PERIDURAL ANAESTHESIA FOR OBSTETRICS*

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THE administration of peridural anaesthesia is now accepted as a satisfactory procedure which is available to the experienced anaesthesiologist for caesarean section, and for all types of obstetrical delivery with the exception of internal version. When this method is to be used it is essential that the anaesthesiologist must have a prior knowledge of the technique of lumbar puncture and the anatomy of the areas surrounding the thoracic and lumbar spines, and must also have extensive experience in the use of spinal anaesthesia. It must be borne in mind at all times that the administration of peridural anaesthesia can lead to catastrophes to patients when it is attempted by casual, inexperienced, or careless anaesthesiologists.

Cathelin and Sicard (1) (1901) performed the first successful caudal blocks by injecting cocaine into the peridural space via the sacral hiatus. Sicard and Forrestier (1906) showed experimentally that it was feasible to make injections into the peridural space using the intraspinous approach. Lawen (1910) recommended the use of caudal block for perineal surgery. Kronig (1910) and Lundy (1935) produced a higher level of anaesthesia by increasing the amounts of anaesthetic solution injected into the caudal canal. Pagès (1921) first reported the use of peridural anaesthesia, and in 1931, Dogliotti (2) described a practical single injection technique.

In 1944 Tuohy (3) introduced his method of administering continuous spinal anaesthesia through a ureteral catheter. In 1949 Cleland, and Flowers, Hellman, and Hingson, described methods of using continuous catheter peridural anaesthesia for obstetrics.

The terms peridural, epidural, and extradural, are synonymous, (4) and the term caudal anaesthesia means that injection has been made into the same space through the sacral hiatus.

The statistical data presented is based upon 568 consecutive peridural anaesthetics which were administered in the case rooms of the Vancouver General Hospital.

PERIDURAL ANAESTHESIA		
Caesarean Section		29
Delivery—Vertex	525	
Breech	11	
Twins	3	
	—	539
Total Cases		568

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Equipment available should include: a suitable tray; two draping towels and a hand towel; a medicine glass, sponges, antiseptic, and forceps; a 25 c.c., a 5 c.c., and a 2 c.c. syringe; a No. 18 G I.V. needle, a No. 24 hypodermic needle; and two No. 18 T G needles—one straight, and one with a huber point. Plastic tubing No. 442 T may be cut into lengths of approximately 36", fitted with stillettes (which may be made from No. 5 or No. 6 tonsil wire), and sterilized separately for 5 minutes at 250°. With a catheter adapter this will provide a satisfactory catheter for the administration of continuous peridural anaesthesia.

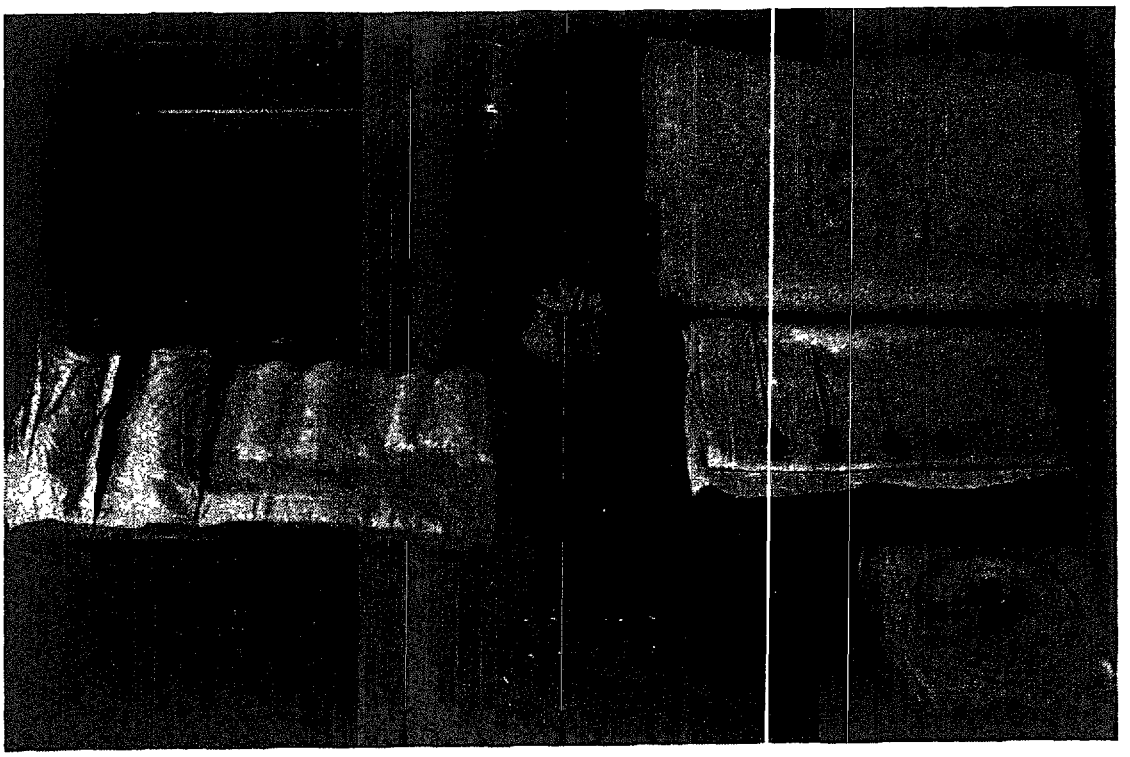

FIGURE 1. Equipment tray.

The special bore needles (18 T) have been developed by Beckton, Dickinson and Company. Their large inner diameter will allow passage of No. 442 T plastic tubing, (which is also supplied by Beckton, Dickinson and Company), for the initiation of continuous catheter techniques, and will also simplify the method I shall describe, as pressure changes are much more apparent in a tube of large diameter than in one of small diameter.

Lidocaine Hydrochloride (Xylocaine) has proven to be the most suitable anaesthetic solution available at present. When used as a 2% aqueous solution it will produce anaesthesia for about 1¼ hours. If adrenaline 1:300,000 or 1:200,000 is added then the length of anaesthesia may be prolonged up to 2½ to 3 hours. As little adrenaline as possible should be used as it produces rigors in some patients. As a general rule it may be considered that 1–1½ c.c. of xylocaine will produce anaesthesia involving one segment, and that the maximum

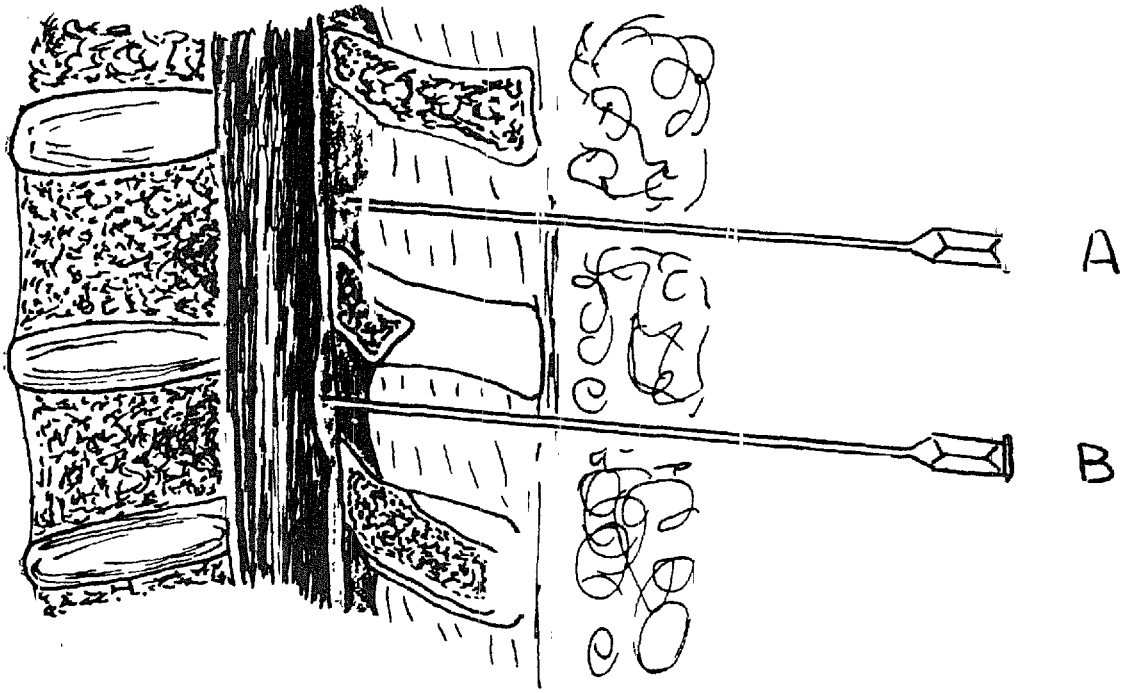

FIGURE 2. Technique.
A Needle point in ligamentum flavum. B. Needle point in epidural space.

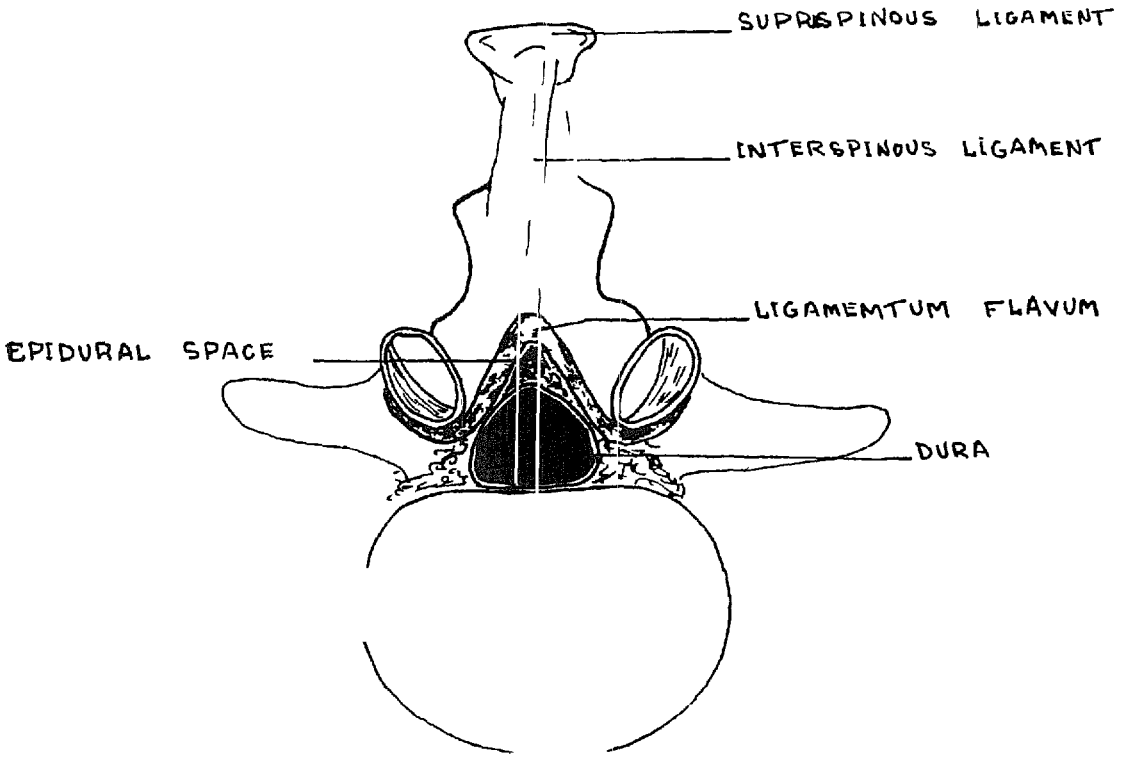

FIGURE 3 Cross section.

non-lethal intrathecal injection is 200 mgm. (or 10 c.c. of 2% solution). Thus, since the peridural space is filled mainly with fatty tissue and a venous plexus, the extent of anaesthesia obtained will depend upon the site at which the injection is made, and upon the quantity of drug injected.

Doglioti's technique (2) is the most efficient for lower thoracic, and lumbar interspaces. A number 18–T needle is placed with its point in the substance of the ligamentum flavum. The stillette is removed and a 5 c.c. syringe containing anaesthetic solution is attached to the hub of the needle. It will be found that it is impossible to inject any solution into the strong and elastic ligamentum flavum. While constantly attempting to inject the solution the needle is slowly advanced through the ligament until it pierces the periosteal layer of the peridural space, and enters the space. Immediately, pressure on the plunger of the syringe will be released and the solution will be injected rapidly into the peridural space. The needle must be fixed in this position and a further test made: if a small syringe filled with air is attached to the hub of the needle it will be found that air can be injected into the peridural space with little or no resistance, and that no fluid can be withdrawn into the syringe. Injection of the required amount of anaesthetic solution can then be made, 5 c c at a time, and the needle withdrawn. This method depends entirely upon the sudden change of pressure which occurs as the point of the needle passes out of the substance of the ligamentum flavum, through the membranous periosteal layer of the peridural space and into the space itself. Thus it will be apparent that the needle which has the largest inside bore, and which is least traumatic, should be used, and also that forceful injection of solution into the space will tend to push the dura away from the point of the needle at the instant the needle enters the peridural space

The single injection technique will be found satisfactory for delivery in all cases suitable for administration of regional anaesthesia. The patient should be placed in the lateral position with knees flexed on the abdomen, and 10–15 c c. of xylocaine 2% solution injected at L 3–4 or L 4–5 For primiparae, the injection should not be made until the cervix is fully dilated, for multiparae it can be given when cervical dilatation has reached 8 cm. For the actual delivery some patients may require light nitrous oxide anaesthesia to control pressure discomfort No vasopressor drug is administered unless hypotension develops.

For Caesarean Section the single injection method is satisfactory if 15 c.c. 2% xylocaine with adrenaline 1.200,000 is injected at L 1–2 or L 2–3. Section patients are always given Methedrine 15–20 mgm., I.M., 10 minutes before anaesthesia is commenced, and painting and draping is delayed for at least five minutes after completion of peridural injection. An intravenous infusion is started immediately after anaesthesia has been given, so that any blood pressure fall may be controlled at once. Again, light nitrous oxide anaesthesia will control any discomfort until the baby is delivered.

Cleland (5) established that the pain pathways for uterine contractions are carried by T 11 & 12 and has evolved a continuous combined peridural and caudal method of controlling pain throughout labour and delivery. Cleland has

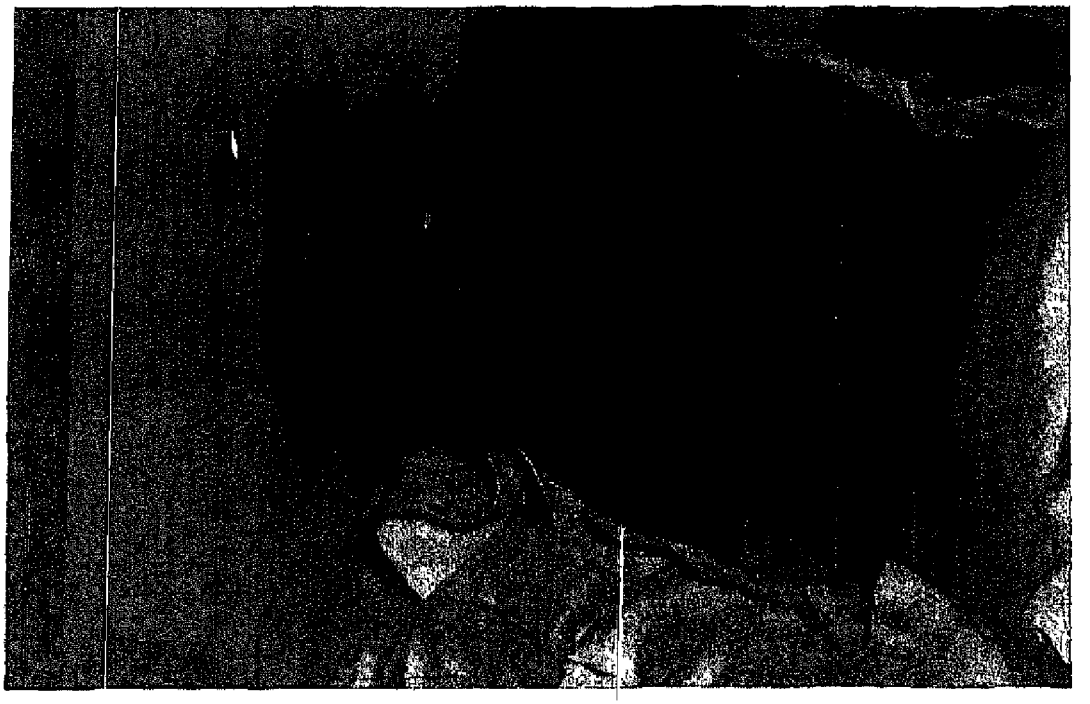

FIGURE 4 Doglıotti's method needle point in ligamentum flavum

also used a double peridural method which has proven suitable for selected cases here—especially toxic cases, and those occasional cases in which satisfactory control of pain cannot be obtained by sedation Two plastic catheters of the type described are used An 18–T needle with huber point is inserted into the space at L 1–2 and one catheter is passed cephalad to T 12 The other catheter is inserted at L 3–4 or L 4–5, using the same needle, and is directed caudad into the caudal canal The catheters are securely taped into position and the pain of uterine contractions can then be controlled by injecting 2–3 c c 2% xylocaine into the upper catheter at hourly intervals The lower catheter is in position for use after cervical dilatation is complete and anaesthesia is required for delivery

Peridural anaesthesia is especially advantageous for obstetrical patients As this type of anaesthesia is essentially a paravertebral block affecting the anterior and posterior nerve roots in the peridural space, patients will retain most of their motor function and will be able to move as directed while they are being prepared for delivery For the same reason previous C N S disease is not considered a contraindication Uterine contractions are frequently strong enough to accomplish spontaneous delivery Vomiting and aspiration, post-spinal headache and neurological sequelae should vanish

There are a few disadvantages which must be considered Labour may be stopped if single injection peridural anaesthesia is given too early in labour, or in some multiparae if the position is posterior In these cases labour will recommence when the anaesthesia has worn off Multiparae may precipitate in spite of peridural anaesthesia if labour is too far advanced when it is administered The incidence of forceps delivery is increased

TABLE I

PERIDURAL ANAESTHESIA COMPLICATIONS
(539 Deliveries)

Type	Cases	%
Total Spinal	1	0 2
Inadvertent Lumbar Puncture	6	1 1
Failure (No Anaesthesia)	4	0 7
Labour Stopped	6	1 1
Patient Precipitated	3	0 5
Hypotension (Vasopressor Required)	24	4 4
Back Pain (Injection Site)	3	0 5
Transient Pains in Legs	3	0 5
Retained Placenta	6	1 1
Headache	1	0 2

Very serious technical difficulties may be encountered. These include inadvertent lumbar puncture with the possibility of injection of a large quantity of drug intrathecally: and drug reaction which must always be considered a possibility when any regional anaesthesia is used. Occasionally no anaesthesia may be obtained probably because injection has not been made into the peridural space. This is not a serious complication, but may prove embarrassing.

Peridural anaesthesia may now be administered safely by the experienced anaesthesiologist, and although it is technically more difficult to accomplish than other forms of anaesthesia available, those who will make the necessary effort to become proficient in its use will be amply rewarded by the favourable reaction of both patient and obstetrician.

SUMMARY

1. Peridural anaesthesia is especially advantageous for obstetrical patients. This report is based on its use in 568 such patients.

2. Various techniques for induction of peridural anaesthesia in obstetrical patients are outlined.

3. Peridural anaesthesia may be administered safely by the experienced anaesthesiologist, but should not be attempted by casual, inexperienced or careless practitioners of the art.

Résumé

L'anesthésie péridurale est acceptée maintenant comme procédure satisfaisante pour l'opération césarienne, et pour tous genres d'accouchement avec l'exception de la version interne. L'anesthésiste qui voudrait employer cette technique doit avoir une connaissance préliminaire de la technique de la ponction lombaire et de l'anatomie de la structure de l'épine thoracique et lombaire. En plus, il devrait posséder une expérience étendue dans l'emploi de l'anesthésie lombaire.

L'auteur rapporte l'emploi de l'anesthésie épidurale dans 568 cas obstétricaux à l'hôpital général de Vancouver et décrit ses techniques, employant l'injection unique aussi bien que les techniques de la sonde de Tuohy et Clelland. Les complications rencontrées ont été l'anesthésie lombaire totale, une ponction lombaire négligente, l'arrêt des douleurs, des douleurs précipités, l'hypotension, des douleurs de reins, des douleurs passagères dans les jambes, une rétention du placenta et des maux de tête. Dans quatre cas seulement l'anesthésie ne s'est pas produite.

La technique d'injection unique a été satisfaisante pour l'accouchement dans les cas de patients propres à l'anesthésie régionale, par l'emploi de 10 à 15 c.c. d'une solution d'xylocaine à 2% injectée au L 3–4 ou au L 4–5. Pour la primipare on ne fera pas l'injection avant que le col de l'utérus ne soit complètement dilaté, mais pour la multipare l'on pourra procéder lorsque la dilatation aura atteint 8 c m. Pour l'opération césarienne une injection unique de 10 à 15 c.c. d'xylocaine à 2% contenant 1/200,000 d'adrénaline est effectuée au niveau du L 1–2 ou L 2–3.

Acknowledgments

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