

Epidural analgesia in labour: the past, the present and the future¹

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The past

The first successful use of regional analgesia in childbirth was recorded by Stoeckel (1909) using the method of sacral injection described independently by Cathelin and by Sicard in 1901. A logical basis for the technique was established by the researches of Aburel (1931) and Cleland (1933), who defined the dual pathways by which labour pain is mediated. Continuous caudal analgesia was introduced by Hingson & Edwards in 1942 and the continuous lumbar technique on which current practice is based was described by Flowers *et al.* in 1949. Thus, for over a quarter of a century, the effective relief of pain in labour by regional block was mainly restricted to North America.

In the UK the demands of private practice were chiefly responsible for stimulating the practice of regional analgesia until 1970, when the Central Midwives' Board of England and Wales announced that, subject to certain conditions, midwives were permitted to assist with the maintenance of the block by top-up injections through a cannula safely sited by the anaesthetist. Then in 1972, the Board prescribed for pupil midwives training in 'assisting with more advanced methods of analgesia carried out by a medical practitioner'; but despite this enlightened encouragement the availability of epidural analgesia is still not uniformly spread throughout this country.

The present

A personal enquiry made of the London teaching hospitals revealed that in 1976 the percentage of all deliveries in which epidurals were given varied from 5% in one department to 62% in another (Table 1). The implications of different epidural rates are suggested in Table 2, based on an assumed delivery rate of at least 2000 a year.

A low epidural rate in any teaching hospital implies that senior registrars emerge from their training presumably fully equipped for consultant status according to the criteria set by the Faculty of Anaesthetists, but unable to comply with any job description which demands involvement in an epidural service. Such hospitals might also be considered defective in their capability to treat obstetric patients and train midwives in line with contemporary practice.

The reasons for failure to start an epidural service are legion. Many well-intentioned attempts to develop a service have foundered because the first few epidurals were unsuccessful or were followed by complications. It is often difficult to find the right mix of the joint enthusiasm of anaesthetists and obstetricians with the time and opportunity to train their juniors. A major difficulty can be the isolation of a maternity unit from the local general hospital, unless the unit is sufficiently large to justify an entirely separate anaesthetic staff.

No hospital claimed a figure higher than 62% and this probably is as high as it should be. The remaining 38% of mothers would comprise those delivered by elective Caesarian section, those

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who succeed in matching their courage against the pain of labour and who prefer to manage on conventional analgesic methods, those admitted in very advanced labour, those with absolute contraindications, those who are fully committed to 'natural childbirth' and those who have been prejudiced, rightly or wrongly, by tales of complications or unacceptable side effects. A figure higher than 62% might invite suspicion that mothers had been unduly pressured to accept an epidural.

But how many epidurals are necessary? Numerous publications have testified to the inadequacy of the simple analgesic methods available to midwives. In 1967 Beazley and colleagues in Sheffield made special efforts to ensure that narcotic and inhalational drugs were given as soon as needed, with the closest possible attention to the details of administration. Despite this intensive effort which included the use of morphine, diamorphine and even paracervical block, there remained 40% of women whose childbirth was unacceptably painful: but it must be conceded that, at most hospitals, attention to pain relief by the conventional methods may not be as meticulous as at Sheffield. The ideal epidural rate must therefore be higher than 40%. In a teaching hospital where there was '100% offer' the rate did not exceed

Table 1. Percentage of parturients receiving epidural analgesia in London teaching hospitals in 1976

Westminster (SW1)	62%	Guy's	34%
Royal Free	60%	St Thomas's	31%
Queen Charlotte's	56%	Hammersmith	30%
Westminster (Roehampton)	51%	St Bartholomew's	21%
St Mary's	44%	Middlesex	18%
Charing Cross	43%	King's College (Dulwich)	15%
St George's	39%	University College	14%
King's College (Denmark Hill)	38%	London (E1)	5%

Table 2. Characteristics of service provided in relation to frequency of epidural analgesia

Percentage of parturients receiving epidural analgesia	Implications for individual maternity departments
Under 10%	A precarious and unreliable service
10-20%	Possibly capable of supplying a medically indicated service but dependent on the availability of one or two competent individuals
20-30%	Service developing the necessary momentum towards a comprehensive service but remaining vulnerable if key personnel leave the hospital
30-40%	Comprehensive service established. All junior resident staff can be trained. Epidurals no longer a novelty to the midwives
40-50%	Comprehensive service well established. Epidurals becoming the standard method of pain relief. Other methods under-used possibly to the detriment of midwife training
Over 50%	Comprehensive service approaching '100% offer' to all patients: the number of epidurals are not only sufficient for training the junior staff but also capable of supporting an advertised instruction course

62%, so for very good reasons 38% did not receive an epidural. In round figures, therefore, an epidural rate of 40% might be considered as really necessary, a further 20% as desirable for therapeutic or compassionate reasons, and in the remaining 40% of deliveries epidurals may not be needed. In 1976 only 6 London teaching hospitals and 2 district hospitals in south-east England were able to attain the minimum 40% target.

The future

The evidence of the gradual but uneven development of epidural analgesia suggests that the future will see a filling in of the many gaps in the service despite strongly held professional and lay opinions which impede progress in this field. The substance of much of the criticism is not only against epidurals themselves but also against some aspects of their practice, their side effects and their complications. As these criticisms command respect it is imperative that, in future, the more unattractive features of epidural practice be eliminated by the application of the same high standards that modern anaesthetists apply to all other aspects of their work. In particular, attention must be paid to: (a) the skill, efficiency and finesse of their technique; (b) the reliability and efficacy of the pain relief achieved; (c) the reduction of side effects; (d) the complete avoidance of complications.

Skill, efficiency and finesse of technique

The ability to set up an epidural speedily and skilfully depends not only on effective training but also on establishing a standard routine in the labour ward to be practised by the anaesthetist and by the midwife who is helping him. At the risk of appearing to give priority to speed at the expense of carefulness, I must stress the need for slowness and caution only at the time of inserting the needle and the cannula into the patient. The anaesthetist's habit of organized efficiency in the anaesthetic room should not be abandoned when setting up an epidural in the labour ward; the relief of severe pain is a matter of some urgency to the sufferer and a quick, painless, efficiently-given epidural can be fitted into a busy time-table when a tedious time-consuming ritual cannot.

Reliability and efficacy of epidural analgesia

It must be accepted that epidural analgesia is, to some extent, a potentially fallible method of pain relief. To observe the epidural space laid open at laminectomy and to see it packed full of fat, fibrous tissue and blood vessels makes one wonder why the small doses of local anaesthetic spread so reliably and predictably in the majority of cases. One cannot honestly guarantee to every mother the immediate relief of pain; but once an epidural is undertaken the anaesthetist is under an unspoken contract to continue his efforts to satisfy the patient. No epidural should be completely ineffective unless the labour had proceeded so rapidly that time did not allow for setting up the epidural again. The reasons why some epidurals are unsatisfactory should be examined more closely. Most cases can be traced to a human failure, a failure of management, and only very few may be attributed to the intrinsic fallibility of the method.

A study by Romine *et al.* (1970) showed that the efficacy of epidurals accorded closely with the experience of the operator. The senior staff appeared to achieve very high standards indeed but the results obtained by more junior staff underlined the importance of close attention to training and supervision when the service is in the hands of less experienced performers. The senior staff's standards are those which should be maintained and it is they who should do the teaching. There is a prevalent belief that a consultant's training obligations are discharged by teaching epidurals in the operating theatre against the background of general surgery: but surely obstetric epidurals can only be learned effectively in the delivery suite and in harmony with the total obstetric management of the woman in labour.

Reduction of side effects

Supine hypotensive syndrome: Among the most important side effects is the tendency of epidurals to unmask the symptoms and signs of the aortocaval occlusion syndrome, or supine

hypotensive syndrome as it is commonly called. There has been a slowly increasing awareness that any disturbing symptoms or signs after an epidural, quite apart from hypotension, must be treated by turning the mother on to her side. Indeed, some have adduced evidence of the need to nurse on their sides all mothers in labour irrespective of whether or not they have had an epidural (Weaver *et al.* 1975). Nevertheless, most midwives and junior obstetricians are no longer trained to palpate, auscultate, catheterize, examine or deliver mothers in the lateral posture: at least they find it most inconvenient to do so. While a strong case has been made for the routine adoption of the lateral posture in labour, there are still midwives and obstetricians who remain to be convinced.

Epidurals and the forceps rate: Despite assertions to the contrary (Doughty 1969, Potter & Macdonald 1971, Maltau & Andersen 1975), an increase in the frequency of forceps delivery is commonly regarded as an inevitable concomitant of epidural analgesia. It is certainly regrettable if midwives feel that the technique is depriving them of the opportunity to practise their craft and to train their pupils, and it is sad if mothers are being dissuaded from accepting an epidural because they are told that a forceps delivery will almost certainly ensue.

It is indisputable that epidural analgesia frequently deprives the mother of the automatic desire to bear down in the second stage, but it is also recognized that labour can be managed in the anticipation of a spontaneous delivery despite the use of regional analgesia. The required manoeuvres include improving the strength of uterine contractions with oxytocin, digital assistance of the rotation of the fetal head, judicious application of fundal pressure once the head is on the perineum and encouragement of the mother to push in concert with contractions which she may not feel: in other words, the active management of the second stage with a view to securing a normal delivery. Perhaps the most effective measure is to give the mother time and opportunity to deliver herself without unduly hasty intervention.

From personal observation of the practice of several obstetricians (Table 3) I have noted a considerable variability in the time that each allows his patients under epidural analgesia to remain undelivered in the second stage of labour. All the patients in the care of one obstetrician were delivered within an average time of 30 minutes of full dilatation of the cervix. The overall forceps rate was 70%, 94% for primigravidae and 41% for multigravidae. Another obstetrician was willing to await delivery without intervention for an average time of more than 1 hour in the second stage of labour: the overall forceps rate was 10%, 20% in primigravidae and 2% in multigravidae.

There are, of course, cogent reasons which would persuade any obstetrician to apply forceps but beyond that, a forceps rate may well be what individual obstetricians wish to make it, in accordance with their own built-in instincts and acquired experience.

It should be remembered that the practice of epidural analgesia is developing concurrently with the introduction of more sophisticated and reliable methods of monitoring which provide earlier warning of possible hazards to the fetus. The growing awareness by many obstetricians

Table 3. *Individual obstetricians and the forceps rate*

Obstetrician	Deliveries			Percentage forceps rate		
	Total	Spontaneous	Forceps	Total	Primiparae	Multiparae
A	129	39	90	70%	94%	41%
B	99	43	56	57%	73%	24%
C	149	85	64	43%	76%	26%
D	132	87	45	34%	67%	14%
E	76	51	25	33%	65%	7%
F	199	153	46	23%	45%	13%
G	71	55	16	23%	45%	3%
H	157	141	16	10%	20%	2%
TOTALS	1012	654	358	35%	61%	16%

of increasing maternal and fetal acidaemia in the second stage has dictated the need to limit its duration. As a result, instrumental delivery is now carried out more frequently, irrespective of the use of epidural analgesia. An epidural service facilitates the application of this trend in obstetric management as well as contributing to the greater comfort and safety of the patient during operative delivery.

Avoidance of complications

Inadvertent dural puncture: The commonest reason for nervousness when learning to do epidurals is the fear of causing an inadvertent dural puncture. This fear is engendered by the belief that the complication is inevitable, particularly during the training period. It used to be said: 'two in your first ten, two in the next twenty, and then two per cent for life'. In the first thousand epidurals reported from Birmingham, Crawford (1972, and personal communication) admitted a 7.6% occurrence of dural taps; in the second thousand the frequency was 3.2%, and in the third thousand 0.9%.

An inadvertent dural puncture should be regarded as an avoidable accident; it should never occur and when it does it is almost invariably due to a human error. These errors must be eliminated as an undue frequency of this complication must reflect adversely against the quality of the supervision of the trainees by their teachers.

The errors stem from: failure to recognize the differential pressures on penetrating the ligaments of the back; failure to control the rate of advance of the needle; and failure of whatever the method used to signal the entry of the needle into the epidural space.

A continuing policy of close supervision of all trainees, making a detailed enquiry into the cause of every dural puncture and letting it be known that its occurrence is regarded as a preventable accident, has resulted in a frequency of only 0.4% of nearly 5000 blocks over the past four years at Kingston Hospital; this should be seen against the constant need to train not only the resident junior staff, but also a new trainee from elsewhere who attends for an organized course of instruction held every two weeks.

Neurological complications: For the past few years a subcommittee of the Association of Anaesthetists has been collecting reports from the UK and overseas of long-lasting neurological complications which have followed epidurals given for obstetric and other indications. Neurological damage has long been recognized as a complication of obstetrics (Chalmers 1949) but even allowing for this, it must be admitted that hard and tragic lessons have been learned in cases where there has been a gross failure of care and expertise in the practice of epidurals. It is not known whether epidurals properly practised carry an intrinsic risk of neurological damage, but while it appears that risks are least where standards are highest and experience greatest, there is certainly no room for complacency anywhere.

Conclusions

Anaesthetists have a heavy responsibility to ensure that epidurals are given effectively and safely. Maintaining a high standard of service inevitably involves the constant training of changing junior medical and midwifery staff. All patients must be followed up after epidural analgesia and an enquiry made into the causes of failures and complications. Only by these means can the quantity, and even more important, the quality of the service be maintained. Where training and supervision is haphazard the results tend to discredit the method itself. Ineffective epidurals, accompanied by a high frequency of complications, deservedly attract criticism.

As the attainment of consultant rank in anaesthesia does not necessarily guarantee the ability of the individual to practise or to teach the technique, there must be a wider availability of postgraduate courses for established consultants (Doughty 1979). Some may still question whether the effort is worthwhile or whether the relief of labour pain should be a high priority in the busy life of the present day anaesthetist. The beck and call of the epidural life is not to everyone's taste.

There is now an indisputable case for the safe practice of epidural analgesia: while it has been shown to give positive clinical benefits to both mother and baby, its most impressive effect is to bring tranquillity and humanity to the delivery suite as well as happiness and dignity to a woman on one of the most important occasions in her life.

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