J. of Obst. & Gyn. of India Vol. 51, No. 2: March/April 2001 Pg 40-43

Admission Test : Screening Test for Prediction of Fetal Outcome In Labour

Aparna Hegde, Shailesh Kore, Sushma Srikrishna, V.R. Ambiye, P.R. Vaidya

Department of Obstetrics & Gynaecology L.T.M.M.C. & L.T.M.G. Hospital, Sion, Mumbai – 400 022

Summary:

Two hundred low risk patients in the first stage of labour with the fetus in cephalic presentation were subjected to an admission test for 15 minutes in a single working unit in L.T.M.G. Hospital, Sion, over a period of 3 months. Patients were then monitored by intermittent auscultation till delivery. Postdelivery, the admission test results were compared to the fetal outcome. It was found that as the admission test results worsened, fetal distress increased ($p < 0.001$) and incidence of operative delivery also increased ($p < 0.001$). Though sensitivity of the test was low, specificity and negative predictive value of the test was high. Admission test – delivery interval was greater than 10 hours in the patients from the reactive group who had fetal distress and delivered operatively.

Introduction

The birth process has been described as the most dangerous journey most of us are ever likely to make. To smoothen this journey, an antenatal risk classification is generally used in hospitals like ours with limited number of fetal monitors for the purpose of determining the patients who would require deligent, or if possible, continuous monitoring. Unfortunately, risk assessment profiles are often an insufficient tool for patient selection (Gibb and Arulkumaran, 1992). Intrapartum fetal morbidity and mortality are not uncommon in a low risk population and FHR changes and fetal acidosis might occur with the same frequency as in a high risk group.

The aim of our study was to evaluate the possible value of the admission test, i.e. a short, continuous electronic FHR recording made immediately on admission, as an intrapartum risk assessment procedure in patients classified as low risk antenatally. Also, we have tried to determine the predictive value of admission test for fetal well-being in the next few hours of labour.

Materials and Methods:

This study was conducted in a single working unit in L.T.M.G. Hospital in the Obstetrics & Gynaecology department over a period of 3 months from September 1997 to Novemeber 1997. Two hundred patients were included in the study at random.

Selection criteria for the study were :

(a) Period of gestation $\geq$ 34 weeks with fetus in cephalic presentation.
(b) Antenatally registered with a minimum of 4 ANC visits.

(c) Patients had been classified as low risk during the antenatal period on examination, by USG and by her past and current medical and surgical history.
(d) Patients in first stage of labour.
(e) There was no evidence of any risk factors on admission (e.g. vaginal bleeding, malpresentation).

Immediately on admission, the patients were monitored with Teksonic fetal monitor for a period of 15 minutes in the left lateral position.

The FHR traces thus obtained were categorised as reactive, equivocal or ominous according to the classification proposed by WHO/FIGO (FIGO, 1987).

Following this, the patients were monitored intermittently by auscultation for 1 minute every 30 minutes in the first stage of labour and every 15 minutes in the second stage of labour post contraction.

After delivery, the Apgar scores and umbilical cord arterial pH of each neonate were determined.

Fetal distress was considered to be present when:
(1) Ominous FHR changes led to caesarean section or forceps delivery (Ingemarsson et al, 1986).
(2) Moderate to thick meconium stained liquor was present (Ingemarsson et al, 1986).
(3) Apgar scores ≤ 6 at 5 minutes (Ingemarsson et al, 1986).
(4) Cord pH < 7 (Carter et al, 1993).
(5) Baby was admitted to the NICU.

Postdelivery, the results of the admission test were compared with the neonatal outcome.

Statistical analysis was done by means of chi-square test (χ^2 analysis) and unpaired 't' test wherever applicable ($p<0.05$ was considered significant).

Results:

Mean age of the patients included in the study was 23.8 years (Range : 18-36 years) with primigravidas and 125 multigravidas.

One hundred and sixty nine patients (84.5%) had reactive admission test, 19 (9.5%) had equivocal test and 12 (6%) had ominous test (Table-I).

Table – I
Results of Admission Test.

Results	No. of Patients	Percentage
Reactive	169	84.5%
Equivocal	19	9.5%
Ominous	12	6.0%

As seen in Table-II, it was found that the incidence of vaginal delivery was more common (90.5%) if the admission test was reactive as compared to the incidence of instrumental or operative delivery ($p<0.001$). Instrumental and operative delivery were more common in the abnormal admission test result group (38.7%) as compared to the reactive test group (9.4%) ($p<0.001$).

It was also found that as the admission test result worsened, the incidence of fetal distress increased ($p<0.001$) (Table-III).

A very important point to note here is that in all 16 patients in the reactive test group who underwent LSCS or forceps delivery, it was found that the indication was non-progress of labour and that the admission test delivery interval was beyond 10 hours (Table - IV).

Table – II
Mode of Delivery in Relation to the Outcome of the Admission Test.

Mode of Delivery	Results of Admission Test							
	Reactive (n=169)		Equivocal (n=19)		Ominous (n=12)		Total (n=200)	
	No.	%	No.	%	No.	%	No.	%
Vaginal	153	90.5	15	78.9	4	33.3	172	86
LSCS	11	6.5	3	15.8	8	66.7	22	11
Forceps	5	3.0	1	5.3	0	-	6	3

Table – III
Incidence of Fetal Distress in Relation to the Results of Admission Test

Results	No. of Patients	No. of Patients With Fetal Distress
Reactive	169	6 (3.6%)
Equivocal	19	3 (15%)
Ominous	12	9 (75%)

Table – IV
Comparison of Mode of Delivery with the results of the Admission Test and the Occurrence of Fetal Distress.

	Reactive	Equivocal	Ominous
Vaginal	153	15	4
FD	2 (1.2%)	2 (10.5%)	1 (8.3%)
No FD	151 (89.4%)	13 (68.4%)	3 (25%)
LSCS	11	3	8
FD	3 (1.7%)	2 (10.5%)	8 (66.7%)
No FD + LSCS for other indications	8 (4.7%)	1 (5.3%)	-
Forceps	5	1	0
FD	1 (0.6%)	-	
No FD + Forceps for other indications	4 (2.4%)	1 (5.3%)	-

FD Fetal Distress

Discussion :

Over the years, it has been recognised that fetal morbidity and mortality occurs as a consequence of labour even in patients categorised as low risk based on various risk classifications. Indeed about half of the admissions to a neonatal intensive care unit derive from so called low risk pregnancies (Schrifin., 1995).

In 1989, ACOG indicated that "fetuses of labouring women could be assessed by electronic fetal monitoring or by intermittent auscultation of fetal heart tones" (ACOG, Technical Bulletin, 1989). Auscultation however is necessarily intermittent, subjective and difficult to verify and document. Also in third world countries like ours, with busy labour wards and a meagre staff, sole reliance on auscultation would prove ineffective and dangerous.

In such a scenario, an alternative to labelling patients for electronic fetal monitoring or atleast stringent auscultation might be a short recording of the FHR on admission for labour : the admission test. Based on the assumption that early uterine contractions may serve as a functional stress to the fetus, an admission test might detect fetal intrauterine asphyxia already present on admission and might have some predictive value for asphyxia that may develop during labour (Ingemarsson et al, 1986).

As seen in Table-V, the specificity i.e. ability to identify correctly those who are not at risk for fetal distress (i.e. true negatives) was high. However sensitivity, i.e. ability to detect correctly true positives was low.

Table – V

	Present Series	Ingemarsson et al (1986)
Sensitivity	66.7%	23.5%
Specificity	90.0%	99.4
Positive predictive value	38.7%	40.0%
Negative predictive value	96.0%	98.7%
% of false negatives	35.7%	
% of false positives	10.4%	

In the 6 patients with fetal distress who were not detected by the admission test (i.e. false negatives), it was found that the admission test – delivery interval was more than 10 hours. One can hardly expect an admission test to predict fetal distress after several hours of labour with many other influencing factors (cord complications, prolonged labour etc.) present (Ingemarsson et al, 1986) To counter this, one could repeat a short recording of the FHR for 15 minutes every 3-4 hours. As sensitivity is inversely proportional to percentage of false negatives, this explains the low sensitivity of admission test.

However, if only the patients with ominous traces are taken into consideration, the positive predictive value of ominous test is as high as 75% and percentage

false positives is only 1.8%.

Conclusion:

Admission test can be used to screen low risk patients to select those for continuous electronic fetal monitoring and/or more stringent auscultation. It can detect fetal distress already present on admission and unnecessary delay in intervention can be avoided.

Baring acute events, it has a good predictive value for fetal well-being in the next few hours of labour. It is a simple test, easy to perform and is a good alternative to labelling low risk patients for FHR monitoring on the basis of an antenatal risk classification.

Acknowledgement :

We would like to thank Dr. R.G. Shirahatti, Dean and Dr. P.R. Vaidya, Head of Department, for allowing us to conduct this study.

References:

1. American College of Obstetricians and Gynecologi Technical Bulletin No. 132., 1989. Intrapartum fe heart rate monitoring. Washington
2. Carter B.S., Haverkamp A.D., Merenstein G.B. Clini in Perinatology, Vol 20, No. 2, 199
3. FIGO Guidelines for the use of fetal monitoring. I Gyn. Obst. 25, 1159, 1987.
4. Gibb D., Arulkumaran Sabaratnam : Fetal monitorin in practise. Butterworth Heinemann Ltd., I Edn. 1992.
5. Ingemarsson I., Arulkumaran S., Ingemarsson I Tambyaraja R.I., Ratnam S.S., Obstet Gynecol 800, 1986.
6. Schrifin S.B.: Clinics in Perinatology Vol. 22 No 1995.