

Spontaneous prolonged contractions during antenatal fetal heart rate monitoring

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Summary

Uterine contractions of more than 2 minutes' duration occurred spontaneously in 1,4% of 6399 antenatal fetal heart rate (FHR) recordings. All recordings were made in the Department of Obstetrics and Gynaecology at Tygerberg Hospital. The patients with spontaneous prolonged contractions (SPC) were compared with a randomly selected control group. Patients who had an SPC during antenatal FHR recording were not at a higher risk of abruptio placentae, preterm labour or unexpected intra-uterine death. Of the infants born to the mothers in the study group, 65,5% were male. There were more primigravidas in the study group, which may have been responsible for the longer duration of the second stage of labour in this group. When primigravidas only were examined no difference between the two groups could be found except for a larger placental mass in the study group. It is uncertain why primigravidas were more likely to develop SPCs as observed during antenatal FHR monitoring.

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Antenatal fetal heart rate (FHR) monitoring to assess fetal well-being is frequently carried out in the Department of Obstetrics and Gynaecology at Tygerberg Hospital. During some of these recordings spontaneous prolonged contractions (SPCs) of the uterus (Fig. 1) were occasionally observed. Although there are a number of publications^{1,2} on oxytocin

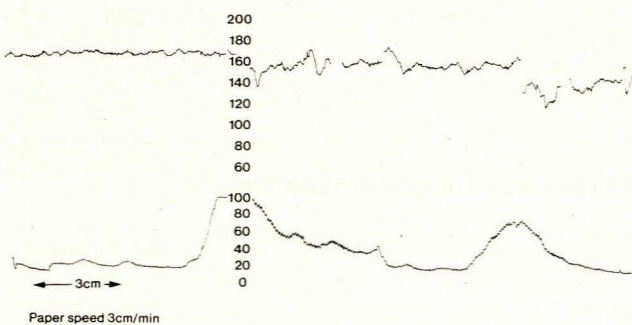


Fig. 1. The spontaneous prolonged contraction is clearly demonstrated.

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overstimulation or excessive uterine contractions after nipple stimulation, SPCs have not yet been reported. As abruptio placentae is a major cause of intra-uterine death in this unit and since severe abruptio placentae is characterised by abnormal uterine activity,³ the question arose whether patients with SPCs are at higher risk of developing abruptio placentae. As deceleration of the FHR sometimes occurs during SPCs, we also wondered whether these patients are at increased risk of unexpected intra-uterine death. Thirdly, it was postulated that patients with these contractions could be at greater risk of preterm labour. With these three questions in mind a retrospective study was performed.

Patients and methods

All antenatal FHR recordings in this department are carefully filed in chronological order. For this study the 6399 recordings obtained in 1983 were reviewed and a study group and a control group of patients were selected. The study group consisted of patients with SPCs (> 2 minutes). The recording immediately following that of a patient in the study group was selected for inclusion in the control group providing SPCs were absent. If it had to be excluded for some reason the next recording was examined. No patient in either group had had any nipple stimulation before the test and none had received oxytocin.

All recordings were made with a Hewlett-Packard 8030A cardiocytograph. The ultrasound transducer was used to record the FHR and an external tocotransducer to measure the uterine contractions. All the necessary precautions to prevent or exclude maternal supine hypotension were always taken.

After antenatal FHR tracings for the study and control groups had been selected, the two groups of patients were compared with respect to age, gravidity, duration of pregnancy, duration of labour, birth weight, placental weight and 5-minute Apgar score. Only vaginal deliveries were considered when the duration of labour was calculated. All the data were analysed by the Institute for Biostatistics of the South African Medical Research Council. For continuous measurements the distribution of values was assessed first and then, if the distribution was approximately normal, Student's *t*-test was used to compare groups. When the distribution deviated too much from the normal the Kruskal-Wallis or Wilcoxon tests were used. For nominal measurements, such as fetal sex, the chi-square test was used to compare the groups. When the cell counts were too small, Fisher's exact test was used. A *P* value of < 0,05 was accepted as statistically significant. For statistical purposes only the first twin was considered.

Results

Of the 6399 recordings examined only 89 (1,4%) demonstrated SPCs (Table I). Clinical records for 5 patients in the control group could not be found, so 84 patients in each group were studied. Of the patients in the study group, 8 (9%) of 89 demonstrated during subsequent recordings, while in 9 cases a repetition of the SPC was found during the same test. Duration of the contractions ranged from 2 to 7,6 minutes, with a mean (\pm SD) of $3,2 \pm 1,2$ minutes. When the groups were compared (Table I) it was found that the patients in the study group had fewer abortions, and the gestational age at the time of initial FHR recording was significantly higher. The gravidity of the study group was lower,

TABLE I. COMPARISON OF MATERNAL AND FETAL MEASUREMENTS BETWEEN THE STUDY AND CONTROL GROUPS

	Study group				Control group				Significance
	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	
Age (yrs)	15	41	24,9	6,5	15	40	26,1	5,7	NS
Gravidity	1	8	2,2	1,6	1	9	2,7	1,8	NS
Abortions	—	1	0,1	0,3	—	2	0,3	0,6	$P < 0,05$
Duration of pregnancy at test (wks)	31	47	39	3,6	29	47	37	3,7	$P < 0,01$
Duration of pregnancy at delivery (wks)	33	47	40,2	3	33	49	40,3	2,8	NS
FHR (/min)	115	160	138	9	125	180	142	10	$P < 0,05$
Duration of first stage (h)	0,5	19,3	7,2	4,3	1	19,2	6	3,9	NS
Duration of second stage (min)	2	80	19,9	16	2	64	14,7	11,4	$P < 0,05$
Birth weight (g)	1 260	5 090	3 163	618	1 700	4 700	3 169	563	NS
Placental weight (g)	240	1 020	589	142	340	1 300	585	156	NS
5-min Apgar score	1	10	8,3	1,9	1	10	8,8	1,2	$P < 0,05$

NS = not significant at the 5% level.

but the difference was not statistically significant. The basal FHR was lower during the SPCs than the basal heart rate in the control group. The second stage of labour was longer and the 5-minute Apgar score lower in the study group. Other measurements did not differ significantly.

There were 6 sets of twins, 5 in the study group. There were fewer normal deliveries and more vacuum extractions, forceps deliveries and caesarean sections in the study group. These differences, however, were not statistically significant (Table II). Two patients in the study group but none in the control group developed abruptio placentae. No difference between the two groups could be found as regards duration of pregnancy at delivery. In the study group 55 (65,5%) of the infants were males; in the control group there were 42 of each sex.

Because the gravidity and number of abortions in the two groups differed, it was decided to investigate the primigravidas only. There were 67 primigravidas, 41 in the study group and 26 in the control group.

No difference between the two groups of primigravidas could be found in respect of age, duration of pregnancy at time of the test, or at delivery, duration of the first and second stages of labour, and fetal weight (Table III). The placentas weighed more in the patients with abnormal contractions.

More caesarean sections and forceps deliveries were necessary in primigravidas with SPCs, but the difference was not significant (Table IV). Statistical significance was also not reached when the patients were separated into operative and normal deliveries. There were no intra-uterine deaths in either group.

TABLE II. METHOD OF DELIVERY IN THE STUDY AND CONTROL GROUPS

	Normal		Vacuum extraction		Caesarean section		Forceps		Breech	Total
	No.	%	No.	%	No.	%	No.	%		
Study group	45	53,6	8	9,5	23	27,4	7	8,3	1	84
Control group	59	70,2	4	4,8	18	21,4	3	3,6	—	84
Total	104		12		41		10		1	168

Pearson $\chi^2_{(3)} = 5,422$; $P > 0,05$, when the breech delivery was excluded from the calculations.

TABLE III. COMPARISON OF PRIMIGRAVIDAS IN THE STUDY AND CONTROL GROUPS

	Study group				Control group				Significance
	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	
Age (yrs)	15	34	21,2	4,6	15	38	21,8	5	NS
Duration of pregnancy at test (wks)	31	47	39,6	3,5	32	46	38	4,1	NS
Duration of pregnancy at delivery (wks)	35	47	40,3	3	33	49	41	3,9	NS
Duration of first stage (h)	2,3	19,3	8	3,7	2	19,2	7,6	4,7	NS
Duration of second stage (min)	4	60	24,1	15,4	5	43	17,6	11,2	NS
Birth weight (g)	1 260	4 200	3 055	614	1 700	3 940	3 010	519	NS
Placental weight (g)	240	1 020	600	154	380	720	524	87	$P < 0,05$
5-min Apgar score	1	10	8,3	2,1	7	10	8,7	0,9	NS

NS = not significant.

TABLE IV. METHOD OF DELIVERY IN PRIMIGRAVIDAS

	Normal		Vacuum extraction		Caesarean section		Forceps delivery		Total
	No.	%	No.	%	No.	%	No.	%	
Study group	20	48,8	3	7,3	16	39,0	2	4,8	41
Control group	15	57,7	4	15,4	7	26,9	—	—	26
Total	35		7		23		2		67

Pearson $\chi^2_{3df} = 1,852$; $P > 0,05$, when the 2 forceps deliveries were excluded from the calculations.

Discussion

In a study like this the selection of a control group is always difficult, but as far as we could ascertain the only difference between the two groups was the absence or presence of SPCs. Contrary to what had been postulated at the beginning of the study, SPCs did not indicate a great risk of abruptio placentae. The fact that there were 2 cases of abruptio placentae in the study group and none in the control group could point towards a risk, but a larger series will be needed to confirm this. It seems that primigravidas develop prolonged contractions more easily at an advanced gestational age.

It was hoped to obtain an early warning of preterm labour, but the duration of pregnancy in the two groups did not differ. Patients with SPCs were not at increased risk of intra-uterine death.

The smaller number of abortions in the study group is probably due to the fact that it contained more primigravidas. As labour is usually longer in primigravidas, it is not difficult to explain why the duration of the first and second stages of labour was longer in the study group. The higher number of primigravidas in the study group also explains the larger number of operative deliveries and the lower 5-minute Apgar scores. No differences were encountered when only primigravidas were examined.

The higher incidences of twin pregnancies and births of male infants as well as the greater placental mass in the study group is difficult to explain. Although boys normally have higher birth weights than girls,⁴ placentas of boys are relatively lighter than those of girls,⁵ but the exact weight of boys' placentas is still higher. The preponderance of boys in the study group therefore explains the higher placental weights in this group. It has been shown that uterine activity is higher in primigravidas,⁶ but it is uncertain whether this finding can be

extrapolated to the antenatal period. A previous study at this unit⁷ demonstrated that patients with biphasic uterine contractions during labour had a higher incidence of operative delivery resulting from failure of labour to progress. However, the difference in the rates of operative deliveries between the two groups in the present study is not statistically significant and it can therefore not be stated that prolonged contractions recorded antenatally necessarily reflect what will happen during labour. It seems that primigravidas have more SPCs before labour, but the reasons for this finding are not clear.

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