Lumbar Epidural Anaesthesia in a Solo

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Introduction

THE PAUCITY OF specialist anaesthetic services in Sarawak does tend to test and at times strain the resilience of the single-handed surgeon in practice. Lumbar epidural anaesthesia has proved both safe and useful in the surgery of the lower abdomen in preselected cases. This report represents the first hundred cases in such a practice, using this form of anaesthesia.

Historical Survey shows that early experimental work was done by Corning, Cathelin and Sicard at the turn of the century. Clinical application is generally accredited to Pages (1921) and Dogliotti (1931). Dawkins (1945) and Bromage (1961, 67) are among the more recent workers who have helped to consolidate the scientific basis and expand the clinical usage of epidural (extradural) anaesthesia.

Anatomically, the dura mater is attached above to the margins of the Foramen Magnum and ends at the lower border of the second lumbar vertebra. The epidural or extradural space is thus between the dura and vertebral canal. It extends from the base of the skull above to the sacro-coccygeal membrane below. It contains areolar tissue, fat and vessels, and has a negative pressure. All spinal nerves must of necessity traverse this space on their way out of the spinal canal. In the lumbar region, this space is 2 – 3 mm in width and is 4 – 5 cm from the skin.

Materials and Methods

For inclusion both the patient and the pathology must be suitable. All the patients were thought fit apart from the disease needing operation. The procedure is explained and only those patients who appeared calm and co-operative were chosen. The surgical condition should be confined to the lower abdomen and the pelvis, such that the operative procedure would be limited to below the umbilicus, i.e. T10 dermatome.

The sex and age distributions are as follows:

There are thirty-two (32) males and sixty-eight (68) females.

Age:

9 – 1.

10 – 19 – 13.

20 – 29 – 31.

30 – 39 – 31.

40 – 49 – 12.

50 – 59 – 8.

60 – 69 – 2.

70 – 2.

The operations performed are as follows:

Type of Operations	*Number.*
Appendicectomy	44.
Bilateral Tubal Ligation	29.
Ing. Herniorrhaphy	9.
Hysterectomy	8.
Ovarian Cystactomy	3.
Gilliam's Operation	2.
Varicocoele	1.
Orchidopexy	1.
Laporatomy	1.
Ectopic Pregnancy	1.
Sigmoid Colcectomy	1.

Anaesthetic Solution used:

Basically, only Lignocaine and Prilocaine (Citanest) were used, with or without Noradrenaline I in 200,000:-

Leostesin 2% – plain – 32.
\+ – Noradrenaline – 8.

Xylocaine 2% – plain – 29.
\+ – Noradrenaline – 11.

Citanest 2% – plain – 15.
\+ – Noradrenaline – 5.

Site of Lumbar Puncture:

The space between the spines of the second and third lumbar vertebrae was preferred, although when necessary the more accessible adjacent spaces were used:-

L1 – 2 – 8.
L2 – 3 – 80.
L3 – 4 – 12.

Technique:

This technique was first introduced to me by McCaul (1966) and is basically similar to that described by Boulton (1968) and by Lee and Atkinson (1968). A Gordh's needle is put into a forearm vein and secured. An ampoule of Aramine, Magill's laryngoscope and an endotracheal tube were put on the anaesthetic machine in readiness. The patient is put in the lumbar puncture position with the side of the intended incision lowermost. The lumbar area is sterilised and draped. A long 19 G needle with a short bevel, attached to a 2 cc. syringe with about 1.5 cc. of air, is then pushed into the L2 – 3 interspace until sudden increased resistance is felt as the needle hits the ligamentum flavum. The plunger of the syringe is pushed and the rebound sensation is quite characteristic. Slow steady pressure is then applied to advance the needle about 1 mm at a time, with frequent test for 'rebound'. A sudden give is felt when the extradural space is entered and the air is injected with ease after negative aspiration for C.S.F. The syringe is disconnected and the needle rotated to make sure that it has not entered the dura. The patient's back is straightened and he is asked to move his toes when a test dose of 5 cc. of anaesthetic solution is injected. After five minutes, if there is no giddiness or tingling in the legs, the remaining 15 cc. of the solution is injected slowly, with the patient continuing to move his toes. The patient then lies on his back with 10 – 15 degrees of Trendelenburg tilt. After 10 – 15 minutes, the incision can usually be made, and only then is the patient told to stop moving his toes.

Results and Discussions

The criteria of a successful block are:

(1) Surgical analgesia of up to T10.

(2) Muscular relaxation below the umbilicus.

(3) Absence of serious side-effects.

98 cases fulfilled these criteria. There were two failures. It is interesting to note that both had acute appendicitis: Case 1, a young woman had uncontrollable quite gross tremors after 20 cc. of 2% Lignocaine, which made operation difficult. In Case 2, a young man aet. 34, the lumbar epidural anaesthesia just refused to rise above L1. General anaesthesia was used instead.

Inadvertant intradural injection is of course the most serious complication; it did not occur in this series. Prophylaxis by attention to details of puncture is of utmost importance. Voluntary movement of the patient's toes throughout the procedure and up to ten minutes after injection of the anaesthetic solution is a useful & visible guide that nothing untoward has happened. Preparation for dealing with apnoea and hypotension from a 'massive spinal' cannot be overstressed.

The blood pressure changes during lumbar epidural anaesthesia have been analysed by Wong et al (1975). The important thing is the pulse

(i.e. perfusion pressure), which is generally maintained, even though there is often some drop in both systolic and distolic pressures. Thus, if the pulse is easily palpable and less than a hundred per minute and the patient is comfortable, the slight hypotension can be ignored.

Transient tremors were seen in 10 cases. If the aspiration test is negative for blood, further injection was continued slowly, with safety.

Some mesenteric traction sensation was felt nearly in all cases of appendicectomy. Discomfort or pain was only felt when there had been undue traction on the caecum, particularly when bound down.

The upper level of block cannot as yet be predicted with certainty. Apart from volume there are so many other factors involved in the spread of anaesthetic solution (Lee and Atkinson, 1968). In general, 2 – 3 cc. will be needed to block one segment. Put in another way, 10 – 15 cc. of solution will be needed to block four segments on each side of the point of injection (Lee and Atkinson, 1968). The rationale of using 20 cc. of solution is to block about six segments above L2, i.e. T9. Roughly, this is true in this series: in all cases the epigastric skin sensation had remained normal (and the mesenteric traction sensation tended to confirm this) implying that the upper level was somewhere between T7 and T10. The lower level invariably went down to S1, as in all cases the legs were completely paralysed toward the end of operation. This suggests that downward spread of epidural solution is favoured.

For procedures of up to $1\frac{1}{2}$ hours, plain Lignocaine 2% or Prilocaine 2% had been found adequate. The solutions with 1 in 200,00 Noradrenaline were used for longer procedures, or when the 20 cc. limit was likely to be exceeded to ensure a high enough block, e.g. tall persons. Probably the 1.5% solution of Lignocaine or Prilocaine as recommended by Boulton (1968) and Lee (1968) would be better, as greater volume can be used. Unfortunately, this strength is not available in the Malaysian market and dilution of the 2% solution could compromise sterility. The long acting Marcaine 0.5% had not been used for the relatively short operations reported in this series.

Conclusion

Lumbar epidural anaesthesia has been found to be effective and safe for a wide range of lower abdominal operations in a solo surgical practice. With careful attention to details regarding the selection of patients and the actual technique if needle puncture and injection, it is relatively free from serious side-effects. Until specialist anaesthetic services become freely available in the whole of Malaysia, I would recommend that epidural anaesthetic techniques, both lumbar and caudal, be included in the post-graduate curriculum for all surgical aspirants.

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