The Frequency and Duration of Uterine Contractions during Labour

E. T. MOKGOKONG

SUMMARY

The behaviour of uterine contractions in the first stage of labour was studied in 1 555 Black and Indian patients. Significant racial differences were found; as well as significant differences in parity.

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To cope efficiently obstetric units handling large numbers of deliveries require simple methods for monitoring labour. These should provide reliable signals of abnormality during labour, be inexpensive, and easily understood, and able to be applied by nurses and junior medical staff.

At King Edward VIII Hospital in Durban, the problem of contracted pelves (which are about 25% smaller than those of women in other communities) and the problem of about 23 000 deliveries a year, make such methods invaluable.

There was the impression that descriptions in the literature of the normal rate of cervical dilation, descent of the fetal head, frequency of uterine contractions and duration of labour, were incorrect and misleading where our patients were concerned. Therefore, the establishment of the norms for these essential factors, and their interrelationships in our practice, became essential.

This article deals with a study of the behaviour of uterine contractions during labour conducted in the Obstetric Unit of King Edward VIII Hospital, in Durban.

PATIENTS AND METHODS

Black and Indian patients of all parities and age groups were studied. Only patients who had had normal labour were retained in the study. Labour was regarded as being normal in cases where cephalopelvic disproportion had been excluded as far as possible, both clinically and by X-ray cephalometry; where the fetus presented in the vertex position; and when labour ended spontaneously and was not associated with a perinatal death. In all, 389 Black primigravidas, 717 Black multiparas, 159 Indian primigravidas and 290 Indian multiparas were studied.

The uterine contractions were recorded by abdominal palpation, using the palms of the hands over the upper uterine segment and fundus. The duration of a contraction was measured in seconds from the time the uterus was felt to harden, until it relaxed. The interval between contractions was measured in minutes from the time of onset of relaxation of a contraction to the time of onset of the next contraction. These records were made at half-hourly intervals until the onset of the second stage of labour.

All senior members of the medical and nursing staffs were trained to make these records until uniformity was obtained.

The duration of contractions and the interval between contractions were plotted against the duration of labour in hours on a graph. Cervical dilatation and the descent of the presenting part were also plotted against the duration of labour in hours on this graph, thus making this factor a constant for the variants. Onset of labour was taken as the time when regular painful uterine contractions started.

The results were then analysed by computer and graphs were produced, showing the behaviour of the factors studied in these groups of patients.

RESULTS

Frequency of Uterine Contractions

Black multiparas. Fig. 1 is a time-interpolated graph of the frequency of uterine contractions in the Black multiparas studied. The curve 'a' is the 10th percentile graph indicating that 90% of the patients in this group fell to the right of those points; 'b' is the median curve for the group; and 'c' is the 90th percentile curve indicating that 10% of the patients fell to the right of those points; 80% of the patients fell between graphs 'a' and 'c'. The graphs 'a', 'b' and 'c' show a fairly constant pattern of progressive increase of frequency of contractions, from a frequency of 10 minutes at the beginning of labour to 1 minute towards

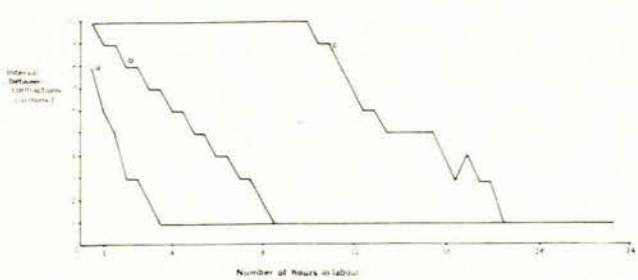

Fig. 1. Black multiparas: interval between contractions.

Department of Gynaecology and Obstetrics, University of Natal and King Edward VIII Hospital, Durban
E. T. MOKGOKONG, B.SC., M.B. CH.B., DIP. MID., F.C.O.G. (S.A.)

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the end of the first stage of labour. Furthermore, these 3 graphs are parallel, and can therefore be used as clear reference lines during labour.

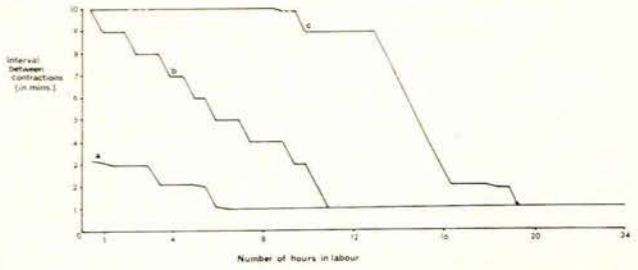

Fig. 2. Black primigravidas (aged 20 yrs and under): interval between contractions.

Black primigravidas: Fig. 2 graph is similar to the previous one, and shows the frequency of contractions in Black primigravidas aged 20 years or under. The results show a slight reduction in the gradient of increase in frequency of contractions in labour. This deceleration is evident between the 4th and 7th hours of labour. Again, the graphs 'a', 'b' and 'c' are virtually parallel.

Fig. 3 shows the frequency of contractions in labour of Black primigravidas of over 20 years of age. The graph is similar to that of primigravidas of 20 years and under, except that the deceleration in frequency of contractions already mentioned is more pronounced.

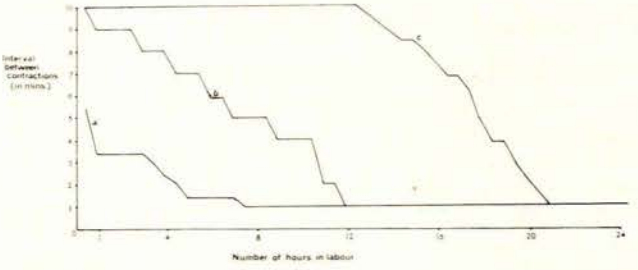

Fig. 3. Black primigravidas (aged over 20 yrs): interval between contractions.

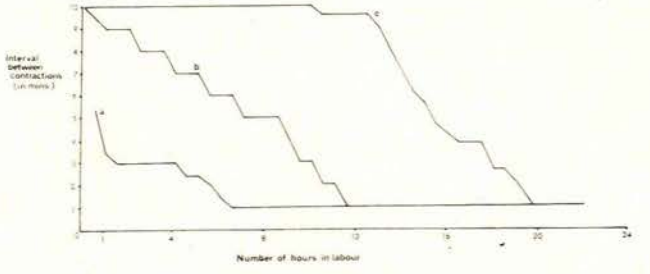

Fig. 4. Black primigravidas (all ages): interval between contractions.

Fig. 4 shows the frequency of contractions in labour of Black primigravidas of all ages. As was expected, it shows a pattern in between that of Figs 2 and 3.

Indian multiparas: Fig. 5 shows that the frequency of contractions in Indian multiparas is very similar to that of Black multiparas. It does, however, show a less rapid increase in the frequency of contractions as the duration of labour increases. This is more marked when 'c', the 90th percentile, is studied. There is a tendency to flattening.

Indian primigravidas: Fig. 6 shows the frequency of contractions in Indian primigravidas studied. The slow but progressive increase in the frequency of contractions is more marked in this group than in the others.

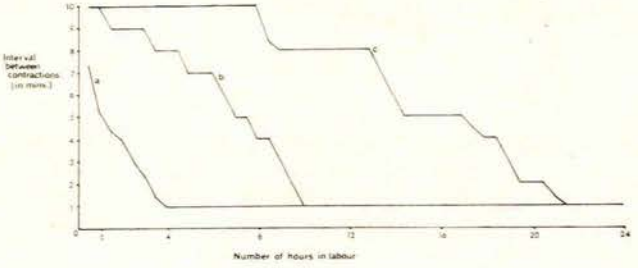

Fig. 5. Indian multiparas: interval between contractions.

Fig. 6. Indian primigravidas: interval between contractions.

In all the groups a progressive increase in the frequency of contractions is shown. The rate of increase of frequency of contractions is greatest in the Black multiparas. Among the primigravidas, the under-20-year-old Black primigravidas show the most rapid increase in the frequency of contractions compared with the older Black and Indian primigravidas.

Duration of Uterine Contractions

Black multiparas: Fig. 7 is a graph of the duration of contractions in Black multiparas studied; 'a' is the 10th percentile curve indicating that 90% of the patients in this group fell to the right of these points; 'b' is the median for the group; and 'c' is the 90th percentile, indicating that 10% of the patients fell to the right of these points. The graph shows a progressive increase in the duration of contractions as the duration of labour increases. The median 'b' shows a fairly steep increase in the duration of

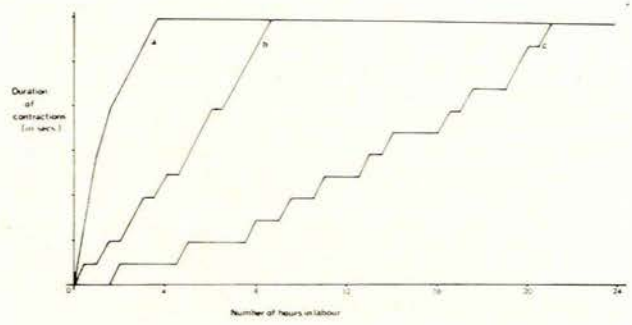

Fig. 7. Black multiparas: duration of contractions.

contractions. The 90th percentile, on the other hand, shows a very slow rate of increase in the duration of contractions, and a 10% very rapid increase in this rate.

Black primigravidas: Fig. 8 shows the duration of contractions in Black primigravidas 20 years of age and under. The graph is similar to Fig. 7, though a slower rate of increase in the duration of contractions is clearly shown. This is more evident when the curve 'a' is studied.

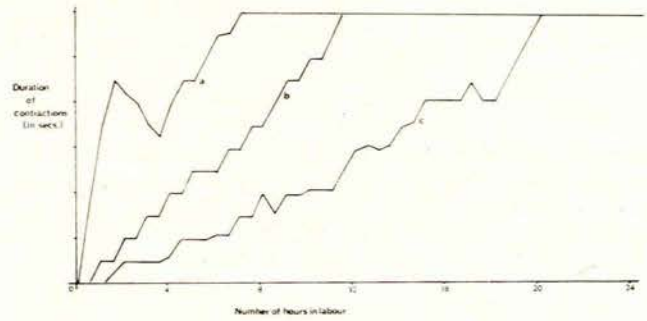

Fig. 8. Black primigravidas (aged 20 yrs and under): duration of contractions.

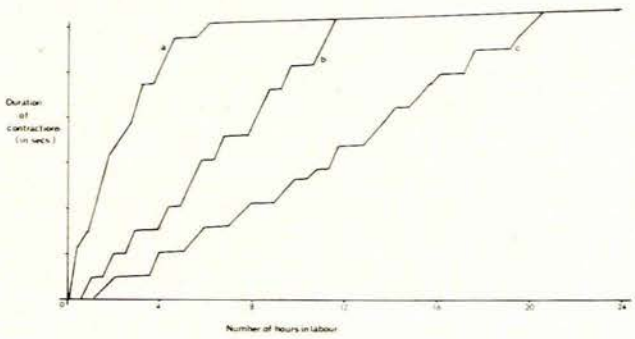

Fig. 9. Black primigravidas (aged over 20 yrs): duration of contractions.

Fig. 9 illustrates the duration of contractions in Black primigravidas over 20 years of age. This is again similar to Fig. 8, although the increase in the duration of contractions is more rapid.

Fig. 10 illustrates the duration of uterine contractions in labour of Black primigravidas of all ages. As was expected, the pattern lies between Figs 8 and 9.

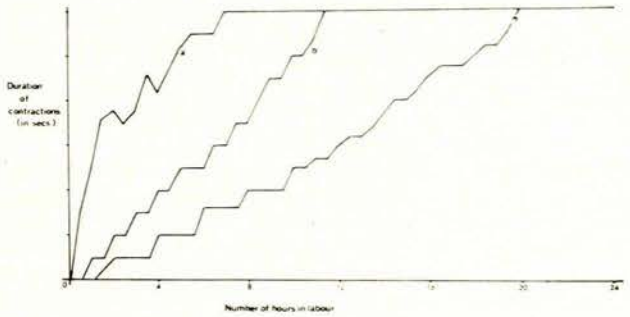

Fig. 10. Black primigravidas (all ages): duration of contractions.

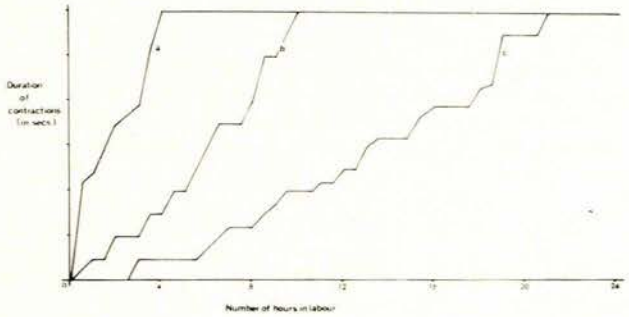

Fig. 11. Indian multiparas: duration of contractions.

Indian multiparas: Fig. 11 shows the duration of contractions in labour of Indian multiparas studied. Again, the pattern is similar to that of the Black groups studied. The increase in the duration of contractions as the duration of labour increases, is more rapid than that found in Black primigravidas, but is slower than in Black multiparas.

Indian primigravidas: Fig. 12 illustrates the duration of contractions in Indian primigravidas. The pattern is very similar to that of Black primigravidas, there being a slow but progressive increase in the duration of contractions as the duration of labour increases.

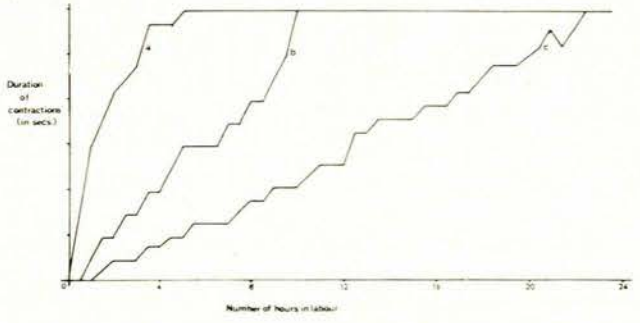

Fig. 12. Indian primigravidas: duration of contractions.

CONCLUSIONS

The results were obtained by using a simple clinical method of assessing uterine contractions during labour. It is obvious that the duration of uterine contractions will be a few seconds less when this method is used, compared with results from tocography. The manual method has the advantage of simplicity and, like tocography, experience reduces the degree of error. The records of the frequency of contractions cannot differ from those of tocography, when this method is used.

Whereas this study confirms known clinical observations and the results of tocography as reported by many workers,[1-7] in that there are significant differences between the behaviour of the primigravid and the multigravid uterus, generally this study brought to light interesting variants of the norms when Black and Indian patients were analysed. Comparison of the Black multiparas and the Black primigravidas shows differences in the frequency of uterine contractions during labour. In the former parity group, the increase in the frequency of uterine contractions as the duration of labour increases, is progressive and rapid. In the latter parity group, the increase in the frequency of uterine contractions as the duration of labour increases, though progressive, is much less than in multiparas. There is also a tendency in primigravidas for a further reduction in the frequency of uterine contractions about halfway through the first stage of labour, followed by a more rapid increase later in this stage.

There is a difference between the 2 parity groups when the durations of uterine contractions are considered. There is a more rapid increase in the duration of contractions as labour progresses in Black multiparas than in Black primigravidas.

The differences between the frequency and the duration of uterine contractions are similarly present between Indian multiparas and primigravidas.

In Black primigravidas, the influence of age on the pattern of uterine action during labour was also studied. The results show that the Black primigravidas under the age of 20 years have a more rapid increase in the frequency of uterine contractions as labour progresses than those over 20 years of age. There is very little difference in the duration of uterine contractions between the 2 age groups of primigravidas, although a slightly slower increase in the duration of contractions was noted in the younger groups.

There is a difference between the Black and Indian patients in the behaviour of the pregnant uterus during labour. When similar parity groups are compared, Black patients have more rapid increases in the frequency and also the duration of uterine contractions than Indian patients. There was, however, no difference in the duration of labour observed in this study and the one by Margolis conducted in this Department.[8] It would be expected from the behaviour of the uterus that labour should be shorter in Black patients. The absence of a difference in the duration of labour may be explained by the fact that Indian patients give birth to smaller babies than do Black patients.

In both racial groups, the duration of the first stage of labour is shorter in multiparas than in primigravidas. In the absence of obvious differences in mechanical problems, the differences of uterine behaviour between the parity groups shown in this study must be responsible for this difference.

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