TRICHLOROETHYLENE ANALGESIA IN LABOUR

OBSERVATIONS ON ITS USE IN THE ROTUNDA HOSPITAL

BY

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This communication records our experiences in the search for a safe, readily portable, and inexpensive inhaler which would afford a sufficiently high degree of relief from pain in childbirth. The survey covers 1,390 labours, 162 of which were on our "district" (in the patients' own homes) and the remainder in our labour wards. Since these figures were collected (March 31, 1951) we have continued the same routine; our further experience does not alter the opinions we are about to give on the 1,390 cases.

It will be seen that Minnitt's gas-air machine has been used more often than any other apparatus, and this is explained by the facts that it is a compulsory part of our nurses' training and that it has been used for a longer time than the "trilene" (trichlorethylene) inhalers. We have attempted to assess the degree of relief given by Minnitt's apparatus and trilene inhalers, and to estimate their efficiency with and without pethidine, "omnupon," or scopolamine. This has been difficult, for our observers have not been experienced, and the opinions of the patients themselves are notoriously difficult to evaluate. Our analgesia service within the hospital is conducted by staff nurses, who supervise the administration of the analgesia and instruct the pupil nurses in training in the correct interpretation of results. The following form is completed and signed at the conclusion of each case. Trilene has not been given to toxæmic women, nor has it been used in cardiac cases or those with pulmonary tuberculosis or any chest complication.

Initially, nitrous oxide and air with Minnitt's machine was the standard method, but a certain number of cases received trilene from Freedman's machine. It was known that trilene was cheap, portable, non-inflammable, and non-explosive, and it was decided that its efficiency should be compared with that of nitrous oxide and air. We soon discarded Freedman's inhaler for that devised by Geoffrey Steel, for we were impressed by the possibilities of Steel's inhaler when we saw it at Queen Charlotte's Hospital. We regarded it as an apparatus which could be used by students and pupil midwives on extern maternity cases.

Steel's inhaler (made by Siebe Gorman) consists of a metal cylinder $4\frac{1}{2}$ in. (11.4 cm.) long and 1 in. (2.5 cm.) in diameter, closed at one end by a detachable screwed metal cap, and communicating with a lightweight rubber facepiece at the opposite end. The overall length of the inhaler is 8 in. (20 cm.), and the weight is $8\frac{1}{2}$ oz. (240 g.). Air is drawn into the apparatus through holes in the cap and passes over the trilene, which is released from

The Rotunda Hospital Intern Analgesia Chart

NAME..... DATE..... NO. IN MASTER'S BOOK.....

ADDRESS..... AGE..... PARITY.....

PREVIOUS OBSTETRICAL HISTORY

Onset of labour at.....hours

"Trilene" begun at.....hours.

		1st Stage	2nd Stage	De-livery	Other Drugs and Time
1. Mother's opinion	Complete Good Fair				
RELIEF					
2. Nurses' opinion	Complete Good Fair				
MINNITT'S (comparison with above)					
1.					
2.					

ADDITIONAL ANAESTHETIC FOR DELIVERY..... TOTAL TRILENE USED.....

PULSE RECORD:	MATERNAL			FOETAL		
	Time	Rate	Rhythm	Time	Rate	Rhythm

CHILD: Delivery	{ Spontaneous Instrumental	Condition of child at birth	{ Normal Blue White
		Respiration	{ Immediate Delayed Obstructed

MOTHER: Condition after Delivery.....	3rd Stage loss....	{ Average Excessive
Condition on Discharge....	{ Mother Child	

COMMENT:	

a crushable ampoule contained in an inner cylinder. The inner cylinder, approximately $\frac{1}{4}$ in. (1.9 cm.) in diameter, is closed at the cap end and open at the facepiece end. The air, having picked up trilene vapour, passes to the facepiece through a lightweight non-return valve, and finally escapes through an expiratory valve incorporated in the facepiece. Air can be drawn in only when an opening on the facepiece side of the non-return valve is blocked by the patient's finger.

The inhaler is charged by breaking a 3-ml. crushable ampoule in the inner cylinder, thereby soaking the absorbent covering of the ampoule in trilene. The surface exposed to the inspired air is small but sufficient to keep the vapour concentration at a level which produces satisfactory analgesia without loss of consciousness. The inhaler is sensitive to temperature changes, but unaffected by movement or shaking, for the trilene is soaked up by the absorbent covering of the crushed ampoule.

It is impossible to assess clinically the effect of temperature variations on the inhaler, and the individual susceptibility to trilene is variable. No attempt has been made to estimate the actual percentage of trilene delivered to the patient.

In spite of the fact that Helliwell and Hutton (1949) reported unfavourably on the unsupervised use of trilene by midwives, our experience with Steel's inhaler in the labour ward, under the supervision of the medical staff and analgesia staff nurses, inspired confidence, in its simplicity and reliability, and we issued it with two brisettes (each is effective for about half an hour) to students and pupil midwives attending cases on the district. Short talks on the scope and limitations of the inhaler were given, and typed instructions emphasized that the inhaler was not designed to produce anaesthesia but to lessen pain at the end of the second stage and at delivery. All observers were particularly asked to note any irregularity of the foetal or maternal heart. No student who felt unwilling or unable to use the inhaler was pressed to do so. We are glad to report that so far we have had no reason to regret our temerity in putting a potent weapon into relatively inexperienced hands.

Up to this time it was difficult to provide analgesia for the normal cases delivered at home by students and pupil midwives. Minnitt's apparatus was too heavy and clumsy if there was poor transport, and the use of narcotic drugs by mouth, or by injection, required greater skill, experience, and supervision than we could supply.

TABLE II.—*Extern Results (Up to March 31, 1951)*

Method	No. of Cases	Relief (Mother's Opinion)			Instrumental Deliveries			Foetal Mort.	Blue or White	Delayed Resps.
		Compl.	Good	Fair	Prim.	Mult.	Total			
Minnitt	848	50	585	213	180	30	210	11	110	107
Steel	279	21	201	57	38	7	45	2	40	31
Freedman	101	3	60	38	19	5	24	1	20	16

TABLE I.—*Intern Results (Up to March 31, 1951)*

Method	No. of Cases	Relief (Mother's Opinion)			Instrumental Deliveries			Foetal Mort.	Blue or White	Delayed Resps.
		Compl.	Good	Fair	Prim.	Mult.	Total			
Steel	162	—	116	46	3	1	4	2 (1 mac.)	—	—

Tables I and III refer to our labour ward cases, and Table II to women delivered in their own homes. Trilene with Steel's inhaler was the only analgesic in the latter group (162 cases), and the forceps rate (2.4%) and foetal loss were low.

The combined figures for Steel's trilene inhaler (Tables I and II) show that for 441 deliveries the forceps rate for all reasons was 11.11%; this incidence is only slightly above our present forceps rate (11.05%) for the entire hospital, including those few women who do not wish for narcotics during labour. The higher forceps incidence (16.13%) for intern cases is explained by the fact that primiparity was high and our disproportion cases are treated in hospital. We wish to emphasize that no case of post-partum haemorrhage occurred in the series under review.

TABLE III.—*Intern Cases*

Method	Complete to good Relief	Forceps Incidence	Foetal Loss	Asphyxia Blue or White	Delayed Onset of Resp.	Any Resp. Delay
Minnitt	% 75.3	% 24.7	% 1.29	% 13.2	% 12.6	% 25.6
Steel	79.9	16.1	0.71	14.3	11.1	25.4
Freedman	62.3	23.7	0.99	19.8	15.8	35.6

Table III, which is self-explanatory, shows in percentages the comparative figures for the Steel, Freedman, and Minnitt inhalers in *intern* patients only, and indicates that the Steel apparatus must be considered at least as safe and efficient as the others. The likely explanation of the better results obtained with the Steel inhaler in the *intern* patients (Tables I and III) is the better supervision by our analgesia nurses and the use of narcotic drugs during labour.

Our routine drugs for the relief of pain in labour are pethidine, omnopon, and scopolamine. Through the courtesy of Roche Products Ltd. our supplies of pethidine, either by itself or in combination with omnopon or scopolamine, have been assured even when these were scarce. We have no experience of ill-effects to mother or child from these drugs in various dosages and combination, provided care is exercised. Our trilene has been supplied by Imperial Chemicals Ltd., who have been of the greatest help in providing the specially designed gamgee-covered 3-ml. crushable glass trilene brisettes. At times the supplies of suitable glass for these was difficult to obtain, but this was overcome and our supplies were maintained.

The institution of a 24-hour analgesia service into a busy labour unit, especially if narcotic drugs are used, inevitably leads to some readjustment of nursing services. Difficulties arose, but these were willingly overcome, and the system is now working smoothly both in the hospital and in the patients' own homes. Dr. Peter Storah, resident anaesthetist to the hospital at that time, supervised this period under review, and we are much indebted to him for his help. Our students, too, have co-operated well in the district part of the work.

Conclusions

Nitrous oxide and air provide probably the most valuable method for use in a ward with unskilled personnel.

Nitrous oxide and air can be administered for a long time without ill effects to mother, child, or uterine tone.

Narcotic drugs may be combined with nitrous oxide and air with advantage. Doses of narcotic drugs sufficient to cause respiratory depression should not be used unless skilled supervision is available.

Trilene is capable of giving an amount of relief comparable to that given by nitrous oxide and air.

Trilene is slightly less agreeable to inhale, but the apparatus necessary is easily portable and cheap.

The inhalation of trilene should not exceed a period of two to three hours. Trilene for long periods, or in too high concentration for shorter periods, lessens uterine tone.

The use of narcotic drugs or full anaesthesia can be combined with trilene just as with nitrous oxide.

Our experience with trilene administered by students and pupil midwives leads us to believe that the method deserves a more extensive trial.

REFERENCE

Helliwell, P. J., and Hutton, A. M. (1949). *Lancet*, 1, 313.