BIOPHYSICAL MONITORING OF FOETUS DURING PREGNANCY BY OXYTOCIN CHALLENGE TEST

by

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SUMMARY

Oxytocin challenge test was done on 64 cases, 14 normal and 64 high-risk patients. Negative cases had good Apgar Score at 1 and 5 minutes as compared to positive and suspicious cases. Perinatal mortality was zero in negative cases and 25% in positive and suspicious cases.

Introduction

One of the major concern of obstetricians today is to identify those high-risk pregnancies in which there is danger of uteroplacental insufficiency. This helps to prevent antepartum death by inducing labour at correct time.

Various tests have been devised to determine antepartum foetal well-being Stressed foetal heart rate monitoring in the form of Oxytocin Challenge Test (OCT) or Contraction Stress Test (CST) reflects respiratory function of placenta (Hammacher, 1966). It is based on the observation that the normal foetal PO_2 (partial pressure of oxygen) is 24 mm Hg. When it drops to below 18-20 mm Hg, vaginal stimulation occurs which leads to bradycardia. Each uterine contraction causes transient reduction of foetal PO_2 and if the base line PO_2 is already below normal the contraction induced bradycardia will occur (Pose *et al*, 1969). The concept of stressing or challenging the foetus with contractions and watching for late decelerations is the basis of OCT.

The OCT has been studied over several years. The negative test has been shown to be reassuring regarding foetal well being (Freeman, 1975; Schifrin, 1975; Christie and Cudmor, 1975). The significance of positive test remains somewhat uncertain (Eving *et al*, 1974) and needs evaluation. The aim of present study was to assess the significance of the OCT and to correlate it with foetal outcome.

Material and Methods

Sixty-four patients were selected for study. Fifty were of high-risk pregnancy and 14 were of normal pregnancy. The indications for performance of OCT in high-risk pregnancy are listed in Table I. The period of gestation ranged from 34 to 43 weeks.

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TABLE I
Indications

Indications	No. of patients	Percentage
Postmaturity	20	40
Pre-eclampsia	18	36
Suspected IUGR	8	16
H/O previous still birth	1	2
Pregnancy with Jaundice	1	2
Decreased fetal movement	1	2
Fetal tachycardia	1	2
Total	50	

The OCT was conducted as described by Ray *et al* (1972) and Freman and James (1975). After thorough examination the patient was placed in semifowler's position with a slight left lateral tilt to avoid compression of venacava and supine hypotensive syndrome. The instrument used was Sonicaid foetal monitor model FM_2. The ultrasonic transducer was put over abdomen after applying liberal amount of aquasonic jelly, where maximum signal was heard. The contraction transducer was applied over fundus of the uterus. The paper speed was 1 cm/min. A baseline record of FHR and uterine contractions was taken for 20 min. If spontaneous contractions were not adequate, intravenous Oxytocin infusion was started at a rate of 0.5 Mu/min. The rate was doubled every 10-15 min until contractions lasting for 40-60 sec. with a frequency of 3 in 10 min were obtained. 30 min record was taken and the drip was discontinued. The monitoring was continued till the contractions became less frequent than 3 in every 10 min.

Interpretation of Results

Negative: The test was interpreted as negative when no late deceleration occurred with adequate uterine contractions. The tests were repeated weekly.

Positives: An OCT was interpreted as positive when late decelerations occurred with more than 50% of adequate uterine contractions. The positive test was taken as an indication for termination of pregnancy.

Suspicious: When late deceleration occurred with less than 50% of contractions.

Unsatisfactory: When adequate uterine contractions not achieved or tracing quality too poor to exclude late decelerations.

Hyperstimulation: When late decelerations occurred with excessive uterine contractions. Excessive uterine contractions without late decelerations were considered as negative.

Suspicious, hyperstimulation and unsatisfactory tests were repeated 24 hours later.

— Figure 1A shows negative OCT
— Figure 1B shows positive OCT

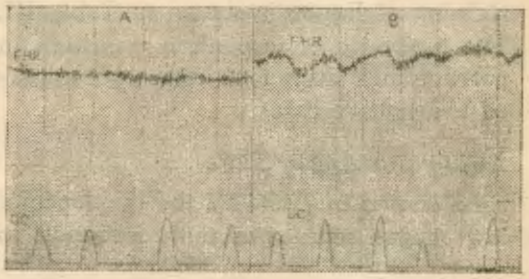

Fig. 1

An attempt was made to follow-up all the patients weekly till delivery and following measures of outcome were noted.

— Meconium in liquor.
— Apgar score at one and five min.
— Observations on obstetric management including route of delivery and indication for intervention.
— Perinatal mortality.

Observations

90 OCTs were done on 64 patients, 70 tests on 50 high-risk patients and 20 tests on 14 normal patients. The results are shown in Table II.

TABLE II
Results of OCT

OCT results	No. of patient	Test
Normal		
Negative	14	20
High-Risk		
Negative	39	54
Positive	4	4
Suspicious	4	7*
Unsatisfactory	3	5**
	64	90

* 3 became negative, 4 remained suspicious.
** 2 became negative, 3 delivered before repeat test.

Relation of OCT to meconium in liquor

The relation of OCT to meconium staining of liquor is shown in Table III. The incidence of meconium was high in positive and suspicious cases as compared to negative cases.

Relation to Apgar Score

As shown in Table IV the incidence of low Apgar score was more common in positive and suspicious cases. All normal patients with negative tests delivered babies with good Apgar Score. In high-risk patients, out of 39 patients with negative OCT only 1 patient (2.5%) had baby with depressed Apgar Score (Apgar score less than 7) at one min. which was due to cord compression. No baby had low Apgar Score at 5 min. In positive group, 2 patients had babies with low Apgar Score at 1 min, both of them had good Apgar Score at 5 min. There was 1 IUD. Of 4 suspicious cases one (25%) had low Apgar Score at one and five min. This baby could not be revived. Other 3 had good Apgar Score at one and five min.

Mode of Delivery

This is shown in Table V. Most of the patients with negative OCT had normal vaginal delivery (72%). In positive and suspicious cases caesarean section rate was high (50%). The caesarean section rate for foetal distress in high-risk pregnancy patients was 5.1%, while it was 50% and 25% in positive and suspicious cases. In positive cases labour was induced in 3 patients, 1 patient left against medical advice and came after 2 days with I.U.D. Out of 3 induced cases, in 2 caesarean section had to be done because

TABLE III
Relation of OCT to Meconium

OCT results	No. of patients	Meconium staining	Percentage
Normal			
Negative	14	1	7
High-risk			
Negative	39	6	15.3
Positive	4	2	50.0
Suspicious	4	1	25.0
Total	61	10	

TABLE IV
Angar Score—OCT Relationship

OCT results	No. of patients	Apgar Score 1-6		Apgar Score 7-10	
		1 min.	5 min.	1 min	5 min.
Normal					
Negative	14	0	0	14 (100%)	14 (100%)
High-Risk					
Negative	39	1 (2.5%)	0	38 (97.5%)	39 (100%)
Positive	4	2 (50%)	0	1 (25%)	3 (75%)
Suspicious	4	1 (25%)	1 (25%)	3 (75%)	3 (75%)

TABLE V
Mode of Delivery

Mode of delivery	Normal pt. 14				High risk pt. 47			
	Negative		Normal		Positive		Suspicious	
	No.	%	No.	%	No.	%	No.	%
Vaginal	10	72	28	72	2	50	2	50
LSCS	4	28	11	28	2	50	2	50
—Foetal Dist.	0	0	2	5.1	2	50	1	25
—C.P.D.	3	21	5	16	0	0	0	0
—Prolonged labour	1	7	3	7.6	0	0	0	0
—Failed Induction	0	0	1	2.5	0	0	1	25

of foetal distress and 1 delivered vaginally. In suspicious cases, 2 were delivered by caesarean section, 1 for foetal distress and 1 for failed induction.

Perinatal Mortality

As is shown in Table VI perinatal mortality was nil in negative cases. It was 25% in positive and suspicious cases. Over all perinatal mortality was 3%.

Discussion

The OCT proved to be a valuable guide in the management of high-risk pregnancy. There was no intrauterine death within a week of negative OCT in our series. Only 2 (5%) high-risk patients with negative OCT developed foetal distress during labour and only 1 (2.5%) had low Apgar Score which was due to cord compression. The other baby had

TABLE VI
Perinatal Mortality

	OCT results	No. of patients	Perinatal No.	Mortality %
Normal Pt. 14	Negative	14	0	0
High Risk	Negative	39	0	0
Pt. 47	Positive	4	1	25
	Suspicious	4	1	25

good Apgar Score. This indicates that there is adequate placental reserve and pregnancy can be allowed to continue for another one week as was done by Ray *et al* (1972) and Schifrin *et al* (1975).

Out of 4 positive cases, induction was done in 3 cases. One patient refused for induction and came after two days in labour with intrauterine death. In 2 induced cases caesarean section had to be done because of foetal distress and 1 patient delivered vaginally. This shows that caesarean section may be necessary in most of the patients but they can deliver vaginally also (25%). This is comparable with the data of Freeman and James (1975) and Schifrin *et al* (1975) and is in contrast to the findings of Hayden *et al* (1975) and Gaziano *et al* (1975) who advised caesarean section in every patient with positive OCT. There was good co-relation between posit.ve OCT and low Apgar Score. 50% of the patients with positive OCT had baby with low Apgar Score at one min and there was one I.U.D. This is comparable with the data of Spurret (1971). The incidence of meconium was much higher in positive cases.

In suspicious cases one (25%) caesarean section was done for foetal distress Liquor was meconium stained, the baby had low Apgar Score at one and five min and could not be revived. Other 3 had vaginal delivery with good outcome. The prognosis of foetus in suspicious cases is not as good as negative cases and is better than positive cases, therefore better the test should be evaluated within 24 to 48 hours or they should be treated on the line as positive cases are treated.

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