PARACERVICAL BLOCK ANAESTHESIA IN LABOUR

IAN G. L. VAN PRAAGH, M.D., F.R.C.S.(C), F.A.C.S.,
F.A.C.O.G., M.R.C.O.G., AND W. G. POVEY, M.D.*

THE SIMPLICITY AND SAFETY of the paracervical block for the relief of the discomfort of the first stage of labour has been noted by several authors in recent years.¹⁻⁹ Concurrently but rarely, significant complications have been reported.^{1, 5, 6, 8, 10, 11} Despite favourable European reports appearing since 1926,¹²⁻¹⁴ no American report appeared on the paracervical block until that of Rosenfeld in 1945.¹⁵

It was proposed to evaluate further the efficacy and safety of the paracervical block as a method of analgesia in the first stage of labour in uncomplicated pregnancy.¹⁶ This simple technique, easily perfected by a physician without special training in anaesthesiology, was assessed as an alternative to more sophisticated conduction methods that demand special training and experience. It was hoped that the technique would decrease the use of centrally acting analgesics which may cause neonatal depression.¹⁷ The relatively brief duration of action and the ineffectiveness in achieving adequate second-stage analgesia were recognized.¹¹ These factors were not considered contraindications to its use.

The neuroanatomic basis for the paracervical block, which is generally agreed upon,¹⁸⁻²¹ has previously been described.¹⁶ The paracervical anaesthesia blocks both sympathetic and parasympathetic nerve fibres entering the uterosacral ligaments at the base of the broad ligaments. It is ineffective in relieving second-stage discomfort because the pain of the second stage is due primarily to distension of the lower birth canal, vulva, and perineum, which is largely innervated by the sensory fibres of the pudendal nerves which enter the spinal cord through the posterior sacral roots (S₂, 3, 4).

INDICATIONS

Paracervical blocks were used in primiparae and multiparae during the first stage of labour in full-term normal pregnancies presenting by the vertex. Contraindications included abnormal antepartum bleeding, malpresentation, foetal distress, infection, and a history suggestive of sensitivity to local anaesthetic agents.

METHOD

The blocks were administered to parturients in established labour at cervical dilations of 2 to 8 cm. Occasionally a second block was used if the effect of the first had disappeared before the onset of the second stage of labour.

Our technique, which has been previously described,¹⁶ involved the accurate

*Woman's Hospital, St. Luke's Hospital Center, 114th Street & Amsterdam Avenue, New York, N.Y. Dr. Povey's present address is: Population Council, Ford Foundation, 60 Av. Mohamed V, Tunis, Tunisia.

placement of 10 to 12 ml. of 1 per cent mepivacaine hydrochloride (Carbocaine)* in each lateral vaginal fornix at 3 to 4 o'clock and 8 to 9 o'clock at a depth of 6 to 12 mm. An equal number of blocks were done using Kobak's needle† and the simple device described by Povey.²² Although some authors have recommended paracervical injection at a depth of 1.5 to 2.5 cm.,^{2, 18, 28} we found, as did Davis *et al.*,⁴ that more superficial injection gave excellent analgesia and minimized the risk of puncturing blood vessels. Slow injection of the agent with intermittent aspiration was practised. After one side of the block was placed, one uterine contraction was observed, along with a check of maternal pulse, blood pressure, and foetal heart rate, before the second side was done.

Of the 208 primiparae, 172 were delivered under general anaesthesia, 35 under conduction anaesthesia, and one received nothing. Thirty-one primiparae delivered spontaneously, while 157 were delivered by low forceps, 13 by mid-forceps, and 7 by caesarean section. Of the 169 multiparae, 120 were delivered under general anaesthesia, 36 under conduction anaesthesia and 13 received nothing. Fifty-one multiparae were delivered spontaneously, 112 by low forceps, three by mid-forceps and three by caesarean section.

RESULTS

Paracervical block anaesthesia was administered to 377 patients in the first stage of labour: 208 were primiparae and 169 were multiparae (Table I). In 18

TABLE I
PATIENT POPULATION

Age (years)	Primiparae	Multiparae*
<15	2	0
15-20	59	20
21-30	122	102
31-40	23	44
>40	2	3
Total	208	169

*Parity of the 169 multiparae:

<i>p</i> i to iii	139
<i>p</i> iv to vi	20
<i>p</i> > vi	10

of the primiparae and 12 of the multiparae, a second block was done, 30 to 90 minutes after the first. The duration of each stage of labour (Table II) was within the normal range for both primiparae and multiparae.^{24, 25} The paracervical block therefore did not alter the length of labour. Since the blocks were used in a "single shot" technique, other medications were used in 81 per cent of the primiparae and 68 per cent of the multiparae to achieve acceptable analgesia throughout the first stage of labour (Table III).

In 336 cases, the membranes were ruptured at the time of the administration

*Winthrop Laboratories, New York.

†V. Mueller & Company, Chicago.

TABLE II
LENGTH OF LABOUR

Stage	Duration	Primiparae	Multiparae
First	<2 hours	0	1
	2-4	10	25
	5-8	55	71
	9-12	72	46
	13-16	47	18
	>16	24	8
Second	0-30 min.	45	79
	31-60	95	69
	61-90	46	17
	>90	22	4
Third	0-30 min.	208	154
	>31	0	15

TABLE III
OTHER MEDICATION USED

	Meperidine	Promethazine	Atropine	Other	None
Primiparae					
Before paracervical block	96	93	20	29	39
After paracervical block	90	33	39	8	77
Multiparae					
Before paracervical block	85	71	39	22	33
After paracervical block	54	16	32	11	88

of the block (Table IV). In 87 per cent the cervical dilation was between 4 and 8 cm. In one case, there appeared to be a transient decrease in the frequency and intensity of uterine contractions following the block. The rate of cervical dilation was not accelerated following the block as had been suggested by others.^{1, 2, 18, 19} These findings are similar to those of Zourlas and Kumar who used objective techniques to measure uterine work.²⁶ The maternal blood pressure largely remained unaltered. Transient post-block foetal bradycardia of below 100 was noted in 4 patients (1.6%). Of the 31 instances of foetal tachycardia, only 3 appeared after the block.

Table V shows that 85 per cent of the blocks in the primiparae lasted 31 to 120 minutes and 5 per cent lasted over 120 minutes. In the multiparae 89 per cent lasted 31 to 120 minutes and 1 per cent lasted over 120 minutes. The results (Table VI) were good in 81 per cent of the primiparae, fair in 14 per cent, poor in 3 per cent and undecided in 2 per cent. In the multiparae, the results were good in 76 per cent, fair in 17 per cent, poor in 5 per cent and undecided in 2 per cent.

Poor results were due to inaccurate placement of the block, owing to inexperience in the physician or lack of co-operation in the patient. Blood aspiration, which occurred during the placement of eight blocks, resulted from the needle's being directed too far laterally in the vaginal fornix. It did not occur when using Povey's needles and only occurred when the Kobak needle protruded to its full length of 12 mm.

There were no significant maternal complications. Other reports have men-

TABLE IV
MATERNAL AND FOETAL STATUS

	Primiparae		Multiparae	
	at block	after block	at block	after block
Membranes intact	31	12	8	0
ruptured	177	196	161	169
Dilation of cervix (cm.)				
2	5	2	3	3
3	15	15	13	14
4	46	36	32	27
5	57	48	47	41
6	38	45	50	50
7	36	39	16	23
8	11	23	8	11
Frequency of uterine contractions (min.)				
2	22	27	28	28
3	120	125	98	88
4	34	28	27	32
5	21	14	14	12
6	4	7	1	9
7	2	2	1	1
8	1	2	0	0
9	4	3	0	0
Maternal blood pressure				
up	7	14	3	3
normal	200	193	73	70
down	1	1	93	96
Foetal heart rate (per min.)				
<100	2	5	1	2
100-130	14	17	10	13
131-150	173	164	146	142
>150	19	22	12	12

TABLE V

	Primiparae	Multiparae
Duration of block (min.)		
0	2	5
1-30	18	9
31-60	56	79
61-90	82	50
91-120	39	23
>120	11	3
Block to delivery time (min.)		
0-61	29	41
61-120	91	78
121-180	56	27
>180	32	23

tioned peripheral vascular collapse, sacral neuritis,⁵ convulsions,⁶ and broad ligament haematomas.⁸ No complications followed the eight blocks in which blood was aspirated. There was no postpartum morbidity. Early in the series there were four patients who felt faint after rapid injection of the anaesthetic solution. There

TABLE VI
RESULTS

	Good	Fair	Poor	Difference of opinion
Primiparae	170	27	7	4
Multiparae	129	28	9	3

were no significant alterations in pulse or blood pressure. Twelve patients experienced numbness or tingling in one or both legs that spontaneously disappeared within 15 minutes.

Adrenaline was not used to prolong the effect of the block²⁷ because of the possibility of inducing uterine inertia.²⁸

CONDITION OF THE NEONATES

Ninety per cent of the infants (336) were in good condition at birth. The 39 infants (10%) with low one-minute Apgar scores²⁹ were of particular interest (Table VII). Twenty-seven were born to primiparae and 12 to multiparae. There was one with Apgar 1, four with Apgar 2, eleven with Apgar 3, nine with Apgar 4, four with Apgar 5, and ten with Apgar 6. Good results, in terms of adequate analgesia, were noted in 29 cases, six were fair, and four were poor. The average duration of action of the block was 83 minutes. There were three instances of transient foetal bradycardia. Significant postmaturity was present in the neonate of one primipara in which the post block foetal heart rate dropped to below 100. Thirty-eight of the 39 infants had good five-minute Apgar scores (8 to 10). There was partial abruptio placentae in the case of one infant who remained depressed at five minutes of age.

An attempt was made to assess the low one-minute Apgar scores. There was no explanation in 28 cases. Of the other 11 depressed neonates one or more of the following factors were noted: four cases of cephalopelvic disproportion, including two difficult mid-pelvic forcep operations, two congenital heart problems, two cord problems and one abruptio placentae, one severe postmature infant, and at least one anaesthesia problem. Possibly more of these low scores were attributable to general anaesthesia; this could only be corroborated by accurate neonatal acid-base studies. There was no clinical evidence that the use of paracervical block during labour was responsible for any of the low Apgar scores. There was no foetal mortality or significant foetal morbidity. The transient post-block foetal bradycardia (Table VIII) did not indicate foetal distress, and in only one instance was it subsequently related to a low Apgar score, secondary to postmaturity rather than to the block itself. The cause of post-block foetal bradycardia is not clear. We agree with Davis *et al.*^{4, 18} that it does not represent foetal distress but must be differentiated from it. This difficult clinical problem can only be clarified by continuous careful clinical observation and possibly by obtaining acid-base values of blood taken from the foetal scalp during labour.³⁰ It may be due to one of several factors, including vaginal manipulation,

TABLE VII
SURVEY OF 39 INFANTS WITH LOW APGAR SCORES

	27 Primiparae	12 Multiparae	39 Total
Apgar scores			
1	0	1	
2	3	1	
3	10	1	
4	5	4	
5	3	1	
6	6	4	
Block result			
good	22	7	29
fair	4	2	6
poor	1	3	4
Average block duration (min.)	85	61	83
Foetal heart after block			
constant	25	11	36
decreased but >100	1	1	2
<100	1	0	1
Post-block anaesthesia			
yes	16	7	23
no	11	5	16
Delivery anaesthesia			
general	24	8	32
pudendal	3	4	7
Delivery method			
low forceps	20	8	28
mid-forceps	3	0	3
caesarean	3	1	4
spontaneous	1	3	4
Condition of infant five minutes postpartum			
good	26	12	38
fair	1	0	1
dead	0	0	0
Explanation of low Apgar scores			
none	18	10	28
due to paracervical block	0	0	0
due to delivery anaesthesia	1	0	1
foetal cause	CPD 3, postmat. 1	CPD 1	5
cord cause	2	0	2
placental abnormality	partial abruptio 1	0	1
other	difficult mid-forceps 2 congenital heart disease 1	congenital heart disease 1	4

TABLE VIII
TIME NEEDED FOR CORRECTION OF FOETAL BRADYCARDIA FOLLOWING
PARACERVICAL BLOCK

	Primiparae	Multiparae
Time to correct bradycardia >100/min.		
0-15	16	11
15-30	1	2
>30	0	0
Time to correct bradycardia <100/min.		
0-15	5	2
15-30	0	0
>30	0	0

direct pressure on the foetal skull at the time of pelvic examination,³¹ alteration in vagal tone secondary to the block,³² or a transient high level of carbocaine in the foetus secondary to its rapid absorption directly following the blocks.³³

SUMMARY AND CONCLUSIONS

A series of 377 patients who received one or more paracervical blocks with 1 per cent mepivacaine during the first stage of labour has been reviewed. The duration of action of the block in the 208 primiparae was 31 to 120 minutes in 85 per cent and over 120 minutes in 5 per cent. In 169 multiparae, 89 per cent lasted 31 to 120 minutes and 1 per cent over 120 minutes. The results were good in 81 per cent of primiparae and 76 per cent of the multiparae. There were failures in 3 per cent of primiparae and 5 per cent of multiparae.

In the 39 infants with low one-minute Apgar scores, none of the low scores could be related to the paracervical block. Transient post-block foetal bradycardia of below 100 was noted in four patients (1.6%). This reaction, which has not been explained, did not represent foetal distress, but must be differentiated from it. There were no significant maternal or foetal complications secondary to paracervical block.

Despite the transient post-block decrease in uterine activity in 30 per cent of cases, there was no evidence that the paracervical block altered the length of labour or the rate of cervical dilation. Single-shot paracervical blocks proved to be a simple, safe, effective, easily taught, useful adjunct to achieving effective analgesia during the first stage of labour in uncomplicated pregnancies.

RÉSUMÉ

Les dossiers de 377 patients qui ont reçu un ou plusieurs blocages paracervicaux à la mépivacaine à 1 pour cent au cours du premier stage du travail ont été revus. La durée d'action du blocage chez les 208 primipares fut de 31 à 120 minutes dans 85 pour cent des cas et de plus de 120 minutes dans 5 pour cent des cas. Chez 169 multipares, 89 pour cent ont duré de 31 à 120 minutes et 1 pour cent plus de 120 minutes. Les résultats furent bons chez 81 pour cent des primipares et 76 pour cent des multipares. Il y a eu échec chez 3 pour cent des primipares et 5 pour cent des multipares.

Des 39 nouveaux nés à bas pointage d'après la table d'évaluation d'Apgar, aucun ne peut être associé au blocage paracervical. Une bradycardie foetale transitoire de moins de 100 fut observée chez 4 patients (1.6%) après le blocage. Cette réaction qui ne fut pas expliquée ne signifiait pas de la détresse foetale, mais le diagnostic doit être fait. Il n'y eut pas de complication maternelle et foetale importante secondaire au blocage paracervical.

En dépit d'une activité utérine transitoire diminuée chez 30 pour cent des cas, le blocage paracervical ne semble pas avoir changé la durée du travail et le rythme de la dilatation du col. Le blocage paracervical à dose unique s'avère donc une technique simple, sûre, facile à enseigner, et un atout utile pour obtenir une analgésie efficace au cours du premier stage du travail, dans les cas de grossesse normale.

REFERENCES

1. ALDRIDGE, C. W., JR.; NANZIG, R. P.; & BEATON, J. H. Uterosacral Block and the Anesthesia Problem. *J. Obste. & Gynec.* 81: 941 (1961).
2. BAKEN, M. J., JR.; FREEMAN, D. W.; & BARNO, A. Transvaginal Regional Block Anesthesia in Labor. *Surg. Gynec. & Obst.* 114: 375 (1962).
3. COOPER, K. & MOIR, J. C. Paracervical Nerve Block: A Simple Method of Pain Relief in Labour. *Brit.M.J.* 1: 1372 (1963).
4. DAVIS, J. E. *et al.* The Combined Paracervical-pudendal Block Anaesthesia for Labor and Delivery. *Am. J. Obst. & Gynec.* 89: 336 (1964).
5. FREEMAN, D. W.; BELLEVILLE, T. P.; & BARNO, A. Paracervical Block Anesthesia in Labor. *Obst. & Gynec.* 8: 270 (1956).
6. PAGE, E. P.; KAM, M. L.; & CHAPPELL, C. C. Usefulness of Paracervical Block in Obstetrics. *Am. J. Obst. & Gynec.* 81: 1094 (1961).
7. SEEDS, A. E., JR.; STEIN-MESSANGER, P.; & DORSEY, J. H. Paracervical Blocks: Results of a Double-blind Evaluation. *Obst. & Gynec.* 20: 462 (1962).
8. SPANOS, W. J. & STEELE, J. C. Uterosacral Block. *Obst. & Gynec.* 13: 129 (1959).
9. WHITE, C. A. & PITKIN, R. M. Paracervical Block Anesthesia in Obstetrics. *Postgrad. Med.* 33: 585 (1963).
10. DENNIS, K. J. Unilateral Parametritis following Paracervical Nerve Block. *J. Obst. & Gynaec. Brit. Common.* 71: 797 (1964).
11. NYIRJESY, I. *et al.* Hazards of the Use of Paracervical Block Anesthesia in Obstetrics. *Am. J. Obst. & Gynec.* 87: 231 (1963).
12. GELLERT, P. Aufhebung der Wehenschmerzen und Wehenüberdruck. *Monatsschr. Geburtssch. Gynak.* 73: 143 (1926).
13. HENRIET, J. Les Bases anatomo-physiologiques et technique sonelle de l'infiltration du plexus pelvipérineal. *Strasbourg Med.* 97: 622 (1937).
14. PIBRAM, E. Die schmerzlose Geburtsleitung in Lokalanästhesie. *Klin. Wchnschr.* 6: 1282 (1927).
15. ROSENFELD, S. S. Paracervical Anesthesia for the Relief of Labor Pains. *Am. J. Obst. & Gynec.* 50: 527 (1945).
16. VAN PRAAGH, I. G. L. & POVEY, W. G. Paracervical Block Anesthesia in Labour. *Canad. M.A.J.* 94: 262 (1966).
17. REID, D. E. *A Textbook of Obstetrics.* Philadelphia: Saunders (1962), p. 383.
18. DAVIS, J. E. *et al.* Paracervical Block for Pain Relief in Labor. *Obst. & Gynec.* 19: 195 (1962).
19. GEMMELL, A. A. Method of Demonstrating Ganglia of the Cervix Uteri. *J. Obst. & Gynaec. Brit. Emp.* 33: 259 (1926).
20. KRANTZ, K. E. Innervation of the Human Uterus. *Ann. New York Acad. Sc.* 75: 770 (1959).
21. REYNOLDS, S. R. M. *Physiology of the Uterus.* 2nd ed., New York: Hafner (1965), p. 463.
22. POVEY, W. G. A Simple Device for Paracervical and Pudendal Block. *Obst. & Gynec.* 28: 435 (1966).
23. KOBAC, A. J.; SADOVE, M. S.; & MAZEROS, W. T. Paracervical Block: A Transvaginal Regional Pain Relief. *Obst. & Gynec.* 19: 302 (1962).
24. CIBILS, L. A. & HENDRICKS, C. H. Normal Labor in Vertex Presentation. *Am. J. Obst. & Gynec.* 91: 385 (1965).
25. EASTMAN, N. J. & HELLMAN, L. M. *Williams Obstetrics.* 12th ed., New York: Appleton Century Crofts (1961), p. 427.
26. ZOURLAS, P. A. & KUMAR, D. An Objective Evaluation of Paracervical Block on Human Uterine Contractility. *Am. J. Obst. & Gynec.* 91: 217 (1965).
27. PITKIN, R. M. & GODDARD, W. B. Paracervical and Uterosacral Block in Obstetrics: A Controlled Double-blind Study. *Obst. & Gynec.* 21: 737 (1963).
28. CALDEYRO-BARCIA, R. & POSEIRO, J. J. The Physiology of the Uterine Contraction. *Clin. Obst. & Gynec.* 3: 386 (1960).
29. APCAR, V. Proposal for a New Method of Evaluation of the Newborn Infant. *Anesth. & Analg.* 32: 260 (1953).
30. BEARD, R. W.; MORRIS, E. D.; & CLAYTON, S. G. Foetal Blood Sampling in Clinical Obstetrics. *J. Obst. & Gynaec. Brit. Common.* 73: 562 (1966).
31. HON, E. H. The Diagnosis of Fetal Distress. *Clin. Obst. & Gynec.* 3: 860 (1960).
32. REYNOLDS, S. R. M. Regulation of Fetal Circulation: Its Relation to Fetal Distress. *Clin. Obst. & Gynec.* 3: 834 (1960).
33. POPPERS, P. J. Personal communication.