

The Correlation between a Positive Fern Test and the Production of Small-for-Dates Babies

A PROSPECTIVE STUDY

E. S. THERON

SUMMARY

A group of pregnant women whose cervical mucus gave a positive fern test were compared with a control group with regard to the production of small-for-dates babies and other possible indicators of placental insufficiency. No correlation was observed between the ferning phenomenon and small-for-dates babies or placental insufficiency. In additional observations it was noted that babies with birthweights below the 10th percentile on the Colorado intra-uterine growth chart were in 45% of cases born to mothers showing no weight gain in the last weeks of pregnancy.

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Recently McDonald¹ reported on the value of the fern test on mucus from the gravid cervix as an indicator of relative placental insufficiency and of fetal growth

restriction. In his series, patients showing ferning after 16 weeks showed a statistically significant increase in the number of small-for-dates babies. This work impressed us as an important lead to follow in the search for a more efficient means of detecting poor intra-uterine growth. If such a test could be shown to be valid, it would be of value particularly to the practitioner away from the larger centres, who does not have sophisticated means of gauging fetal well-being at his disposal. Techniques such as ultrasonic cephalometry and serial urinary oestrogens are not available and he usually has to rely on clinical judgement alone. A simple test of placental sufficiency would be of inestimable value.

We consequently undertook to prove or disprove the value of the procedure in question by taking cervical smears from all new antenatal cases over a period and then following up the patients to ascertain signs of placental insufficiency and the production of small-for-dates offspring.

Department of Obstetrics and Gynaecology, State Hospital, Windhoek

E. S. THERON, M.B. CH.B., *Principal Medical Officer* (Present address: Kalafong Hospital, Pretoria)

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PATIENTS AND METHODS

Between 27 March 1973 and 31 August 1973, 867 new cases passed through our non-White antenatal clinic (ANC). Cervical smears were taken aseptically from 841

of these cases. After drying, the smears were inspected under the low-power objective for the ferning phenomenon. Cervical mucus of patients who were fern-positive at their first examination was reassessed throughout pregnancy at their regular ANC visits. Fern-negative patients did not have a repeat mucus examination. The taking of smears was also discontinued in fern-positive cases, after the second negative smear.

The patients were scored as follows:

- 4—at least 3 smears taken, all positive
- 3—at least 2 smears taken, all positive
- 2—at least 3 smears taken, only 1 negative
- 1—occasional positive and all remaining who have had positive smears
- 0—fern-negative.

All the fern-positive mothers were at or over 16 weeks pregnant at their first attendance.

All babies who were born in hospital to fern-positive mothers from 1 April 1973 to 31 October 1973, were assessed for fetal maturity, as were also a good sample of babies of fern-negative mothers. For this purpose the scoring system of Dubowitz *et al.*,² in which a series of 11 external characteristics and 10 neurological signs are employed, was used. The baby receives a score for each test and the total count over all 21 signs is used to give the estimated fetal age. The authors state that by using a battery of tests a more objective and reliable estimate of gestational age is achieved than by relying on individual criteria. They give a 95% confidence limit of 2 weeks for the scoring system. Recent investigations^{3,4} have shown that this scoring system is valid for non-White patients in Southern Africa.

Having assessed fetal maturity, the relative size at birth was determined by comparing each newborn's fetal age and birthweight with the Colorado intra-uterine growth chart of Lubchenco *et al.*⁵ This chart gives the percentiles for birthweights at various lengths of gestation in a White population in Colorado. Although unlikely to correspond exactly to our population because of differences of hereditary background and maternal nutrition, it was used as a measuring scale against which to compare our infants with each other. It is emphasised that this is not a true percentile score in our population group, but simply a device used to compare relative weight at birth of the infants with fern-positive and fern-negative mothers. By doing this we corrected for differing lengths of gestation in the mothers studied. We were not able to construct a percentile birthweight chart for our population because of the small number of cases involved.

For the purposes of this study a 'percentile score' of less than 10 was regarded as a small-for-dates baby. In addition, several other possible parameters of placental insufficiency were recorded, viz. poor weight gain, albuminuria, hypertension and positive Wassermann reaction, as well as perinatal deaths, 1-minute Apgar scores and operative interference for fetal distress.

RESULTS

Of the 841 patients whose cervical mucus was assessed, 96 were fern-positive. Only 42 of the patients, however,

gave birth in hospital during the test period, and were thus available for follow-up and comparison with 208 of the 541 fern-negatives who gave birth in hospital during this period.

From the results shown in Table I it can be seen that there is no great difference in relative birthweight between babies born to fern-positive and those born to fern-negative mothers. There is, further, no excess of small-for-dates babies born to mothers with fern-positive cervical mucus. Both fern-positive and fern-negative groups show approximately bell-shaped curves of normal distribution of relative birthweight, which seems to indicate that the presence of the 'ferning' phenomenon in the cervical mucus has no correlation with the relative birthweight and, because of this, no correlation with placental insufficiency either.

Table II reflects further parameters of fetal distress in the two groups investigated. These parameters likewise indicate that there is no clear correlation between a positive fern test and fetal risk.

TABLE I. COMPARISON OF RELATIVE BIRTHWEIGHT OF BABIES OF FERN-POSITIVE AND NEGATIVE MOTHERS

Group	No.	Percentile score on Colorado intra-uterine growth chart					
		>90	75-89	50-74	25-49	10-24	<10
Fern-positive cases							
4	1					1	
3	5		3		1	1	
2	3			3			
1	33	1	4	11	7	9	1
Total	42	1	7	14	8	11	1
%	100	2,4	16,7	33,3	19	26,2	2,4
			52,4%			47,6%	
Fern-negative cases							
cases	208	13	33	56	62	32	12
%	100	6,3	15,8	26,9	29,8	15,4	5,8
			49,0			51,0	

TABLE II. FURTHER PARAMETERS OF FETAL DISTRESS

	Fern-positive (42 cases)	Fern-negative (208 cases)
Mean Apgar score at 1 minute	8,24	8,06
Macerated stillbirths (rate/1 000 births)	0	4,8 (1 case)
Fresh stillbirths (rate/1 000 births)	0	0
Neonatal deaths (rate/1 000 live births)	23,8 (1 case)	4,8 (1 case)
Perinatal deaths (rate/1 000 births)	23,8 (1 case)	9,6 (2 cases)
Caesarean section for fetal distress (rate/1 000 live births)	0	14,5 (3 cases)
Instrumental deliveries for fetal distress (rate/1 000 live births)	0	4,8 (1 case)

TABLE III. OTHER POSSIBLE PARAMETERS OF PLACENTAL INSUFFICIENCY, COMPARING 3 GROUPS OF RELATIVE BIRTHWEIGHT

Group	Percentage of total													
	Total		Parity			Weight gain		Albuminuria		Hypertension		Hb < 10 g/100 ml		WR pos.
	No.	%	Prim.	Para 1-4	Gr. multip.	Good	Poor	None or wt. loss		Occa-sional	Fre-quent	Mild	Severe	
								Occa-sional	Fre-quent					
Below 10th 'percentile'	13	100	31	54	15	46	9	45	15	23	31	0	8	0
50th-74th 'percentile'	70	100	34	47	19	56	22	22	29	17	21	1	1	16
90th and above	14	100	7	79	14	64	36	0	29	21	21	0	14	8

In Table III some other clinical measurements and simple laboratory determinations are listed, comparing the group of babies with the lowest relative birthweight with that with the highest relative birthweight and the group falling between the 50th and 74th 'percentiles'. In this table fern-positive and fern-negative cases are combined.

The various categories in Table III are defined as follows:

Good weight gain means weight gain of 1.5 kg or more in the last 6 weeks of ANC records.

Poor weight gain indicates weight gain of less than 1.5 kg during the last 6 weeks of ANC records.

Occasional albuminuria refers to protein in the urine in less than 1 in every 3 ANC attendances.

Frequent albuminuria refers to protein in the urine at 1 in every 3 ANC attendances or more frequently.

Mild hypertension means a diastolic pressure of 90 or more, but less than 110 mmHg, at any ANC attendance.

Severe hypertension means a diastolic pressure of 110 mmHg or more at any ANC attendance.

Inspection of the figures permits the following observations: (a) as would be expected, relatively few primiparas produce overly large babies; (b) there is a positive correlation between failure to gain weight in the latter weeks of pregnancy and the production of small-for-dates babies (however, although 45% of mothers giving birth to small-for-dates babies failed to gain weight, another 46% had a satisfactory weight gain of 1.5 kg or more over the 6-week period); (c) the figures show no

real correlation between albuminuria, hypertension, low haemoglobin concentration or positive Wassermann reaction and small-for-dates babies.

DISCUSSION

McDonald's¹ finding that there is a statistically significant increased incidence of small-for-dates babies in mothers who show a positive fern test after 16 weeks is thus not confirmed. The reason for this discrepancy is possibly that both series are too small to yield completely valid results. His group of fern-positive cases after 16 weeks was 55, with a control group of 73. Our study group comprised 42 cases, with a control group of 208. It is also true that McDonald's cases were drawn from a population already suspected of being at extra risk, whereas ours came from routine bookings at ANC. Whereas his results could be expected to be slightly more valid for the numbers involved, coming as they did from a more 'concentrated' group, our findings reflect the fact that for routine screening purposes at ANC, the fern test is of no value as an indicator of poor intra-uterine growth.

REFERENCES

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