EFFECT OF OXYTOCIN ON SERUM BILIRUBIN LEVELS OF NEWBORNS

by

ALKA SETHI
RAMA MITRA
MUKESH CHANDRA
SHEILA LONGIA
RATNA
and
ROHIT SHAMSHER SETHI

SUMMARY

The effect of oxytocin on serum bilirubin levels of newborns was assessed in 80 cases of labour. Serum bilirubin was assessed in cord blood and again on the 5th day in all the full term normal weight newborns having no evidence of sepsis, or blood group incompatibility. Our study revealed that none of the new borns of the augmented group had hyperbilirubinemia (> 10 mg). It was also observed that although the mean serum bilirubin level on the 5th day was slightly higher in the induced group, no statistical difference was seen when compared to the control.

A significant finding, however was a direct correlation between the total dose of oxytocin administered, deliveries conducted with dose of oxytocin exceeding 1000 m.i.u. had higher serum bilirubin levels when compared to those with lower dose and in which no oxytocin was administered.

Introduction

The present decade has witnessed enormous advances in the field of obstetrical management. Rapid strides and newer techniques have been evolved in the active management of labour. The role of oxytocin in the induction and acceleration of labour is worth mentioning. While some workers (Mast *et al* 1971; Ghosh and Hudson 1972; Blackburn 1973; Calder *et al* 1974; Chalmers *et al* 1975 and Chew 1977) state that oxytocin used for induction of labour enhances the incidence and severity of jaundice, others (Beazley and Alderman 1975; Boylan 1976; Friedman and Sentleben 1976; Leijon *et al* 1980 and Singh and Singh 1981) refute this observation and claim that oxytocin per se has no such effect. In view of this, the present study was undertaken to evaluate the effect of oxytocin on

From: Departments of Obstetrics and Gynaecology, Paediatrics and Pathology, M.L.B. Medical College, Jhansi.

Accepted for publication on 15-5-85.

the incidence and severity of neonatal jaundice.

Material and Methods

The effect of oxytocin on serum bilirubin levels of newborns was assessed in 80 cases of labour. The cases comprised of 30 cases of normal spontaneous labour (control), 20 cases of accelerated labour (oxytocin used to expedite spontaneous labour), 20 cases of induced labour (inducibility of cervix being assessed by Bishop's scoring method, 1964) and 10 cases where caeserean section was done. Preterm cases, those with history of oral contraceptives and those manifesting blood group incompatibility were excluded from the study. Induction was done by the method of Theobald *et al* (1948). 5 i.u. of syntocinon in a bottle of 5% dextrose was administered at the rate of 10 drops/min. After every 30 minutes, 5 i.u. of syntocinon was added till a maximum of 2 i.u. or till effective uterine contractions were established, whichever was earlier.

Only those full term normal babies having Apgar score > 7 at birth, weighing > 2.5 kg and not manifesting any evidence of sepsis, asphyxia or cephalhaematoma were included in the study.

Routine investigations, blood grouping and serum bilirubin estimation before and after delivery was done in each mother. Besides taking cord blood for total serum bilirubin estimation, bilirubin was also done on the 5th day (to exclude the possibility of physiological jaundice which starts waning on the 5th day) in all the cases. Serum bilirubin was measured by the method of Varley (1975).

Observations

The case material is depicted in Table I. 50% of the total cases belonged to age group 21-25 years. A majority of the control cases (76%) and nearly all (91%) of the study group patients were under the age of 30 years. Parity ranged from P_0-P_6 in the control group, while it was $< P_4$ in the induced cases. The duration of 1st and 2nd stages of labour in the accelerated group (4-8 hrs and 1-1 hr) and induced group (8 hrs and 1-6 hrs) was considerably shorter than the control group (11 hrs and 1-8 hrs). All the cases of augmented labour had a Bishop's pelvic score of more than 7 indicating a favourable cervix. It was observed that the accelerated group required a lower dose of syntocinon (382 $\pm$ 290 m.i.u.) than the induced group (849 $\pm$ 335 m.i.u.), difference being statistically significant ($P < 0.05$). Similarly, it was observed that the mean induction delivery interval was found to be shorter (4.5 $\pm$ 2.72 hrs) in the accelerated group as compared to the induced group (10.125 $\pm$ 2.90 hr).

TABLE I

Study Groups

Clinical groups		No. of cases
I	Control (Normal delivery)	30
II	Accelerated labour	20
III	Induced labour	20
IV	Caesarean section	
	(a) Elective	5
	(b) Failed induction	3
	(c) Emergency	2

A total of 80 newborns, characteristics of which are shown in Table II, were examined.

The mean serum bilirubin levels in cord blood shown in Table III, reveals statistically insignificant difference in all the groups ($P > 0.05$).

The mean serum bilirubin levels on the 5th day are shown in Table IV.

TABLE II

Characteristics of Newborns in Various Groups

Clinical groups	No. of cases	Apgar Score	Birth weight (kg)	Gestational age (in weeks)
Control	30	7.8	2.7	38
Accelerated	20	7.4	2.7	38
Induced	20	7.7	2.8	38.9
Caesarean	10	7.4	2.69	38.3

TABLE III

Mean Serum Bilirubin in Cord Blood

Clinical group	No. of cases	Cord blood bilirubin mg%		P value	
		Mean	S.D.	With control	With each other
Control	30	1.483	.43		
Accelerated	20	1.49	.2125	>0.05	
Induced	20	1.515	.2497	>0.05	$P_{2,3}$ — >0.05
Caesarean	10	1.43	.258	>0.05	$P_{2,4}$ and $P_{3,4}$ >0.05
(a) Elective	5				
(b) Failed induction	3	1.5	.1		
(c) Emergency	2	1.5	.424		

TABLE IV

Mean Serum Bilirubin Levels on the 5th Day in Newborns

Clinical groups	No. of cases	No. of cases in different bilirubin groups		Mean serum bilirubin levels (mg%)	
		<5 mg%	5-10 mg%	Mean	S.D.
Control	30	29	1	2.08	1.269
Accelerated	20	18	2	2.310	1.50
Induced	20	17	3	2.895	1.996
Caesarean	10			1.85	.498
(a) Elective	5	5	—	1.5	.0632
(b) Failed	3	3	—	2.43	.513
(c) Emergency	2	2	—	1.7	.141

P value — P 1,2 — > 0.05 P 2,3 — > 0.05
P 1,3 — > 0.05 P 2,4 — > 0.05
P 1,4 — > 0.05 P 3,4 — > 0.05

It is evident from Table IV, that only 6 cases in all had jaundice ranging from 5 to 10 mg% while none of the cases had jaundice above 10 mg%. It was also seen that although highest serum bilirubin values were observed in induced cases, the values were not statistically significant from accelerated or the control group cases.

An attempt was made to derive a correlation between the total dose of syntocinon and the severity of jaundice (Table V).

TABLE V

Relationship of Total Dose of Syntocinon and Serum Bilirubin Levels on 5th Day in Induced Group

Groups ascending to dose of syntocinon (m.i.u.)	No. of cases	Total dose of syntocinon (m.i.u.)		Mean serum bilirubin levels (mg%)	
		Mean	S.D.	Mean	S.D.
< 500	3	310	69.28	1.8	.2
500-1000	13	828.46	123.41	2.48	1.36
> 1000	1.4	1320	247.38	5.275	2.65

P Value
C control

$pc_1 - > 0.05$ $p_{1,3} - < 0.05$
$pc_2 - > 0.05$ $p_{1,2} - > 0.05$
$pc_3 - < 0.01$ $p_{2,3} - > 0.05$

It is evident that the group where the total dose of oxytocin exceeded >1000 i.u. recorded highest mean serum bilirubin level and those were statistically significant from those of control ($P < 0.01$) as well as from the group in which the dose of oxytocin was less than 500 i.u. ($P < 0.05$).

Discussion

The effect of oxytocin on serum bilirubin levels in cord blood as well as on the 5th day was studied with a view to substantiate or contradict the widespread speculation that oxytocin per se enhances the severity of jaundice. Bilirubin was estimated on the 5th day to exclude the possibility of physiological jaundice where peak levels are seen from 2 to 4th day. Similarly, other factors incriminated in the causation of jaundice were also excluded viz prematurity, asphyxia, birth weight below 2.5 kg, history of blood group incompatibility or intake of drugs.

The cord bilirubin levels in all the groups of cases in the present series had normal values which are in agreement with those observed by other workers (Leijon *et al* 1980 and Singh and Singh 1981). Further, on the 5th day none of the augmented cases manifested hyperbilirubinemia (> 10 mg%), though a slightly higher levels of bilirubin were observed in the newborns delivered after induction with oxytocin. The values from those of the control were statistically insignificant ($P > 0.05$). Our results are in conformity with those reported by other workers (Beazley and Alderman 1975; Boylan 1976; Friedman and Sentleben 1976; Leijon *et al* 1980 and Singh and Singh 1981) who have also reported no correlation between the use of oxytocin, to the severity of neonatal jaundice. However, other workers (Mast *et al* 1971; Ghosh and Hudson 1972; Blackburn *et al* 1973; Calder *et al* 1974; Chalmers *et al* 1975 and Chew 1977) have reported hyperbilirubinemia in those infants born after induction. They have hypothesised that (1) perhaps oxytocin induces foetal hypoxia which damages the hepatic enzyme system or (2) interruption of pregnancy at term reduces the surge of corticosteroids, and as the hepatic enzymes are corticosteroid inducible their relative deficiency leads to hyperbilirubinemia.

Another finding of our study was a positive dose dependent relationship of oxytocin to, the development of neonatal jaundice. Though there was no significant difference between the mean serum bilirubin levels of the controls and those of

the augmented group as a whole, when the latter group was subdivided on the basis of dose of oxytocin administered, it was observed that newborns delivered to mothers who received 1000 or $>$ 1000 units of syntocinon had significantly higher serum bilirubin values ($P < 0.01$) then those who received $<$ 1000 units of syntocinon and those of the unaugmented group (control). This observation of ours has also been reported by Beazley and Alderman (1975).

Thus the present study suggests that oxytocin can be used safely to induce labour without any significant elevation of bilirubin in the new born baby.

References

1. Beazley, J. M. and Alderman, B.: Brit. J. Gynec. Obstet. **82: 265, 1975.**
2. Blackburn, M. G., Mancusi-ungaro, Orzalisi, M. M., Hobbins, C. J. Anderson, G. G.: Am. J. Obstet. Gynec. **116: 847, 1973.**
3. Bishop, E. H.: Pelvic scoring for elective induction. Obstet. Gynec. **24: 266, 1964.**
4. Boylan, P.: Brit. Med. J. **2: 465, 1976.**
5. Calder, A. A., Quasted, M. K., Mohr, V. K. and Turnbull, A. C.: Lancet 1330, 1974.
6. Calmers, I., Turnbull, A. C., Carmpbell, H.: Brit. Med. J. **2: 116, 1975.**
7. Chew, W. C.: Brit. Med. J. **2: 679, 1977.**
8. Friedman, E. A. and Sentleben, M. R.: Brit. Med. J. **1: 198, 1976.**
9. Ghosh, A. and Hudson, P. P.: Lancet. **2: 823, 1972.**
10. Varley, H.: Practical clinical biochemistry, 1975, 4th edition, pg. 353.
11. Leijon, I., Finstorm, O., Hertenskoff, S., Rydon, G. and Tylleskar, J.: Acta. Obstet. Gynec. Scand. **59: 103, 1980.**
12. Mast, H., Quakeranack, K., Lenfers, M. and Hagen, C.: Der Einfluss des geburs-verlaufes auf den ikterus neonatorum, geburtshilje and frauneif kunde. **31: 443, 1971.**
13. Singh and Singh: J. Obstet. Gynec. **4: 553, 1981.**
14. Theobold, G. W., Graham, A., Campbell, J., Gange, P. D. and Driscoll, W. J.: Brit. Med. J. **2: 123, 1948.**