It seems sometimes unnecessary that all the lumbar and sacral nerves be involved when the operation is on a part of the abdomen, and it is also undesirable, as there is often retention of urine, and so the patient is unable to pass urine and requires catheterization. Sometimes this catheterization requires to be repeated for several days as the spinal centre for micturition, situated in the sacral part of the spine, gets paralysed. This effect on the spinal micturition centre is mostly temporary, but is sometimes more pronounced by certain toxic drugs like Stovaine Anaethaine with 10 per cent glucose, heavy Nupercaine, particularly if a bigger dose than necessary is injected and if alcohol has been used to lighten the specific gravity of the spinal solution, because alcohol has a destructive action on nerve centres and tissue, as pointed out by me in the British Medical Journal of 6th November, 1945, under Stovaine Analgesia.

It is now a known fact that a few cases have occurred of permanent urinary and defecation derangements and the patients have sometimes sued or cursed the surgeon or anaesthetist concerned for their spinal anaesthetic. This is one of the reasons why certain operators prefer general to spinal anaesthesia, as they had such bitter experience of spinal anaesthesia. But the thing that prompted me to work out this method of sacral escape is that

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I have seen at times male patients after operations, in the free surgical wards, in severe agony due to retention of urine, and the nurse or a lady house surgeon present there would not catheterize, and the patients waited very anxiously till a male house surgeon came up for his rounds and relieved the patient by passing a catheter. Such patients were in a condition of severe psychic shock, with beads of cold sweat on the forehead and anxious crying look, although there was no other post-operative complication. This retention of urine is therefore an undesirable and unnecessary complication of spinal analgesia.

I have, therefore, for over a year now, successfully modified the technique of administering spinal analgesia, so as to allow all the sacral nerves to escape. The patient is put in a lateral position with the thighs well flexed and touching the abdomen.

*With a hyperbaric or heavy solution*, even before the spinal injection is given the pelvic end of the table is raised to 15 degrees, and also the head end to 15 degrees, with a pillow under the head and neck. After thus arranging the pelvic and head ends of the table, the position of the table appears to be like a broad letter V (Plate No. I). Now, the whole table is slightly tilted to Trendelenburg position. These adjustments of the table are quickly made by the two wheels that are provided at the cephalic and the caudal ends, and also by the arrangement for tilting the whole table to Trendelenburg position. The lowest of most dependent part of the spine is now the region of the 3rd lumbar, or 3rd and 2nd lumbar. The object of keeping the thighs well flexed and raising the caudal end of the spine is to straighten up the lower end of the spine and entrap the solution in the mid-lumbar and lower-lumbar region, and prevent it entering the sacral concavity, so that all the sacral nerves and the sacral centre of micturition escape.

In *Surgical Physiology*, by J. Nash, it is stated “since micturition can be carried out naturally after ablation of hypogastric plexus, it is clear that only the sacral supply to the bladder is essential for micturition.” Now the hypogastric nerves coming from the lumbar ganglia are paralysed in spinal analgesia, but
Plate I.
For Injection of Heavy Solution.

Plate II.
After Injection.
Spinal Analgesia, with Sacral Escape

if the sacral nerves escape, then the nervi erigentes or the pelvic nerve which arises from the sacral segments escape, and so the act of micturition can be performed normally by the patient. (Diagram No. 1.)

The injection is given slowly without any force or barbotage. After the injection, the patient is turned on the back with both thighs still well flexed and almost touching the abdomen for about 3 minutes (Plate No. II), after which the limbs are straightened. The quantity of solution injected is only the necessary minimum.

*With a hypobaric or light solution*, if the table is immediately put in the Trendelenburg position after the spinal injection, as is commonly done, the sacral nerves cannot escape, because the solution remains caudalwards, but if before the injection is given the patient is so put that the highest part of the spine and body is kept at about the 5th dorsal, and the thighs well flexed on the abdomen with patient in lateral position, and the head and neck kept low, the light spinal solution, which should be warmed, will not collect down in the sacral concavity but will ascend cephalwards.

Further procedure depends upon whether the effect of spinal
analgesia required is only for one side of the body, i.e., unilateral, or hemi-lateral, or a bilateral effect. The former, or unilateral, is advantageous for one-sided limited operations, e.g. hernias, etc., because there is less fall of blood-pressure, whereas the usual bilateral effect is good for laparotomy and operations on the middle of the abdomen. For producing a unilateral analgesia it is necessary to maintain the lateral posture, with the affected side high in cases of hypobaric or light solutions, and the non-affected side resting on the table. This position is maintained till the solution is fixed, i.e. 10 to 15 minutes, and then the patient is put on his back.

For producing complete bilateral analgesia of the abdomen with light solutions the patient is first put prone on his face and stomach to soak the posterior roots for 3 minutes, and then is turned on his back to soak the anterior roots, but to secure the escape of sacral nerves the thighs must be kept well flexed for another 3 minutes and thereafter the lower limbs are straightened.

This method is useful in abdominal operations above the diaphragm. The head and neck are kept low with light solutions and the table is only gradually tilted to the Trendelenburg position.

Thus the escape of sacral nerves is successfully obtained.
with either unilateral or bilateral type of analgesia and with heavy, light, or isobaric solutions.

The test of the success of this method of sacral escape is that the sensations over the perineum, scrotum and penis in the male, and vulva in the female, should be present, as tested by a pin, but as the genitofemoral nerve which comes from the lumbar nerves also supplies the scrotum, etc., if it is sometimes involved, the sensations may be lost, but certain areas on the posterior aspect of the lower limbs, where there is cutaneous distribution of the sacral nerves, remain sensitive, as tested by a pin. (Diagram No. 2, in which shaded area shows presence of sensation.)

In conclusion, this method has the following advantages:

1. As the sacral nerves are not paralysed, the important sacral centre of micturition, which is innervated by these nerves, escapes, and so the micturition reflex remains unaffected.

2. The post-operative period is comfortable inasmuch as there is no painful distention of the bladder, and therefore there is no need of catheterization, which may otherwise be needed, sometimes repeatedly, and which may lead to pain and infection.

3. There is less trouble for the overworked house-staff of the hospital.

4. As there is presence of sensation in the saddle area and also certain portions of the posterior aspect of the lower limbs, where also there is anatomical cutaneous distribution of the sacral nerves, the patient cannot inadvertently be burnt by a hot-water bottle over these areas.

5. For Cæsarean sections done under spinal Analgesia, if by this method the sacral escape is allowed to take place, then in addition to the above-mentioned advantages the tone of the uterus is better maintained, good contractions occur, and so loss of blood is diminished.