

INTRA PARTUM FOETAL DISTRESS

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OPSOMMING

Navorsing is gedoen om vas te stel of intra-partum fetale nood, die apgattelling en biochemiese analise van die suur-basis balans van die bloed van die chorioniese arteries enige langtermyn neurologiese defekte kan voorspel.

Die steekproef het bestaan uit eksperimentele en nie-eksperimentele groepe, met nege-en-twintig moeders in elke groep. Slegs twee babas het na 24-uur neurologiese abnormaliteite getoon en geen voorspellings kon dus in dié verband gemaak word nie.

Daar is egter bevind dat lae apgattellings voorspel kan word met die kliniese diagnose van intrapartum fetale nood.

INTRODUCTION

The occurrence of neonatal asphyxia at Baragwanath Hospital is a daily problem. The question was raised as to whether intra partum foetal distress, apgar scoring at birth and the biochemical analysis of blood acid base status from the chorionic arteries can predict any short-term neurological defects.

AIMS OF THE STUDY

- To detect factors directly related to the incidence of asphyxia neonatorum.
- To detect factors coincidentally related to the incidence of asphyxia neonatorum.
- To establish parameters to detect complications with their sequelae.
- To reduce the occurrence of asphyxia neonatorum thus improve the quality of life.

THE HYPOTHESIS

There is no correlation between apgar scoring, biochemical analysis of chorionic arterial blood and short-term neurological defects within the first twenty four hours of neonatal life.

This research project won the 1984 Juta Nursing Research Prize for students on courses leading to a post-registration diploma or certificate in Nursing. The researchers were studying for the Diploma in Advanced Midwifery and Neonatal Nursing Science at Baragwanath Hospital.

TYPE OF STUDY

A prospective clinical study consisting of asphyxiated and non-asphyxiated groups was undertaken. Twenty-nine mothers with clinical signs of foetal distress (these represented the asphyxiated group) were monitored during labour. The non-asphyxiated group consisted of twenty-nine mothers who were also monitored during labour; of these twenty-six presented later with only one of the clinical signs of foetal distress when the second stage of labour was imminent. The subjects chosen were full term and the babies' birth weights had to exceed 2,2 kilograms.

The investigators assessed both maternal and foetal condition and obtained the following data from the mother's clinical records.

Data directly related to the study

- **Clinical signs of foetal distress:** These are listed in table 1.
- **Technological signs of foetal distress**

The asphyxiated group only was monitored with internal cardiotocography.

The foetal heart rate and the uterine contractions were plotted on the Philpott charts as indicated in table 1.

- **Apgar scoring**
Accurate assessment of apgar score at 1 minute, 5 minutes and 15 minutes was done.
- **The biochemical analysis of chorionic arterial blood**

Two heparinised syringes were used to withdraw blood from both umbilical arteries within fifteen minutes of expulsion of the placenta. These samples were immediately taken for analysis to the acid base machine (Radiometer ABI 3).

In a pilot study concern was raised because of difference in acid base status between blood from the two chorionic arteries of the same placenta. Because of this phenomenon, specimens were taken in each case from both chorionic arteries and the results compared.

- **The assessment of short-term neurological defects 12-24 hours**
A clinical assessment was conducted as indicated in table 1

Data co-incidentally related to the study

- **Medical History**
Hypertension
Cardiac disease
Anaemia
Diabetes mellitus
Other
- **Obstetrical Data**
Ante-partum haemorrhage
Poly-hydramnios
Pre-eclampsia
Other

Booking status

Number of ante-natal clinic visits

**TABLE 1 RESEARCH QUESTIONNAIRE
ADVANCED MIDWIFERY AND NEONATOLOGY**

NAME:				Obstetrical Problems			
AGE:				APH	YES	NO	
PARITY:				Polyhydramnios	YES	NO	
STILLBIRTHS:				Pre-eclampsia	YES	NO	
EDD:				Blood Tests			
BOOKED YES NO				RH	+	-	
No. of ANC visits				Group	A	B	AB O
Medical Problems				Antibodies	YES	NO	
Hypertension YES NO				Rubella	+	-	
Cardiac YES NO				Hb			
Anaemia YES NO				WR	NEG	POS	
Diabetes YES NO				Clinical Signs of Foetal Distress			
Other				— meconium stained liquor	YES	NO	
				— foetal bradycardia	YES	NO	
				— foetal tachycardia	YES	NO	
				— excessive foetal movement	YES	NO	
				— decreased foetal movements	YES	NO	
				Cardiotocograph	YES	NO	

DATE: **TIME:**

Rupture of membranes:-

Colour of Liquor: Clear Meconium stained

Liquor on inspection: Thick Medium Thin

Delivery: Normal Forceps Vacuum C/S

1st Stage: **DATE:** **TIME:**

Duration of 1st stage of Labour Hrs mins.

Duration of 2nd stage of Labour Hrs mins.

Baby: Time of birth **Cord around the neck** YES NO

Sex M F **If yes number of times**

Weight **Tight or loose**

Condition Alive Fresh SB **True knots** YES NO

Apgar	1 min		5 mins		15 mins	
Heart rate	Absent	0	Absent	0	Absent	0
	L 100	1	L 100	1	L 100	1
	100	2	100	2	100	2
Respiratory Rate	None	0	None	0	None	0
	Slow or irregular	1	Slow or irregular	1	Slow or irregular	1
	Good and regular	2	Good and regular	2	Good and regular	2
Muscle tone	Flaccid	0	Flaccid	0	Flaccid	0
	Slight flexion of Limbs	1	Slight flexion of Limbs	1	Slight flexion of Limbs	1
	Active movement	2	Active movement	2	Active movement	2
Reflex Activity	None	0	None	0	None	0
	Grimaces	1	Grimaces	1	Grimaces	1
	Coughs or sneezes	2	Coughs or sneezes	2	Coughs or sneezes	2
Colour	Pale or blue	0	Pale or blue	0	Pale or blue	0
	Body Pink		Body Pink		Body Pink	
	Limbs Blue	1	Limbs Blue	1	Limbs Blue	1
	Pink all over	2	Pink all over	2	Pink all over	2
Total						

TABLE 1 (continued)

RESUSCITATION				PLACENTAL ARTERIAL BLOOD GASES FROM FOETAL SIDE OF PLACENTA		
Suctioned	YES	NO				
If suctioned meconium in mouth/nose	YES	NO				
Intubated	YES	NO				
If intubated meconium in trachea	YES	NO				
IPPR	YES	NO	If IPPR Mask ET Tube			
Time of first spontaneous breath			mins			
Transferred to	66	67	T/A ICU			
Examination				Time taken		
Congenital abnormalities				Time put into ABG Machine		
Other abnormalities				NEUROLOGICAL ASSESSMENT AT 12-24 HOURS		
Examination of placenta				DATE OF ASSESSMENT		
Placental weight				TIME OF ASSESSMENT		
Infarcts	YES	NO		1) Increase in level of apparent alertness	YES	NO
Retroplacental clot	YES	NO		2) Any seizure	YES	NO
Vasa Praevia	YES	NO		3) Apnoeic spells	YES	NO
Cord:				4) Jitteriness	YES	NO
Number of blood vessels	3	Less		5) Weakness	YES	NO
Cord length				6) Proximal limb weakness	YES	NO
				Upper limbs	YES	NO
				Lower limbs	YES	NO

Liquor

Colour, thickness and duration of rupture of membranes.

Labour

Duration of the first and second stages and the method of delivery. Special note was made of the occurrence of the cord around the neck — whether tight or loose, how many times, the presence of true knots in the cord.

Resuscitation

Whether the newborn was suctioned and characteristics of the secretions obtained. Whether intubated and the method of ventilation employed. Accurate timing of the occurrence of the first spontaneous breath.

Immediate examination of the neonate

Special note was taken of infarcts which became significant if they covered a large enough area to interfere with the uterine placental foetal exchange (1.p 591).

A retro-placental clot, which signifies premature separation of the

placenta thus interfering with the uterine placental foetal exchange, was also noted.

Results and analysis

A total of fifty-eight patients in labour enrolled in the study. Comparisons were made between:

- the intrapartum non-asphyxiated group (N=28) and the intrapartum asphyxiated group (N=28)
- the subjects who had babies with apgar score ≥ 7 (N=36) and apgar score < 7 (N=22).
- the blood values of the two chorionic arteries of all placentae
- intrapartum asphyxia, neonatal asphyxia and short-term neurological defects.

The t-test was used to test correlated samples and the chi-square for discrete data.

Findings

Intrapartum non-asphyxiated group versus Intrapartum asphyxiated group

There was a significant difference between the two samples regarding:

- **hypertension** during pregnancy. More hypertension occurred in the experimental group (p=0,05)
- **normal deliveries/caesarian section and intubation**. Not surprisingly more caesarian sections (p=0,002) and intubations (p=0,005) were performed on cases from the experimental group
- **cord around the neck**. This was more common in the experimental group (p=0,05)
- **apgar scores**. Apgar scores at one minute (p < 0,001), at 5 minutes (p < 0,001) and at 15 minutes (p < 0,01) were lower in the intrapartum asphyxiated group with the great correlation at 15 minutes
- **birth weight**. The birth weight in the experimental group was significantly lower (p < 0,05).

There was no significant difference between the groups regarding:

- maternal age, parity, booking status, post dates (≥ 7 days past EDD), WR (Wasserman positive)

- hypertension during labour (diastolic ≥ 90), delay in cervical dilatation, instrumental deliveries (forceps and vacuum)
- chorionic arterial PH, CO₂ HCO₃ between the two chorionic arteries.

Apgar ≥ 7 group versus 7 < group

There was a significant difference between the two groups regarding:

- **parity.** Mothers of low parity occurred more in the neonatal asphyxiated group ($p < 0,05$) primigravidas as such were not compared, but this could have been a contributory factor.
- **Chorionic blood pH.** A low pH was found to be significantly different in the low apgar group ($p < 0,05$). However the pH was influenced by one very low value (pH = 6,71) and if this extreme subject is taken out, there was no significant difference.

There was no significant difference between the two groups

- maternal age, booking status, post dates, WR and hypertension
- cervical dilatation, chorionic arterial CO₂ HCO₃ and cord around the neck.

Blood values of the two chorionic arteries of all placentae

No significant difference was found when comparing the pH, PCO₂ and HCO₃ between isoplacental chorionic arteries.

Asphyxia and short-term neurological defects

Only two neonates were judged to be neurologically abnormal at 24 hours of age. These small numbers prohibit statistical analysis.

LIMITATIONS

- Observations were made late in labour, a common problem in the hospital is that patients present late in labour.
- The unavailability of cardiotocographs for the non-asphyxiated group and even for six subjects in the foetal distress group.
- Loss of data for two asphyxiated subjects and two non-asphyxiated subjects because the acid base machine was out of order for twenty-four hours.

CONCLUSION AND DISCUSSION

- The presence of clinical signs of intrapartum asphyxia, as well as ante-natal factors, can predict low apgar scores.
- Although cord around the neck showed to be a predictor of intrapartum foetal distress, it could not be shown as a predictor of post-partum asphyxia (low pH).
- **Queenan** (Queenan: 27) states that *foetus of high risk pregnancies showed significantly lower pH and high base deficits . . .* The investigator's finding also contradicted Babson's statement (Babson: 52) that there is an accurate correlation between the degree of foetal distress and foetal blood pH. Our findings disclosed a more accurate correlation between foetal distress and apgar scoring.

RECOMMENDATIONS

- To do a similar study in a larger group in order to test short-term neurological outcomes.
- An improvement in facilities and services to avoid a delay in implementing immediate action to facilitate delivery.
- Availability of proper functioning cardiotocographs and introducers to have made it possible for the investigators to use equal instruments for subjects in both groups.

- That mothers receive good antenatal care and vigilant monitoring during labour, followed by an accurate assessment of the newborn infant, especially with regard to apgar scoring.
- It would appear that it is unnecessary to provide acid base facilities to prevent or assess neonatal asphyxia.

SUMMARY

Low apgar scores can be predicted from the clinical diagnosis of intrapartum foetal distress but neither low apgar score nor intrapartum foetal distress correlated with arterial acid base changes.

Too few babies had neurological deficit to warrant analysis.

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