

THE "STANDARDISED-DOSAGE" METHOD OF USING
SCOPOLAMINE-MORPHINE DURING LABOUR.

by

N. HIRSCHMAN, M.B., Ch.B.

Thesis for the Degree of M.D. 1922.



The following observations on 140 cases - 63 primiparae and 77 multiparae - of morphia-scopolamine treatment, were carried out in the Royal Maternity and Simpson Memorial Hospital, Edinburgh, in 1917. I have to thank my chief, Dr J.W. Ballantyne, for kindly giving me the scope and allowing me to make use of the material in his term of office. I also have to thank him as well as Dr O. Nicholson for their interest and encouragement while these observations were made.

We know that scopolamine as an anaesthetic or an adjuvant of other anaesthetics in surgery, originated with Schneidern in 1899. It was not however, until 1902 that von Stenbuchel reported his employment of it for a similar purpose in labour, and not until Kronig, Gauss, Blos, Kerff, and others published their results, was any widespread attention drawn to this usage of morphine and scopolamine. It is to Gauss, as we know, that the phrase "Dammerschlaf", ("Twilight Sleep") is due. To him also is due the "memory test".

There are some who say that, any method followed apart from Gauss's Memory Test, is not really Twilight Sleep. For convenience sake, however, I shall make use of this term here and there. My criticisms and results will necessarily be based on facts, and not on any prejudice in favour of or against the use of the drugs or other methods. I shall in all probability be inclined to make my percentages of successes too small, through being over cautious, and allowing as a failure any doubtful result. The omnopon used was in ampoules manufactured by Hoffmann-la-Roche. The other

drugs were manufactured by Duncan and Flockhart, Edinburgh. I will not dwell on the various criticisms offered against Twilight Sleep by the Berlin school nor the various methods followed by other men. Most medical men are aware of the nature of this treatment in obstetrics. Even the average layman of today, from the reading of books, magazines, etc. has some idea of it. On the other hand, I know of doctors even now, who have, whether in cases of primiparae or multiparae, given one injection of morphia and scopolamine at any odd time during labour, say they have used Twilight Sleep in these cases, and, when unsuccessful or the babies badly oligopnoeic, become prejudiced and condemn the drug. It is a duty of every medical man practising midwifery to have a good idea of this treatment if not actually to use it. If this drug is to be used at all, however; a chance must be given to the busy practitioner who says, "He has no time to waste over a confinement," and who, if he did, would only neglect the rest of his practice. The method adopted ought to be simple, and, if carried out by most of us, will have a beneficial effect on the falling birth-rate. Just as well as we are beginning to realise that antenatal treatment of pregnant women is important, so ought we to make more use of this drug, and by telling the woman who is to be confined, that she will

have "Twilight Sleep", thus ease her mind in many cases, of a dread.

Report of the National Birth-rate commission:-

"The fear of the pain of childbearing is admitted as one of the reasons why some women refuse motherhood". Even the use of chloroform will not dispel this fear.

Premature delivery may even occur, not only as the result of physical but also of mental disturbance. The confinement, under "Twilight Sleep", instead of becoming to the morbid woman a possible pathological condition, becomes really a physiological one in the true sense of the word.

The Lancet in Sept. 1915 says:- "Recent statistical returns of the births and deaths of infants in this country are disquieting; regarded individually they are bad enough, but taken collectively they are distinctly alarming. The continued fall in the birth-rate, which has now reached its lowest level recorded, may have many explanations, but the factor of the deliberate limitation of families, whether from provident or selfish motives, can no longer be ignored. The dissemination of knowledge with respect to the use of contraceptives has undoubtedly contributed to this result, not only among the upper and middle classes, but even among the poorest, with whom such practices were quite exceptional a decade ago." *Fear, however,

as I have pointed out above, is the predominating factor in a large majority of cases. Not a single instance do I know of, where the patient said, after having had "Twilight Sleep", either completely or partially successful, that she would have no more children. Who can deny having heard the phrase "Never again", at the usual painful labour?

Yet, to give a drug like morphine scopolamine in any haphazard fashion, a drug which is still in its developmental stage as regards its use in labour, is not by any means scientific and certainly likely to cause some trouble and anxiety as I shall endeavour to show.

As Gauss said in criticising the Siegel method:-

"If you could trust to having an average woman you could use an average dose, but the dose is easier to regulate than the woman". There is absolutely no doubt, that, just as with other drugs, some women have an idiosyncrasy to Morphine-Scopolamine. In spite of Gauss's criticism, we see that quite a fair percentage of cases treated by his method, are failures or partial successes, just the same as we find this to be the case with other methods. There must be some compromise arrived at, whereby the practitioner or specialist in obstetrics should be able, as I mentioned, to go about the rest of his duties.

In the method I have adopted - the "standardised dosage" as Dr. Greenwood calls it, I have tried to regulate the dosage so, that it should dispense with the difficult "individualisation" technique of Gauss, and allow a nurse of ordinary intelligence to carry out the doctor's instructions. Except in one case, where I had given a patient who had a very rigid os, two doses of chloral-20 grs. every twenty minutes - was there any necessity for the nurse to be actually alarmed and to call me.

DOSAGE.

During my observations I have used the following drugs and doses:-

<u>Multiparae</u>	-	Initial dose (1) $2/3$ gr. Omnopon and $1/150$ gr. Scopolamine with an h'rly injec. of $1/450$ gr. Scop.
<u>Prims.</u>	-	Initial dose (2) $1/4$ gr. Morphia & $1/150$ gr. Scop. with an h'rly inj. of $1/450$ gr. Scop.
<u>Prims.</u>	-	Initial dose (3) $2/3$ gr. Omnopon and $1/150$ gr. Scop. with h'rly inj. $1/450$ gr. Scop.
<u>Prims.</u>	-	Initial dose (4) ditto. ditto. $1/400$ " "
<u>Multip.</u>	-	ditto. (5) ditto. ditto. " "
<u>Multip.</u>	-	ditto. (6) $1/12$ gr. Heroin & $1/150$ gr. Scop. ditto. $1/450$ " "
<u>Prims.</u>	-	ditto. (7) $1/4$ gr. Morphia & $1/100$ gr. Scop. & $1/150$ gr. Atropin $1/400$ gr.

I have not repeated the initial injection except in one case where labour had stopped. In this paper I shall point out two main things viz:- that there is a definite "danger period" or "period of oligopnoea" approximately from $2-3\frac{1}{2}$ hours after the initial injection of morphia, and that the combination of atropine, if it does not totally prevent this period, at any rate tends to give us fewer oligopnoeic babies.

Success depends upon the patients lack of conception of pain after the confinement is over with no unfavourable result to the child due to the administration of "Twilight Sleep".

It is advisable that I state here what I mean by the various terms amnesia etc. in order to show how I come by my results. After the effects of the drugs

have disappeared the patient is questioned as to how much or what she remembers. One might say that this is simply an inversion of Gauss's "Memory Test" with certain limitations. I place my results in Class I, II or III accordingly.

CLASS I.

Total Amnesia:- The patient says she remembers nothing and has consequently no conception of having had pain during labour. Apperception - as Greenwood calls it - is complete.

CLASS II.

Partial Amnesia:- The patient has perception of pain or recollection of pain during the labour.

CLASS III.

No amnesia:- The patient recalls all events in full detail and recollects having had.-

- (a) No pain - Complete analgesia or Hypalgesia as Greenwood calls it.
- (b) Mitigated pain - Partial Analgesia.
- (c) Usual pain - No Analgesia.

Of course a primipara could not very well refer to pain as "usual". She is therefore asked whether the pain was unbearable or not.

One cannot always tell the ultimate result from the notice the patient takes of the prick of the needle or from her behaviour. There might have been or there may be an "islet of memory" formed. I have seen patients speak and act quite rationally while under

the drug and yet remember nothing when questioned after the labour. On the other hand, I have seen cases, where apparently no "islets of memory" were caused, and where the patient was drowsy, talking nonsense very often, result, if not a failure, at any rate, not in a complete success. Of course a patient might even tell a deliberate lie. I mention this because I had one case - a prim. - in private practice to whom I had given seven injections. This might on the other hand, be due to the fact that the patient was never really under the influence of the morphia and that numerous "islets of memory" were formed.

RESULTS.

Multip:- 11 cases - treated with:-

$\frac{2}{3}$ gr. Om. & $\frac{1}{150}$ gr. Scop. initially & $\frac{1}{150}$ gr. Scop. every hour.

Average number of injections 4.18.

<u>1st Set.</u>	{	(Class I.	3	cases	or	27.2%
	{	" II.	5	"	"	45.45%
	{	" III.	3	"	"	27.2%
	{	(a)	5	"	"	45.45%
	{	(b)	6	"	"	54.54%
	{	(c)	0			

Three of these cases had no chloroform at the end of 2nd stage.

Two of these cases had only one injection. Both these facts tend to make the percentage too low.

There were no restless patients.

Four babies were oligop. but recovered.

The first one was born spontaneously 2 hrs. 40 mins, after initial injection. (danger per.)

The second was born spontaneously 2 hrs.5 min. after initial injection. (danger per.)

The third was born spontaneously 3 hrs.55 min. after initial injection. (danger per.)

The fourth was a forceps case for contracted pelvis.

Subtracting this last we get olig. babies 27.2%.

The low results are undoubtedly due to the quickness of the labour.

There were two forceps cases. Subtracting the one above we get 9.1%.

Live babies were 100%.

Prim.-13 cases - treated with $\frac{1}{4}$ gr. morph. and $\frac{1}{150}$ gr. Scop. initially & $\frac{1}{450}$ gr. Scop. hourly.

Average number of injections 6.5

(Class I. 8 cases or 61.5%
2nd.Set. (" II. 5 cases or 38.5%
 (" III. 0.

((a) 9 cases or 69.23%
 ((b) 4 cases or 30.76%
 ((c) 0

Two of these cases had no chloroform. One patient (7.6%) was very restless. Five babies were oligop, but recovered. One was born spontaneously 2 hrs.45 min. after initial dose, and took 15 min. to cry. Of the four remaining three were stiff forceps cases and the other was a dry labour. Thus olig. babies 7.69% Better results were obtained here owing to labour being more prolonged.

There were 6 forceps cases of which one was contracted pelvis, and three for large babies. This gives two cases or 15.3%

Live babies were 100%

In this series there were three babies born in the danger period, besides the one above, who were lively. I shall refer to this later. One case had 26 hrly. injections. She delivered herself spontaneously, the baby being quite lively.

Prims.- 6 cases - treated with $2/3$ gr. Omnop. and $1/150$ gr. Scop. initially & $1/450$ gr. Scop. hourly.

Average number of injections 6.8

<u>3rd set.</u>	{	<u>Class I</u>	5 cases or 83.3%.
	{	" <u>II.</u>	1 case or 16.6%
	{	" <u>III.</u>	0
	{	(a)	5 cases or 83.3%
	{	(b)	1 case or 16.6%
	{	(c)	0

One case had only one injection.

There were no restless patients.

No babies were olig.

Of six babies, five were alive and one was a craniotomy.

There were three forceps cases of which one was for contracted pelvis, thus giving 2 or 33.3%.

Primiparae - 30 cases - treated with: $\frac{2}{3}$ omnop. and $\frac{1}{150}$ gr. scop. initially & $\frac{1}{400}$ gr. scop. hourly.

Average number of injections 7.2.

4th. Set. { Class I. 25 cases or 83.3%
 { " II. 3 cases or 10.0%
 { " III 2 cases or 6.6%

{ (a) 26 cases or 86.6%
 { (b) 2 cases or 6.6%
 { (c) 2 cases or 6.6%

Six cases had no chloroform

Three cases had only one injection.

These facts again lower my percentage of successes.

Two patients were very restless (6.6%)

Four cases had chloral for rigid os, one having three successive doses each 20 grs. every 20 minutes.

One case had a total of 36 inj. but the treatment was discontinued twice in three days on account of labour stopping on each occasion. There were 11 olig. babies viz:- One baby was born spontaneously 1 hr. 35 min. after the initial inj. and was very olig.

A second was born spontaneously 3 hrs. 20 min. after the initial injection also olig. as well as another 4 hrs. after. Of the remaining eight, there were six forceps cases - three stiff ones - and 2 breeches. Excluding the three stiff forceps for large babies and the breeches in which there was delay in the after-

coming head we get olig. babies 6 or 20%.

As soon as no chloroform is given or injections begin late we get a smaller percentage of successes and a higher percentage of olig.babies.

Out of 30 babies, twenty eight were alive, the other two being unavoidable *craniotomies*.

There were eight forceps cases of which two were for large babies - one an impacted shoulder. This gives us two forceps cases 20%.

Multiparae - 62 cases - treated with: $\frac{2}{3}$ gr. Omnop.
& $\frac{1}{150}$ gr. scop. initially & $\frac{1}{400}$ gr. scop. hourly.

Average number of injections 5.09

5th. set. { Class I. 41 cases or 66.2%
 { " II. 5 cases or 8.06%
 { " III. 15 cases or 25.8%

{ (a) 47 cases or 75.8%

{ (b) 10 cases or 16.1%

{ (c) 5 cases or 8.06%

Five cases had no chloroform.

Fifteen cases had only one injection.

Two cases were very restless 3.2%

Four cases had chloral.

Seven babies were born in the "danger period" 2-3 $\frac{1}{2}$ hrs. after first injection; All of these were born spontaneously, all were badly olig., but recovered.

There were eleven other babies olig. Of these, seven were forceps cases for contractions, or large babies, and one a difficult breech. Excluding these we get ten olig. babies or 16.6% In 62 cases there were 63 babies (one case twins). One, an anencephalic, died in 20 min. There were three dead babies, of which one was macerated, the second was due to a severe accidental haem. from a fall, and in the last the mother, after a fall had not felt life for three days before admission. This was a forceps case.

There were altogether thirteen forceps cases of which seven were mentioned above, two prolapsed cords requiring interference, and also in the case of the ¹¹large child which was dead-born.

Thus we get 3 forceps apparently due to Morph. Scop.

as 4.9%

(The small hospital percentage here was no doubt due to the fact that I was administering pituitrin in a bigger percentage of cases).

Multiparae - 4 cases treated with $\frac{1}{12}$ gr. Heroin $\frac{1}{150}$
gr. scop. initially & $\frac{1}{450}$ gr. scop. hourly.

Average number of injections 5.2

6th. set. (Class I 0
(" II 3 cases or 75%
(" III 1 case or 25%
(

((a) 1 case or 25%
((b) 3 cases or 75%
((c) 0
(

All the cases had chloroform.

No patients were restless.

One baby was born 2 hrs. 25 min. after initial injection, but was quite lively. This in my opinion, shows that the morphia in the initial dose was too small to cause any oligop. in spite of the baby born in the "danger period".

For the same reason the total successes are small.

There were no dead babies and no forceps cases.

Primiparæ - 14 cases - treated with $\frac{1}{4}$ gr. Morphia & $\frac{1}{100}$ gr. scop. & $\frac{1}{150}$ gr. Atropine initially and $\frac{1}{400}$ gr. scop. hourly.

Average number of injections 6.4

7th. set. { Class I 13 cases or 92.8%
 { " II 1 case or 7.1%
 { " III 0.

{ (a) 13 cases or 92.8%
 { (b) 1 case or 7.1%
 { (c) 0

One case had no chloroform.

One patient was very restless (7.14%)

Four babies were born in the danger period and all were lively. This, I am sure, was due to the fact of $\frac{1}{150}$ gr. Atropine being added to the initial dose.

(A larger dose of scop. was used as will be noticed. The other cases had only $\frac{1}{150}$ gr. scop.)

There were 13 live babies, the dead-born one being born spontaneously. It had blood in its ~~mouth~~ and nose, was very badly nourished and the coils of the cord were thin and few. There were two forceps cases (14.3%)

Considering as "Twilight Sleep" percentages the total result of 77 multiparac and of 63 primiparac, we get irrespective of the dosage used the followingL-

<u>77 multip.</u> <u>(55%)</u>	(<u>Class I</u> 75.1%
	(" <u>II</u> 16.8%
	(" <u>III</u> 24.6%

(a) 68.8%

(b) 24.6%

(c) 6.4%

8 cases had no chloroform, 17 cases had only one injection, and 2 cases were very restless 2.5%. There were 13 olig.babies out of 75 or 17.3%. 4 forceps cases or 5.1% due to morph.-scop.

<u>63 primip</u> <u>(45%)</u>	(<u>Class I</u> 80.9%
	(" <u>II</u> 15.08%
	(" <u>III</u> 4.7%

((a) 48.1%

((b) 12.6%

((c) 3.1%

9 cases had no chloroform, 4 cases had only one injection, and 4 cases were very restless 6.3%. There were 7 olig. babies out of 59 or 11.8% and 12 forceps cases or 19.04%

The percentage for a total of 140 cases combining prim. and multip:- is as follows:-

{	<u>Class I.</u>	67.8%
{	" II.	16.4%
{	" III.	15.0%
{	(a)	75.7%
{	(b)	19.2%
{	(c)	5.0%

Oligopnucia babies 14.9% due to morpho.-scop. apparently.

Restless patients 4.2%.

Forceps cases 11.4% due to morph.-scop.

17 cases had no chloroform.

21 cases had only one injection.

Maternal mortality 0.

Apart from the different doses used, if we take "Twilight Sleep" as having been used in 140 cases of multip. and primip, we find that there were 141 babies born of which 7 were dead.

viz:- 3 unavoidable craniotomies

1 macerated foetus

1. due to severe acc. haemorrhage (set V.)

1. in which the mother felt no life for three days (set V.)

1. where baby was badly nourished (Set. VII.)

This gives us 134 live babies of which one-an anencephalic - died after 20 min. If the last three are considered as being due to the treatment we get 2.1% of dead babies. If the last one only is considered then we get .74% dead babies. The high percentage of forceps cases is unavoidable where the institution is one for teaching purposes. Besides that, when the 2nd. stage has lasted about 2-3½ hrs, the patient is, as a rule, delivered with forceps. Another point to be considered is that, when the patient is admitted to a public hospital and is in labour, she is given a bath first before being brought to the labour^{ward}. Injections are given therefore very late, the pains being usually severe.

RESULTS COMPARED IN DIFFERENT SETS.

In comparing the results in the different sets I -VII, it is easily seen that the percentage of successes is found in the cases of primiparae. It is certainly due to the fact that labour is more prolonged, thus necessitating a larger number of injections and so conducing to a better amnesic and analgesic effect. For the same reason we find that, in a percentage of multiparae, only one or two injections are given with not such a good effect apart from any idiosyncrasy to the drug. As regards the primiparae, the percentage of successes is raised and that of failures lessened. Those primiparae treated with $\frac{2}{3}$ gr. Omnopon & $\frac{1}{150}$ gr. Scop. show a much better result than those treated with $\frac{1}{4}$ morphia and scopolamine. The omnopon also seems to have a less toxic effect not only on the patient, but also on the foetus. The scopolamine has a quicker effect, and, when the babies are born, they are a good deal less blue. Heroin $\frac{1}{12}$ gr. is certainly too small a dose for an initial injection. Although the percentage of complete successes is small, the partial successes are fairly good. In set VII, the addition of Atropine $\frac{1}{150}$ gr. has had a remarkable effect. The result here contradicts Dr. Innes & others who used atropine in their cases. Any toxic action the morphia has in the mother or child, seems to be counteracted

by this drug. The fact that the babies born in the "danger period" were not oligopnoeic, is not, in my opinion, due to mere coincidence. The forceps cases were also less cf. e.g. with Set II; the restless patients gave as little trouble as the others, if not less than usual. There were no absolute failures.

RESULTS COMPARED WITH THOSE OF OTHER OBSERVERS.

In comparing these results with those of other men it can be seen that a regulated standardised dose has its advantages. Dr Siegel, one of Krönig's assistants at the Freiburg Hosp., used the "standardised dosage" modification. The "memory test", as here, was dispensed with. His method and results were as follows:-

1st Injection	Scopolamine	gr.1/130	narcophine	gr.½.
$\frac{3}{4}$ hr. after first	"	gr.1/130	"	
1½ hr.	"	gr.1/400	"	gr.¼.
3 hrs.	"	gr.1/400	"	
4½ hrs.	"	gr.1/400	"	gr.¼ etc.

Complete amnesia	88%
Partial	10%
Unaffected	2%
Olig-babies	27.7%
Still-born	1.3%

Considering the initial large dose of narcophine and the alternate doses of this drug, I am surprised at his low results of successful cases of amnesia, and certainly astonished at the small percentage of olig-babies and still-births. His method is too drastic and is to be condemned by anybody wishing to use the "standardised dosage" method. The fact of 2% being unaffected with such large doses of narcophine, seems to me to prove that the percentage of cases of idiosyncrasy towards the drug is more or less 2%.

The following are a few groups of statistics of cases occurring in Hosp. or private practice, recorded by other observers.

Haultain & Swift.

Oct. 14.1916 40 cases

Complete Am. & Analg.	75%
Partial Am.	13%
No amnesia	12%
Forceps 35% P.P.H.	3.3%

Lebanon Hosp. New York.

66 cases

Complete Am.	67.95%
Partial "	13.59%
Neg. "	18.12%
Marked Analg.	85.68.
Slight "	9.52.
Forceps	9.06%
Atonic P.P.H.	3.03%
Olig babies.	11.92%
Still-born	2.98%

<u>Gauss.</u>	86%)
Amnesia	98.6%)

Forceps 9.4%-12.6%

Still-born babies 1.2%

Slight olig.	"	23.8%
Placenta Expelled spontaneously		56%
"	"	by Crede's method 43%
		manual 0.6%

St. Bath. Hosp. London.

Complete amnesia	55%
Partial "	20%
Negative	25%
Marked analgesic	60%
Slight "	25%
Neg.	15%
Olig. babies.	42.1%.

St. Thomas's Hosp. 80 cases.

Compl. am.	45%
Partial "	32.5%
Neg. "	18%
Compl. Analg.	45%
Partial "	50%
Neg.	5%
Olig.	12.9%
Forceps	12.5%

Queen Charlott's Hosp. 67 cases.

Compl. Amnesia	46.2%
Partial "	44.7%
Neg	2.9%
Compl. Analg.	47.7%
Partial "	46.2%
Olig.	19.1%

City of London Lying in Hosp. 135 cases.

Compl. Am.	40%
Partial "	58%
Failures	3%
Forceps.	32%

L.A.N.
Gen. Lying in Hosp. 20 cases.

Compl. Am.	50%
Partial "	35%
Failures	15%
Compl. Analg.	50%
Partial "	40%
Failures	10%

Spontaneous breathing babies 65%

Solomon's & Freeland 100 cases.

Compl. Analg.	10%
marked "	57%
Fair "	20%
None	13%

Arlumks & Rongy 100 cases.

Amnesia	83%
Analg.	8%
Fail	9%
Olig. babies	15.2%

Frigyesi. 200 cases.

Compl. Am.	62.5% (one inj.)
" "	80.7% (several)
Analg with no Am.	25%
Olig. babies	15%

Greenwood 200 cases.

Amnesia Successes	98.6%
Olig.	10.66%
Infant mortality	2%

In comparing these results with the total result of my 140 cases, it will be seen that there is not too much to be said against the used of regular fixed doses.

One primip, was ~~at~~ 14.

My percentages are necessarily low, because of the total I had only 63 primiparac or 45%

COMPLICATIONS.

Restlessness may occur not only after giving two or three injections of Scop, but also after 20, 30 or more. It is not always due to an idiosyncrasy of the patient to the drug, but very often to faulty technique or carelessness on the part of the attendant in administering to the patients needs.

In every case, I have found that there is thirst to a greater or less degree. Even when the patient does not ask for a drink, small sips of water or milk, especially if she is restless, ought to be given. Apart from actually giving fluid, the face, lips, gums of the patient should be constantly moistened by the attendant. Especially when the head is on the perineum, the patient is very apt to put her hands down to the vulva during a pain. If sepsis is to be avoided, this particularly should be prevented. The nurse should be very careful not to allow the bladder to become distended, for obvious reasons, and should persuade and encourage the patient to pass water at regular intervals, depending on the quantity of fluid taken and the length of the labour. If necessary a catheter should be passed. The patient will not always ask for what she wants.

EFFECTS on the MOTHER.

The nurse ought not to hold a conversation with the patient in any way except in so far as is essential. Some patients talk quite rationally, are not much flushed, the Babinski sign and pupil reflexes may be absent, muscular co-ordination may be good, and yet they may turn out to be very good cases of "Twilight Sleep" and vice versa.

The value of suggestion on restless patients is very notable. I have seen very restless cases, where I have suggested that "they are tired and want to sleep", become absolutely calm. I have never had occasion to discontinue treatment in these cases, nor have I observed any active or muttering delirium. It is probably faulty technique. In a few cases, as mentioned previously, where the os has been very rigid, I have given chloral in 20 gr. doses every 20 min. up to three doses if necessary, before starting on the morphia-scopol. The dose is certainly heroic, but the doctor ought not to leave the case during the time. It has one advantage viz. that the patient does not realise when she is getting the initial dose of morphia-scopol, this fact tending later to make the case more successful. The patient ought in all cases to have chloroform at the end of the 2nd. stage,

in order that she should not retain any idea of the labour from an "islet of memory" being formed, due to the more intense pain.

A remarkable after-effect on the mother, is the absence of shock and exhaustion either subjectively or objectively, occurring not only in short labours but also in lengthy complicated ones. This necessarily tends to make the convalescence quicker and more pleasant, in as much as nervous energy is conserved. In most cases of multiparæ, if morphia $\frac{1}{4}$ gr. or $\frac{2}{3}$ gr. omnopon is to be given, it should, even at the risk of labour stopping again, be administered at the very beginning, judging only from the state of the os and not from the actual severity of the pain. It is well known that some multiparæ will often not have acute pain until the os is fully dilated or even the head of the perineum. If there is any reason to anticipate a fairly rapid course of labour, and a risk of the child being born in the "danger period" a smaller dose of morphia or omnopon than usual, should be given, with more frequent injections of scopolamine or a larger initial dose of scop. The dose of morphia is the governing factor, and, unless this be given before the pains become acute, no complete success need as a rule be expected.

One great disadvantage I must mention, apart from any method adopted. With the average general practitioner who treats patients with "twilight Sleep", and who has not had a very great experience of this drug, vaginal examinations, particularly in multiparae, are necessarily increased.

This is a fact even with his more experienced colleagues. If puerperal infection, caused as a rule by sepsis from without inwards, is to be avoided and the percentage of deaths lessened, then it is the duty of everyone using this treatment to be particularly careful, and not give occasion for further criticism on the part of those who already condemn the drug.

EFFECTS on the CHILD.

I do not think it is necessary to listen to the foetal heart any more than in cases not treated by morph. - scopol. Any cause for anxiety that there is - apart from the child being born in the "danger period", - (this not being a real danger) depends on other complications.

The baby, no matter what success or failure the case has been, is always more or less blue. There is never really that pink colour seen.

Scopolamine babies invariably seem to have more viscid mucous in their throats than those born otherwise. I make it a rule in every case where the child is not lively, to ligature the cord immediately and use a mucous extractor. Of 23 babies born spontaneously up to 2 hrs. after the initial inj. only 2 were oligopnoic.

Judging by what the nursing staff told me in the hospital, the scopol. babies seem more quiet and contented than any others. Whether this is merely the imagination of enthusiasm or not, I am not prepared to say.

It is at any rate, a known fact that the drugs are excreted by the child in a few hours, so one cannot say that the babies are still stupid from the effects of the drug.

CONCLUSIONS.

On looking through my results of morphine - scopolamine treatment on 140 cases carried out in the Royal Maternity and Simpson Memorial Hospital, I have come to the following conclusions:-

It is the morphia which causes the analgesic effect in the mother primarily, and allows the scopolamine to take effect.

A second dose of morphia is not necessary, but, where for any particular reason the doctor thinks it is required, he should make quite certain, first of all, that the child is not likely to be born in the "danger period", viz. from 2-3 $\frac{1}{2}$ hours after the last injection of morphia. If it is born in that interval it will be very oligopnoeic. A smaller dose of morphia e.g. $\frac{1}{12}$ gr. Heroin, although likely to cause little amnesia or analgesic effect in the mother, will not cause this oligopnoea.

The question of this inner limit to a "danger period", as I call it, was discussed in May 1917 by another resident and me at the above hospital. Since then I have observed that there is more or less a definite outside limit. The reason I use the word danger, is in order to keep the doctor on the "qui Vive" and make him realise this period before

commencing treatment. The baby born in this period, may not be in any apparent danger, but will likely cause some anxiety before it breathes properly and cries.

The "danger period" can be avoided by combining a dose of atropine e.g. 1/150 gr. with the initial injection of morphia-scopolamine. From the similarity of its action to scop. and its effect on the brain, I think the amnesia becomes more pronounced, at the same time preventing the toxic action of the morphia. If, knowing that the atropine is an antidote to morphia, we allow the latter to act first for $\frac{1}{8}$ hr. and then inject the atropine, we might get a still better result.

Although I have used different doses "standardised-dosage" method - in treating the primip. and multip. in the 140 cases, I have seen that the initial dose ($\frac{1}{4}$ gr. morph. 1/100 gr. scop. and 1/150 gr. atropine) followed by 1/400 gr. scop. hourly (mentioned in Set 7) is the best from every point of view.

The babies in a set of 14 primip. were all lively; the forceps cases apparently due to the treatment in comparison with those known to be from a definite cause like contracted pelvis - were also less. (Instead of morphia $\frac{1}{4}$ gr. I think $\frac{1}{2}$ gr. or $\frac{2}{3}$ gr.

Omnopon would be better)

The initial dose of scopol. ought always to be $\frac{1}{100}$ gr. apart from any idiosyncrasy of the patient to the drug, although as I said before, the initial dose of morphia is the governing factor. In multip. The initial dose of morphia should be from Heroin $\frac{1}{12}$ gr. to Omnop $\frac{2}{3}$ gr. depending on how long labour is expected to last. It is certainly advisable, although not essential, to have a nurse in attendance who has seen the effects and nursed cases of "Twilight Sleep". She must be in constant attendance upon the patient, not leaving her alone for a moment.

In this connection I might here mention an amusing incident. A patient was in labour one evening in the hospital and under "Twilight Sleep".

The nurse in charge of the case left the labour ward and, on returning a few moments later, found that the patient had disappeared. A search was made high and low but without success. One of the residents happened to go to his room just then and found the patient sitting in his bed. His room was on the same landing as the labour ward, and the patient, becoming restless, suddenly walked outside, and into the first open door, which was his. Fortunately the case terminated with forceps.

The morph. scopol. treatment is particularly indicated in primiparae and in cases where a lengthy severe labour might be expected.

If pituitrin is to be given at all during the labour, it is certainly less torture to the patient to be under morph.-scopol. narcosis or semi-narcosis than otherwise.

A little chloroform before giving the first injection certainly helps to make the patient drowsy, but this is inadvisable, as many people, particularly primiparae, cannot bear the smell of this drug. The "standardised - dosage" method is to save the doctor trouble, and allow him to go about his other duties. For the same reason, whiffs of chloroform for restlessness are out of the question. Chloroform should, however, be administered at the very end of the second stage not only for obstetrical reasons, but also because it prevents "islets of memory", or impressions, on the brain.

I am sure, no matter which method is followed, that in most cases of "Twilight Sleep" there is not that complete alertness and desperation present, when the patient has to bear down. This would no doubt tend to make forceps cases more frequent. Pituitin, however, overcomes this disadvantage, as a rule. The

advantages in using the treatment outweigh the disadvantages by far. With ordinary, reasonable care, there certainly need not be any untoward effects on the mother, and very little, if any, on the child.

As regards the exception in Set II where the baby was lively although born in the "danger period" a likely reason is, that in a small percentage of cases, a less amount of morphia than usual enters the foetal circulation within a certain time. Again, a large percentage of the morphia may not wear off or be excreted by the foetus until nearly 4 hours after the last injection of morphia. For that reason a small percentage of babies are oligop about that time e.g. In sets 1 and 4.

Thirdly, in cases where babies are oligop. when born in less than two hrs. after the last dose of morphia, the reason may be that the drug enters the circulation too quickly.

Referring to "Twilight Sleep" and the occurrence of three stillborn babies, each of which had an enlarged thymus,

Dr. F. J. Browne, in his discussion of stillbirths - causes pathology and prevention, says:- "Instances of increased susceptibility to the action of morphia are not infrequent in the cases of infants and young children. and it does not seem unreasonable to suppose

that a like idiosyncrasy may exist in the unborn foetus or that the maternal metabolism in certain cases is slower than in others, this allowing more of the toxin to pass over into the foetal circulation. The scopolamine has no olig. effects on the child. I know of a case where the nurse made a mistake as regards the doctor's orders, and gave three doses of scop. each $\frac{1}{150}$ gr. in the course of 10 hrs. the last dose about one hour before the child - quite lively - was delivered with forceps.

Post-partum haemorrhage and manual extraction of the placenta does not occur more frequently than usual.

There are some who say that this treatment is liable to cause some defect or ill-effect later in the child. I can only say that I have had an opportunity in private practice of observing the babies born under the treatment, and they were all apparently healthy and bright later.

Looking at morph.-scopol. treatment from an antenatal point of view, I think it is ^{an} unquestionable fact that the thought of having this treatment is bound to react favourably on the mental and physical condition of the mother, and therefore on the child. If we have to consider the antenatal care of a pregnant woman we must try and cure not only her

physical symptoms but also, in those who dread and fear the impending labour - as mentioned previously - their mental symptoms as well.

If the falling birth-rate has to be stopped, then more maternity hospitals for scop.-morph. cases ought to be erected so as to give those a chance to benefit, who cannot afford the necessarily high fees.

The question should become a National one.

References:-

Martin. B.M.Journal Jan.6, 1917.

Haultain & Swift. B.M.Journal, Oct.4, 1917.

Lancet Sept.30, 1916.

Scop-morphine semi-narcosis during labour -
W.D. Greenwood.

Amnesia & Analgesia in Parturition - A.M. Hellman.

Twilight Sleep - C. Webb-Johnson.

The falling birth-rate B.M.J. Aug.27, 1921.

Still-births:- Causes, pathology and prevention -
Dr F.J. Browne. B.M.J., July 30, 1921.