The Bulletin of the
Kandang Kerbau Hospital,
Singapore,
Vol. V — No. 2 — October, 1966.

Surgical Induction in the Grande Multipara

by

T. H. Lean, FRCS., FRACS., FRCOG.

KANDANG KERBAU HOSPITAL, SINGAPORE.

It is generally known that there are a number of factors which influence and safeguard the mechanism controlling the maintenance and termination of pregnancy. Some of these factors improve and some others depress uterine activity and theoretically, these different factors make up an equation which will determine whether a pregnancy will be continued or will be interrupted. Bengtsson has shown that the theoretical equation can be made up as follows: —

$$\text{Uterine Activity} = \frac{\text{Oestrogen} + \text{Oxytocin} + \text{Volume} + \text{Anatomic Factors} + \text{Nervous Factors}}{\text{Progesterone} + \text{Oxytocinase} + \text{Other Anatomic Factors} + \text{Other Nervous Factors}}$$

This equation suggests that labour may start in several different ways — by an increase in one or several factors above the line and/or decrease in the factors below. Based on this equation, it becomes apparent that surgical induction of labour involves the factor of volume but the exact mechanism of the formula triggering uterine activity has not been shown with clarity. Gibberd has stated that the principles underlying all mechanical methods of inducing labour are essentially crude, but in the present state of our ignorance as to the cause of the onset of labour, we have to continue to rely on the crude methods in many cases.

If one confines attention of surgical induction of labour to the procedure of amniotomy, one will see that this procedure stands a class by itself. It had stood a prolonged test of time and was first used by Denman in 1756 — being labelled as the "English Method". Amniotomy remains the most efficient and most widely used method of surgical induction in the obstetric world today.

At the Kandang Kerbau Hospital, experiences of amniotomy in general have been reported by Sinnathuray. The study affirms the efficacy and safety of selective induction of labour as an invaluable therapeutic procedure in modern obstetrics. Interest however was generated on a particular group of obstetric patients viz: the grande multipara. About 30 per cent of the cases reported by Sinnathuray involved patients in this category and in view of the interesting obstetric behaviour of this group of patients, it was thought that perhaps a detailed study of amniotomy amongst them will provide interesting results.

Incidence of Grande Multiparity

This present analysis covers deliveries at the Kandang Kerbau Hospital in 1965. There had been a total of 38,849 deliveries conducted, distributed amongst the various parity groups as follows: —

Deliveries at Kandang Kerbau Hospital, 1964	—	39,598	
Para 6 and over, 1964	—	11,162	28.2%
Deliveries at Kandang Kerbau Hospital, 1965	—	38,849	
Para 1	—	8,081	20.8%
Para 2 to 5	—	18,471	47.5%
Para 6 and over	—	12,297	31.7%
Maternal Mortality Risk for the Grande Multipara		= 3 per 1,000	

If the group parity 6 and over is taken to represent the grande multiparity group — it can be seen that an average of 30 per cent of problems at the hospital concerned the grande multipara. In 1964 — 11162 deliveries out of a total of 39598 occurred amongst the grande multipara.

The high maternal mortality risk for the grande multipara at about 3 per 1000, and which is 5 times higher than the risk for women of parity 5 and less, has been stressed (Lean).

Incidence of Surgical Induction (Amniotomy)

In general, it is difficult to make comparison between incidences of surgical induction at the various centres. There is such a wide variation and the incidence merely gives one an idea of the attitudes and the types of problems that each particular institution faces. Thus for example in the United Kingdom, an average rate of 20 per cent of incidence of surgical inductions has been cited for the whole obstetric service, but variations range from 40 per cent at Bristol to 20 per cent at Glasgow and 11.4 per cent at Queen Charlotte's Hospital, London. At the Kandang Kerbau Hospital, Sinnathuray reports an approximate incidence of 2 per cent and basing on his analysis of 1000 consecutive surgical inductions which he analysed. In the year 1965, records show that only a total of 550 cases were surgically induced by low amniotomy amongst 38,849 deliveries giving an approximate incidence of 1.4 per cent. This is indeed a surprisingly small incidence but many factors contribute to the small ratio. These factors include the high dilution of about 25000 uncomplicated and normal deliveries, and also the fact that at the same time, a unit was also studying the outcome of cases of post-date pregnancies without specific termination. It was also observed that of the three obstetric units in the hospital, only one unit was actively carrying out surgical induction for the various indications.

The 550 cases of amniotomy carried out in 1965 at the Kandang Kerbau Hospital were distributed amongst the various age and parity group as follows: —

Parity	Below 20 years	21-25	26-30	31-35	36-40	40 & Over	Total	
1	52	91	39	15	3	0	200	: 36.4%
2-5	12	60	73	37	14	3	199	: 36.3%
6	0	3	12	10	6	1	32	: 5.8%
7	0	1	13	12	9	3	38	: 6.9%
8-9	0	0	6	14	17	8	45	: 8.2%
10 & over	0	0	2	7	21	6	36	: 6.4%
	64	155	145	95	70	21	550	: 100.0%
	11.6%	28.2%	26.4%	17.3%	12.7%	3.8%		

Viewing the parity groups per se, the distribution of amniotomy were as follows as compared to the 1964 series (Sinnathuray): —

	Present Series, 1965		Sinnathuray's 1964 Series	
	Cases	Per Cent	Cases	Per Cent
Para 1	**200**	**36.4**	318	31.8
2 to 4	161	29.4	410	41.0
5 and over	189	34.6	272	27.2
6 and over	**151**	**27.5**		
7 and over	119	21.7		
8 and over	81	14.8		
10 and over	36	6.5		

Basing these figures against the total deliveries in the various parity groups at Kandang Kerbau Hospital in 1965, the following incidences are obtained: —

Parity	Deliveries	Amniotomy	Incidence
1	8081	200	2.4% : 1 in 40
2-5	18471	199	1.0% : 1 in 92
6 & over	12297	151	1.2% : 1 in 81

It would appear that there are twice as many obstetric problems in the primigravida group that require surgical inductions as compared to the other two parity groups. It is interesting to note that a sizeable proportion of the deliveries at the Kandang Kerbau Hospital had occurred amongst the grande multipara group viz. 12297 deliveries or 31.7 per cent.

The Indications for Amniotomy

It is generally conceded, on general principles, that an indication for termination of pregnancy by any known method including surgical amniotomy exists once it is established that foetal environment in utero has become hostile for the foetus. There is a large number of obstetric conditions which render this condition so and these would constitute indications. The biggest group reported by Sinnathuray included those with the placental insufficiency syndrome viz. post-maturity, the toxaemias of pregnancy, hypertension, nephritis, diabetes mellitus and the elderly primigravida. Other cases of unexplained past perinatal death, unexplained habitual abortions, threatened abortions or unexplained ante-partum haemorrhages in early pregnancy, previous caesarean sections and multiple pregnancies also fit into this big group.

In the present analysis, amniotomy in the grande multipara group had been done for various indications as listed below and are compared with the other parity groups as well as with the 1964 series of Sinnathuray: —

Indications of Amniotomy

	Sinnathuray's Series 1964	Para 1	2 to 5	6 & Over	All Para
Post-Maturity	662 : 66.2%	74 : 13.3%	120 : 22.0%	59 : 10.8%	253 : 46.1%
Toxaemia / Eclampsia	303 : 30.3%	115 : 20.9%	61 : 11.0%	80 : 14.5%	256 : 46.4%
Diabetes & Others	272 : 27.2%	11 : 2.0%	18 : 3.3%	12 : 2.2%	41 : 7.5%

Indications Against Deliveries
1965

	Para 1 Deliveries	Incidence	Para 2 to 5 Deliveries	Incidence	Para 6 & over Deliveries	Incidence
Post-Maturity	8081	74: 0.9%	18471	120: 0.7%	12297	59: 0.4%
Toxaemia/Eclampsia	8081	115: 1.4%	18471	61: 0.3%	12297	80: 0.6%
Others	8081	11: 0.1%	18571	18: 0.09%	12297	12: 0.09%

From the above tables, it is to be seen that the bulk of inductions done at the institution are amongst those with the placental insufficiency syndrome and toxaemia of pregnancy. It can be pointed out that there has been a drop in the number of cases induced for the placental insufficiency syndrome considering of course, the fact that interest was specific in 1964 on this topic and in 1965, a unit was working on these cases without induction. The rise in the number of cases of toxaemia of pregnancy that were induced in 1965 as compared to 1964 is attributed to the fact the Eclamptic Unit had a specific plan of management for these problems and early termination and induction was one of the pillars of the obstetric management. The present series showed an almost even rate of induction in all the parity groups for the varying indications.

When taken against the number of deliveries in each parity group however, it is apparent that the problem of post-maturity is less common with the grande multipara, being only 0.4 per cent as compared to the primigravida 0.9 per cent and the group para 2 to 5 — 0.7 per cent. Toxaemia of pregnancy appeared to be twice higher in incidence in the primigravida — 1.4 per cent when compared to the grande multipara at 0.6 per cent and the parity group 2 to 5 had the lowest incidence — four times less than the primigravida and two times less than the grande multipara.

Method of Induction

In deference to an observation that low amniotomy has a shorter induction delivery interval (Nixon and Smyth) — it was noted that in this series, all the induction done was a low amniotomy. The majority of cases did not require additional help to bring on labour but a total of 124 patients required the use of the "Pitocin Drip". There were 5 patients who had the "Pitocin Drip" before amniotomy and were not included in the series. The distribution of the method of induction amongst the parity groups are as follows: —

Parity	Amniotomy	Amniotomy/Pitocin
1	138 : 24.6%	57 : 10.4%
2 to 5	172 : 31.3%	27 : 4.9%
6 & over	111 : 20.1%	40 : 7.2%
Total:	421 : 76.0%	124 : 22.5%

Sinnathuray's 1964 Series

Amniotomy and Pitocin = **19.1%**

Compared to the 1964 series, the present study showed that a higher percentage of the cases after low amniotomy 22.5 per cent required the "Pitocin Drip". From the above table, it is also apparent that the group para 2 to 5 had the least number of cases that required the "Pitocin Drip" after low amniotomy. The primigravida had the highest percentage at 10.5 per cent and the grande multipara group in between at 7.2 per cent. It is to be pointed out that although critics of the "Pitocin Drip" interdict its use amongst the grande multipara group of patients, its use in this group in the present series showed no disastrous results like a ruptured uterus.

Outcome of Labour

Labour was efficiently established and was consummated successfully within 24 hours in a total of 415 cases or 75.4 per cent of all cases amniotomised in this series. Sinnathuray reported a rate of 83.4 per cent of such deliveries in his series. Of the remaining 135 cases, 17 cases or 3.1 per cent were delivered by caesarean sections before labour ensued. The indications for the caesarean sections in these cases were as follows: -

1. Vaginal deliveries
   before 24 hours 1965 415 cases 75.4%
   Sinnathuray's Series
   (1964) 83.4%

2. Caesarean Sections 1965 37 cases 6.7%
Sinnathuray's Series (1964 : 1.3%

Indications

(a) Failed Induction even with "Pitocin Drip" 12 cases
(b) Unstable Presentation after amniotomy 1 case
(c) Cord Prolapse 1 case
(d) Foetal Distress (Diagnostic Amniotomy) 3 cases
(e) Maternal & Foetal distress 20 cases

3. Assisted vaginal deliveries within 24 hours 17 cases

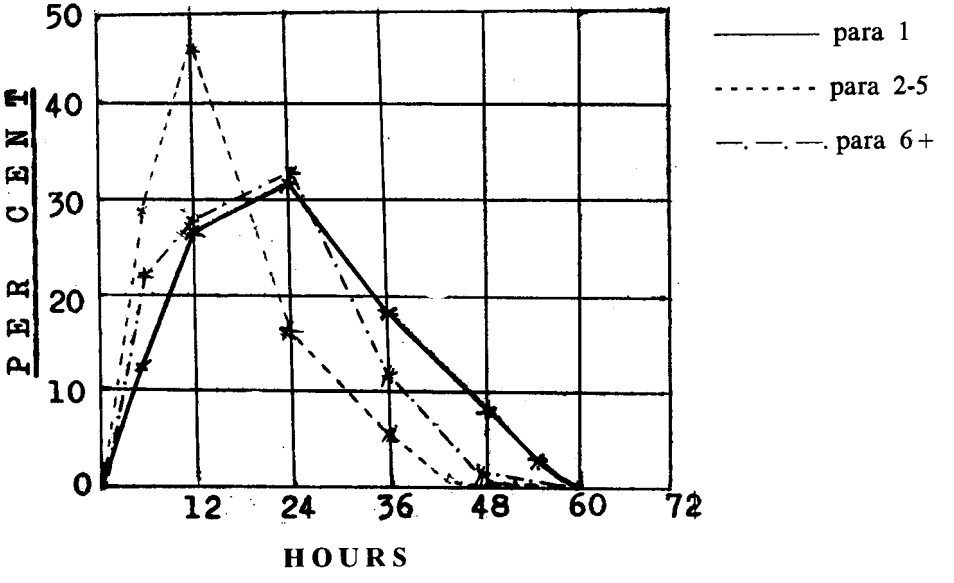
Assisted vaginal deliveries after 24 hours 17 cases

4. Normal vaginal deliveries after 24 hours 64 cases

A total of 17 cases were assisted vaginal deliveries within 24 hours and another 17 cases beyond 24 hours. Normal vaginal deliveries occurring after 24 hours of amniotomy totalled 64 cases and there were 20 cases requiring caesarean sections after labour had ensued following amniotomy for indications of maternal and or foetal distress.

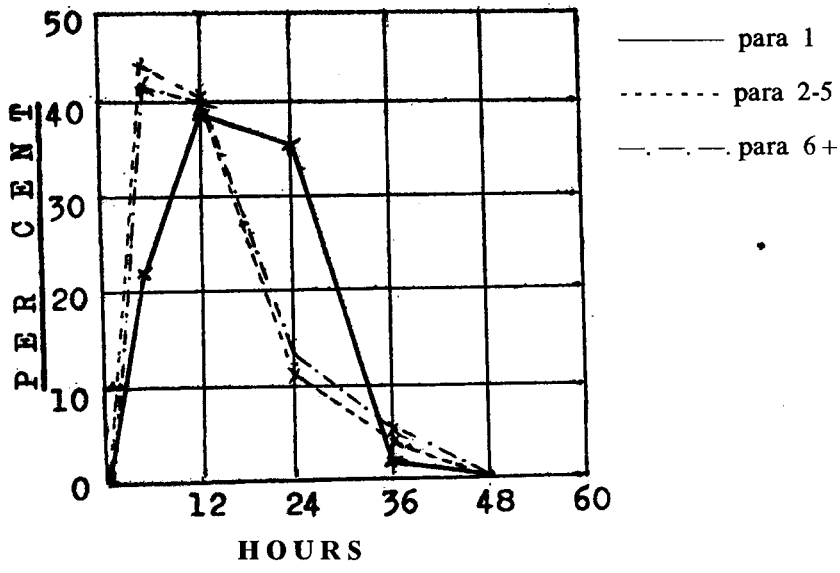
Viewing this problem amongst the grande multipara and the other parity groups — the outcome as to the induction delivery interval is shown on the following table: —

Parity	- 6 hours	7-12	13-24	25-36	37-48	Over 48
1	24	55	62	37	17	5
	12%	27.5%	31%	18.5%	8.5%	2.5%
2-5	58	92	34	14	1	0
	29%	46%	17%	7%	0.5%	0%
6 & over	33	42	49	19	6	2
	22%	28%	33%	12.5%	4.0%	0.5%



As shown earlier, a total of 124 cases required the "Pitocin Drip". This represented 22.5 per cent of the total cases amniotomised. Of these cases on whom the "Pitocin Drip" was required, the outcome of labour is shown in the following table: —

Parity	- 6 hours	7-12	13-24	25-36	37-48
1	13	22	15	7	0
	22.8%	38.6%	26.3%	1.2%	0%
2-5	12	11	3	1	0
	44.4%	40.8%	11.1%	3.7%	0%
6 & over	17	16	5	2	0
	42.5%	40.0%	12.5%	5.0%	0%



The operation of caesarean sections for the various indications listed earlier including those 17 cases done before labour ensued and a further 20 cases done after labour had ensued, was found to be distributed amongst the various parity groups as follows: —

Parity	Before Labour	After Labour Ensued	Total
1	3 cases	14 cases	17 cases : 8.5%
2 to 5	4 cases	3 cases	7 cases : 3.5%
6 & over	19 cases	3 cases	13 cases : 8.6%

The tables presented convey impressions as follows: —

(a) Induction-Delivery Interval

The parity group 2 to 5 showed the highest percentage of deliveries within the first 12 hours after induction viz. 75 per cent. The grande multipara group with 50 per cent of deliveries within the first 12 hours showed a better performance against the primigravida group with only 39.5 per cent of the cases delivered within the first 12 hours. The primigravida group showed the highest percentage viz. 29.5% of deliveries after 24 hours of amniotomy against the group para 2 to 5 with an incidence of 7.5 per cent. The grande multipara group was in between with 17 per cent. In effect, the IDI seemed shortest with the group para 2 to 5 and longest with the primigravida. The grande multipara came in between the two groups.

(b) Pitocin-Delivery Interval

Of the cases requiring the use of the "Pitocin Drip", parity group 2 to 5 presented with the highest percentage of cases that were delivered within 12 hours after commencement of the Pitocin Drip. This was closely followed by the grande multipara group with 82.5 per cent; but only 61.4 per cent of the primigravidae were delivered within the same period. These figures imply that primigravid patients respond less readily and less completely to the "Pitocin Drip" when compared with the other two parity groups.

(c) Caesarean Sections

The caesarean section rate was lowest for the group para 2 to 5 being only at 3.5 per cent. Identical percentages at a two times higher percentage at 8.5 and 8.6 per cent for primigravida and the grande multipara group were at the same time recorded. This confirms the observation that the group para 2 to 5 was the best behaved group after amniotomy.

Hazards of Amniotomy

The operation of amniotomy is not without its hazards. Such complications are adequately described in the standard text-books and will not be reviewed here. The hazards that were encountered in this present series are tabled as follows: —

	Para 1	2-5	6 & Over
1. Failed amniotomy (Labour did not ensue)	31 15.5%	10 5%	33 22%
2. Intra-uterine infection & maternal distress	24 12%	4 2%	15 10%
3. Prolapsed cord	1 0.5%	0 0%	1 0.66%
4. Malpresentation	0 0%	1 0.5%	0 0%
5. Intra-uterine death of foetus	1 0.5%	1 0.5%	0 0%

No case of ruptured uterus was recorded despite the use of the "Pitocin Drip" in some cases and no complication of abruptio placentae was recorded in this series following amniotomy.

A total of 74 cases or 13.4 per cent failed to go into labour after amniotomy and the highest incidence was contributed by the grande multipara group at 22 per cent. The group para 2 to 5 was the lowest with 5 per cent.

A total of 43 cases or 7.7 per cent had evidence of intra-uterine infection as compared with Sinnathuray's report of 3.9 per cent in his series. Here again, the group para 2 to 5 contributed the least towards this incidence with the group para 1 and the grande multipara contributing near identical ratios at 12 and 10 per cent respectively.

Two cases were complicated by prolapse of the cord occurring in the primigravida and grande multipara group respectively. One case of malpresentation occurred in the group para 2 to 5 in the whole series and 2 cases of intra-uterine death were analysed and occurred in the primigravida and group para 2 to 5 respectively.

Mortality Results

No maternal death was recorded in this series and this is as it should be. It would be simply tragic in present affluent conditions for a maternal death to occur as a result of amniotomy, for surgical induction, as mentioned earlier, is done nowadays for foetal salvage principally.

The perinatal mortality pattern showed a total of 10 cases or an incidence of 16.3 per 1000 as compared with Sinnathuray's series of 12.9 per 1000. The causes of the 10 cases of perinatal deaths included 3 still-births and 7 neonatal deaths. The alluded causes of these perinatal deaths are as follows: —

Cord prolapse	1 case
Abruptio placentae	1 case
Placental insufficiency	1 case
Malformations	1 case
Intracranial haemorrhage	3 cases
Aspiration pneumonia	2 cases
Unverified	1 case

When listed amongst the parity groups, the perinatal deaths are as follows: —

Para 1	2 cases	: 3.6 per 1,000
Para 2 to 5	4 cases	: 7.2 per 1,000
Para 6 & over	4 cases	: 7.2 per 1,000

These figures are too small in number to be of statistical significance.

SUMMARY:

1. The incidence of Grande Multiparity at the Kandang Kerbau Hospital is discussed and a series of surgical inductions by amniotomy involving 550 patients is presented. An incidence of 1 in 81 pregnancies in the Grande Multipara group is cited and the results of such inductions are compared with amniotomy in Primiparas as well as those in parity group 2 to 5.

2. The major indications for surgical amniotomy in all groups by and large include those done for "Post-Maturity", Toxaemias of Pregnancy and Eclampsia. Post-Maturity problems are much less with the Grande Multipara.

3. A total of 76 per cent of all cases did not require the Pitocin Drip — and this was least required in the parity group 2 to 5, followed by the grande multipara group. Primipara required the Pitocin Drip after amniotomy in 10.4 per cent of the cases. No untoward results were obtained with the Pitocin Drip in use on the Grande Multipara.

4. A total of 75.4 per cent of all cases induced attained normal vaginal deliveries and 6.7 per cent of all cases resulted in Caesarean Sections. This rate was almost equal between Primpara and Grande Multipara at 8.5% and 8.6% respectively. Only 3.5% in the group Para 2 to 5 required Caesarean Sections. The Induction-Delivery interval appeared highest with the Primpara at 29.5 per cent. This was followed by the Grande Multipara at 17 per cent. The interval was lowest with the group Para 2 to 5 — at 7.5 per cent.
   Of the cases where the Pitocin Drip was required, 85.2 per cent of cases in Para 2 to 5 were delivered. A total of 82.5% of cases in the Grande Multipara Group was next best and the Primpara had the lowest percentage of cases as regards a successful Pitocin-Delivery Interval at 61.4 per cent.
   The significant hazards of amniotomy included Failed Induction which was highest with the grande multipara group at 22%, followed by the primpara at 15.5% and then the group para 2 to 5 at 5%. Intra-uterine infection was also another significant hazard after amniotomy and appeared highest with the primpara at 12%, followed by the Grande Multipara at 10 per cent. The group para 2 to 5 was lowest with this complication at 2%. Prolapsed Cord was only associated on 2 occasions in 550 inductions.

5. No Maternal Death was recorded in the whole series.
   An incidence of 16.3 per 1000 perinatal mortality rate was encountered in the whole series. The primpara group had a rate of 3.6 per 1000 followed in identical ratios by the group para 2 to 5 and the Grande Multipara group at 7.2 per 1000 but it is suggested that the numbers involved are too small to be of statistical significance.

REFERENCES:

Bengtsson, L. P. (1962): Lancet, 1, 339.
Lean T. H. (1966) "The Grande Multipara in Obstetrics".
Bull. Kandang Kerbau Hosp. Vol. 5 No. 1.
Nixon W. C. W. and Smyth C. N. (1959): Amer. J. Obstet. Gynec: 77, 2.
Sinnathuray T. A. (1965) "Surgical Induction of Labour in Modern Obstetrics".
Med. J. Malaya Vol. XIX No. 4.