HEAVY NUPERCAINE SPINAL ANALGESIA IN OPERATIVE OBSTETRICS

WITH REPORT ON 394 CASES

BY

LOUIS RESNICK, M.B., Ch.B., M.R.C.O.G.

Whole-time Obstetrician and Gynaecologist, Hope Hospital, Salford

The safety of spinal analgesia in general surgery is recognized by most authorities nowadays. Its use in obstetrics, however, is still looked upon as a "risky" and even dangerous practice by the majority of obstetricians, in view of the occasional alarming drop in blood pressure, with its attendant dangers. In recent years a good deal of literature concerned with spinal analgesia in Caesarean section has appeared, among which may be mentioned reports by Brindeau (1935), Lloyd-Williams (1937), Murad and Parhad (1937), Cosgrove, Hall, and Gleeson (1937), Duca (1938), Pérez and Guglielmo (1939), Sebrechts (1940), and Weintraub and Merriam (1943).

The first recorded series of cases performed under heavy percaïne (or nupercaine) spinal analgesia was that of Thomas (1942, 1944), who reported two series totalling 203 Caesarean sections, of which 200 were carried out under heavy percaïne, without a maternal death due to that drug or a maternal death due to any cause whatever during its use.

In the past two years analgesia by the spinal route, using heavy nupercaine, has been the method of choice in the obstetrical department of this hospital for patients requiring Caesarean section and operative vaginal delivery. In this period spinal analgesia was given successfully on 394 occasions to 393 patients, 137 of whom had Caesarean section and 256 operative vaginal delivery. This paper is an analysis of the results in these cases, and an attempt to estimate the safety of heavy nupercaine in operative obstetric practice.

Solution Used.—Heavy nupercaine (Ciba Ltd., 1944) is the hyperbaric solution, 1 in 200, with 6% glucose, and is made up in sterile 3-c.cm. ampoules. It is a derivative of quinoline—the hydrochloride of α -butyloxycinchoninic acid diethyl-ethylenediamide.

Premedication

In Caesarean Section.—(i) Cases not in labour, or in early labour, in which sedatives have not been given. Omnopon 1/3 gr. and scopolamine 1/300 gr. were administered about 45 minutes before operation. Atropine 1/100 gr. was given in all cases, in the event of the spinal analgesic not producing the desirable effect and a general anaesthetic becoming necessary. Ephedrine 1 gr. was given to all patients at the same time, to combat a drop in blood pressure. (ii) Cases of trial labour under twilight sleep, or cases in which other sedatives have been used. Atropine 1/100 gr., with ephedrine 1 gr., was given as a routine as in (i). Other supporting sedatives were not found necessary.

Cases requiring Operative Vaginal Delivery.—Supporting sedatives were rarely needed, as twilight sleep or other methods of sedation were prescribed in the majority of cases. Ephedrine 1 gr. was given to all patients half an hour before operation. We have often employed paraldehyde by the rectal route, in cases of severe pre-eclamptic toxæmia ("eclampsism") and cases of essential hypertension, in labour. In these no other supporting sedative was used when operative vaginal delivery was considered necessary. In one case of intra-partum eclampsia 6 dr. of paraldehyde in 4 oz. of olive oil was given as a routine. Delay in the second stage of labour occurred, and forceps extraction was indicated. Ether or chloroform anaesthesia was contraindicated owing to the presence of bronchitis after a recent attack of influenza. The paraldehyde acted as premedication to both the spinal puncture and the forceps extraction under spinal analgesia.

Technique of Administration of the Spinal Analgesic

In Cases requiring Caesarean Section.—The technique outlined by Thomas is clear enough to need little elaboration. The dosage we used was 1.2 to 1.5 c.cm., barbotage being part of the method.

In Patients requiring Operative Vaginal Delivery.—An important preliminary procedure in dealing with these cases was the reassurance of the patient immediately before the operation, as occasionally the mere movement of the woman during traction on the foetus, such as with forceps, caused her marked anxiety, although no real pain was experienced during the entire operation. The technique of administration was similar to that employed in Caesarean section, with a few variations. The Trendelenburg and lithotomy positions used after injection of the analgesic solution were found unnecessary here. The dosage employed was 0.5 to 0.8 c.cm., with barbotage. Analgesia reaching to just below the level of the umbilicus, including the pelvic floor and perineum, was obtained. In several cases the "sitting" posture was adopted, especially with extremely obese patients, in whom the spinal column was difficult to define, and with patients in whom spinal deformities existed. The subject is turned on to her back immediately after the introduction of the analgesic, as described above.

Analysis of the Cases

394 spinal analgesias were administered to 393 patients, 137 of whom had Caesarean section and 256 operative vaginal delivery. (One patient had two successful analgesias.) Patients requiring supplementary inhalational or intravenous anaesthesia were not included in this series.

Indications for Caesarean Section.—Table I summarizes the indications, the majority of which were provided by contracted pelvis, previous section, and disproportion. Included in this

TABLE I.—Indications for Caesarean Section

Indication	Primigravidae	Multiparae	Total
Contracted pelvis	27	31*	58
Disproportion (including persistent occipito-posterior and transverse lies)	21	10	31
Placenta praevia	4	5	9
Foetal distress	8	—	8
Pre-eclamptic toxæmia	7	—	7
Bad obstetric history	—	5	5
Breech presentation (elderly primigravidae)	3	—	3
Essential hypertension (elderly primigravidae)	3	—	3
Accidental haemorrhage	2	—	2
Prolapse of the umbilical cord	2	—	2
Uterine inertia (elderly primigravidae)	2	—	2
Pelvic fibroid	2	—	2
Pelvic ovarian cyst	1	—	1
Ruptured uterus	—	1*	1
Chronic nephritis	1	—	1
Rigid cervix	1	—	1
Ruptured ovarian cyst	1	—	1
Total	85	52	137

* Previous Caesarean section.

series were two patients with disproportion in whom unsuccessful attempts at forceps extraction had been made before admission to hospital. In 7 cases sterilization by the Madlener method was performed, and in one a large ventral hernia was repaired.

Types of Operation.—Of the 137 operations performed 103 were lower uterine segment Caesarean sections (75.18%) and 34 were classic Caesarean sections (24.81%).

Indications for Operative Vaginal Delivery.—These are summarized in Table II. Delay in the second stage of labour was the main indication in 154 cases. There were 14 cases of "failed forceps"; these patients had had general anaesthetics before admission, and required operative delivery after treatment for shock. Destructive operations, such as craniotomy and perforation of the foetal head, were performed in 6 cases.

Methods of Delivery.—In 256 patients labour was terminated, as follows: (i) *Low-forceps extraction* (136 cases): To one patient two spinal analgesias were administered—first for reposition of a prolapsed umbilical cord and the application of Willett's forceps, and five hours later for a low-forceps extraction. (ii) *Mid-forceps extraction* (108 cases). (iii) *High-forceps extraction* (8 cases): Three cases of hydrocephaly required perforation of the head before extraction. (iv) *Breech extraction*, 6 cases. (v) *Craniotomy*, 4 cases. Of 262 infants delivered 167 required manual rotation of the foetal head, arrested in the transverse and posterior positions.

TABLE II.—Indications for Operative Vaginal Delivery

Indications	Booked Cases					Emergency Cases					Total
	Positions					Positions					
	Ant.	R.O.T.	L.O.T.	L.O.P.	R.O.P.	Ant.	R.O.T.	L.O.T.	L.O.P.	R.O.P.	
Delay in 2nd stage:											
Anterior position	45	—	—	—	—	—	—	—	—	—	45
Deep transverse arrest ..	—	20	23	—	—	—	5	9	—	—	57
Persistent occipito-posterior ..	—	—	—	1	15	—	—	—	1	15	32
Impending inertia			10				6				16
Brow presentation			—				3				3
Persistent mento-posterior ..			—				1				1
Total	114					40					154
Foetal distress			41				17				58
Maternal distress			6				4				10
Prolapse of umbilical cord ..			2				—				2
Breech presentation			4				2				6
Hydrocephaly			1				2				3
Meningocele			—				1				1
Prophylactic forceps:											
Pre-eclamptic toxæmia ..			7				—				7
Essential hypertension ..			9				—				9
Previous Caesarean section ..			4				—				4
Heart disease			6				—				6
Pulmonary tuberculosis ..			2				—				2
Grand total	196					66					262

Post-operative Complications

Headache.—In spite of the precautions taken over lumbar puncture, this complication was the most serious feature of spinal analgesia in this series. After Caesarean section there were 17 cases (12.4%) of headache—7 (5.1%) severe and requiring sedatives, and 10 (7.3%) slight and requiring little or no sedation. Of the patients undergoing operative vaginal delivery 39 (15.2%) complained of headache—9 (3.5%) severe and 30 (11.7%) slight. In the complete series of 393 patients, therefore, 56 cases of headache occurred (14.2%). During the same period heavy nupercaine analgesia was used in 306 gynaecological cases, the technique being the same, and an incidence of 6.65% headache was found. Spinal headache was therefore encountered slightly more than twice as often in parturient as in non-parturient women.

Chest Complications.—Basal collapse was encountered in only one case in the entire series—in a patient who had had a Caesarean section. Bronchitis occurred in 7 patients—one after Caesarean section and 6 after vaginal delivery. Sixteen of the latter group had had general anaesthetics before admission to hospital. Pneumonia was not encountered.

Late Results.—There were no complaints of headache, or other complications attributable to the analgesic, after discharge from hospital.

Maternal Mortality ; Infant Mortality

(a) **After Caesarean Section.**—There were no deaths, immediate or remote, in the entire series of cases undergoing Caesarean section. (b) **After Operative Vaginal Delivery.**—Of 256 patients who were delivered by the vaginal route 2 died: the first, three days after forceps extraction, owing to aplastic anaemia following acute pyelitis treated with sulphonamides; the second, 16 days after delivery, owing to pulmonary embolism. The overall maternal mortality was therefore 0.50% in the 393 patients subjected to spinal analgesia, the deaths not being attributable to the analgesic.

Seven (5.1%) infants delivered by Caesarean section and 34 (13%) by operative vaginal route were lost. In no case was foetal death attributable to the analgesic.

Advantages of Heavy Nupercaine Anaesthesia

So far as Caesarean section is concerned nothing further can be added to the conclusions noted by Thomas in his paper "Caesarean Section under Spinal Analgesia"; these we confirmed.

In patients requiring operative vaginal delivery the advantages are:

To the Mother.—(i) Spinal analgesia is safe in patients with constitutional diseases which contraindicate general anaesthesia,

such as chronic bronchitis, pulmonary tuberculosis, and chronic heart disease. (ii) It is safe in patients with types of liver and kidney impairment in which general anaesthesia may act adversely—e.g., pre-eclamptic toxæmia. (iii) It is safe in patients with essential hypertension. (iv) Uterine atony and undue uterine haemorrhage are rarely encountered in the third stage of labour. (v) Obstetric shock is rare. The spinal analgesic, acting as a regional nerve-block, cuts out reflex stimuli from the pelvis and perineum. This, associated with a lessened tendency to uterine haemorrhage, prevents the two chief factors which may produce obstetric shock. (vi) There is an absence of immediate post-operative discomfort and vomiting. The general condition of the patient, both during the operation and afterwards, is much better than after general anaesthesia. (vii) Pulmonary complications are rare.

To the Accoucheur.—(i) Spinal analgesics can be rapidly given, the technique being simple. (ii) Spinal analgesia makes it possible for the single-handed accoucheur to undertake manipulations or other treatment, in institutions suitably equipped. In the absence of a skilled anaesthetist the spinal analgesic may be given and the delivery performed by the accoucheur himself. This practice was carried out in every case in the series of 256 operative vaginal deliveries. (iii) Maximal relaxation of the pelvic musculature is obtained by the spinal analgesic, rendering intrapelvic manipulations, such as manual rotation of the foetal head arrested in the posterior or transverse positions, easier than under general anaesthesia. (iv) Additional anaesthesia is not required for the repair of an episiotomy or laceration.

To the Infant.—The analgesic has no detrimental effect whatever on the infant.

It is our opinion that spinal analgesia, using heavy nupercaine, is safe and reliable in operative obstetrics in selected cases of advanced pregnancy.

Contraindications to Spinal Analgesia

(i) Any disease of the central nervous system or of the vertebrae, or lumbro-sacral infection interfering with aseptic technique. (ii) In the presence of abnormal presentations, such as transverse lies, requiring internal or external version. (iii) A blood pressure below 100 mm. (iv) In acute shock. After the treatment for shock, spinal analgesia may be employed providing the blood pressure is over 100 mm. Hg. Spinal analgesia was used with striking success in 36 cases of acute shock, after routine shock treatment. (v) In acute heart failure from any cause. (vi) In the presence of "constriction ring dystocia." General anaesthesia was found to be essential in these cases to overcome uterine spasm.

Summary

Two series totalling 394 obstetrical cases, of which 137 were Caesarean sections and 257 operative vaginal deliveries under spinal analgesia, are presented. No maternal deaths attributable to the analgesic occurred.

Heavy nupercaine, 1 in 200, in 6% glucose, was employed in all cases.

The advantages, contraindications, and complications of spinal analgesia in operative obstetrics are outlined.

My thanks are due to Mr. George Brown, medical superintendent of this hospital, for permission to publish the results of these cases; and to the assistant obstetrical and medical officers who administered several of the spinal analgesics for Caesarean section and who performed a number of the operations. I am particularly indebted to the midwifery staff for the excellent supervision and nursing care.

REFERENCES

- Brindeau, A. (1935). *Paris méd.*, **25**, ii, 499.
 Ciba Ltd. (1944). *The Nupercaine Handbook*.
 Cosgrove, S. A., Hall, P. O., and Gleason, W. J. (1937). *Anesth. & Analges.*, **16**, 234.
 Duca, A. (1938). *Gynecologia*, **4**, 364.
 Lloyd-Williams, K. (1937). *British Medical Journal*, **2**, 826.
 Murad, Fouad, and Parhad, A. (1937). *Ibid.*, **2**, 1143.
 Pérez, M. L., and Guglielmo, L. di (1939). *Gynec. et Obstét.*, **39**, 388.
 Schrecks, J. (1940). *J. Obstet. Gynec. Brit. Emp.*, **47**, 588.
 Thomas, R. C. (1942). *Ibid.*, **49**, 247.
 (1944). *Ibid.*, **51**, 324.
 Weintraub, F., and Merriam, M. S. (1943). *Amer. J. Obstet. Gynec.*, **46**, 836.

J. H. Lamb (*Arch. Derm. Syph.*, 1945, **52**, 93) records two cases of vesicular eruption due to penicillin in men aged 23 and 26. In neither case was the eruption serious, except that discontinuance of the drug became necessary because of extreme pruritus.