

# Sonographic cervical length in threatened preterm labor in a South African population

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**KEYWORDS:** cervical length; preterm labor; sonography

## ABSTRACT

**Objective** In a previous study conducted in the UK we demonstrated that only 8% of women with threatened preterm labor deliver within 7 days. Furthermore, delivery within 7 days occurred in less than 1% of women presenting with a sonographically measured cervical length  $\geq 15$  mm, compared to 37% in those with cervical length  $< 15$  mm. In this study we investigate the potential value of cervical length in the prediction of outcome of threatened preterm labor in a South African population.

**Methods** We examined 63 women with singleton pregnancies presenting with regular and painful uterine contractions at 24–36 (mean, 31) weeks of gestation. Women in active labor, defined by the presence of cervical dilatation  $\geq 3$  cm, and those with ruptured membranes were excluded. On admission to the hospital a transvaginal scan was performed to measure the cervical length. The subsequent management was determined by the attending obstetrician. The primary outcome was delivery within 7 days of presentation.

**Results** Delivery within 7 days of presentation occurred in 20/63 (32%) pregnancies, including 20 of the 30 (67%) cases with cervical length  $< 15$  mm and none of the 33 cases with cervical length  $\geq 15$  mm. Logistic regression analysis demonstrated that the only significant contributor in the prediction of delivery within 7 days was cervical length (odds ratio 0.67; 95% CI 0.54–0.85;  $P = 0.001$ ) with no significant independent contribution from maternal age, gestational age, body mass index, parity, use of antibiotics, previous history of preterm delivery, cigarette smoking, contraction frequency or use of tocolytics.

**Conclusion** In this South African population, which had a high incidence of delivery within 7 days of presentation

with threatened preterm labor, sonographic measurement of cervical length is equally effective as in a lower-risk population in distinguishing between true and false labor. Copyright © 2004 ISUOG. Published by John Wiley & Sons, Ltd.

## INTRODUCTION

In women presenting with threatened preterm labor there is an association between sonographic measurement of cervical length and the likelihood of subsequent preterm delivery<sup>1,2</sup>. In a previous study in the UK of women with singleton pregnancies and intact membranes presenting with threatened preterm labor we found that sonographically measured cervical length at the time of presentation helps distinguish between true and false labor<sup>3</sup>. Thus, delivery within 7 days of presentation occurred in 8% of the population, including 0.6% in those with cervical length of  $\geq 15$  mm and 37% in those with cervical length  $< 15$  mm. In the study, 19% of the population were of Afro-Caribbean origin and in this subgroup the incidence of delivery within 7 days was four times higher than in the Caucasian women in the study population.

The aim of the present study was to investigate further the potential role of sonographic measurement of cervical length in the prediction of early delivery in women with threatened preterm labor by examining a population at high risk of preterm delivery in South Africa.

## METHODS

This was a prospective, observational study of sonographic measurement of cervical length in women with singleton pregnancies presenting to the labor ward with

painful and regular uterine contractions at 24–36 weeks of gestation. Women in active labor, defined by the presence of cervical dilatation  $\geq 3$  cm, and those with ruptured membranes were excluded. The study was carried out at Tygerberg Hospital, Cape Town and Kalafong Hospital, Pretoria, South Africa. Written informed consent was obtained from those agreeing to take part in the study, which was approved by the research ethics committee of each hospital.

Transvaginal sonography was carried out by appropriately trained doctors as previously described<sup>4,5</sup>. Three measurements were obtained and the shortest, technically best measurement in the absence of uterine contractions was recorded. The management of the women, including hospitalization and administration of tocolytics, was determined by the attending obstetricians, who were not aware of the ultrasound findings.

The primary outcome measure was delivery within 7 days of presentation, rather than delivery before 37 weeks. This is because in the clinical management of patients with suspected preterm labor the primary aim of tocolytic administration is to achieve short-term delay in delivery for effective use of corticosteroids.

### Statistical analysis

The effect of maternal age, parity (nulliparous, parous), gestation at presentation, cigarette smoking (yes or no), body mass index, history of previous preterm delivery or second-trimester miscarriage (yes or no), use of antibiotics, frequency of uterine contractions (one, two or more contractions per 10 min), use of tocolytics (yes or no) and cervical length on delivery within 7 days of presentation was investigated using logistic regression analysis. Two-sided *P*-values are reported throughout.

### RESULTS

We recruited 63 women presenting with threatened preterm labor at a median gestation of 31 (range, 24–36) weeks. The median cervical length at presentation was 15 (range, 1–40) mm. The demographic characteristics of the women are given in Table 1. All patients were hospitalized, and the 40 (63%) women who presented at less than 34 weeks received tocolytics (nifedipine,  $n = 23$ ; nifedipine and indomethacin,  $n = 11$ ; nifedipine, indomethacin and hexoprenaline,  $n = 6$ ) and corticosteroids for fetal lung maturity.

Delivery within 7 days occurred in 20 of the 63 (32%) cases. In 33 cases the cervical length was  $\geq 15$  mm and none of these women delivered within 7 days. In the 30 women with cervical length  $< 15$  mm delivery within 7 days of presentation occurred in 20 (67%) cases, including 7/10 (70%) cases treated with tocolytics and 13/20 (65%) cases managed expectantly. The relation between cervical length at presentation and the rate of delivery within 7 days is shown in Figures 1 and 2. Regression analysis demonstrated that the only significant

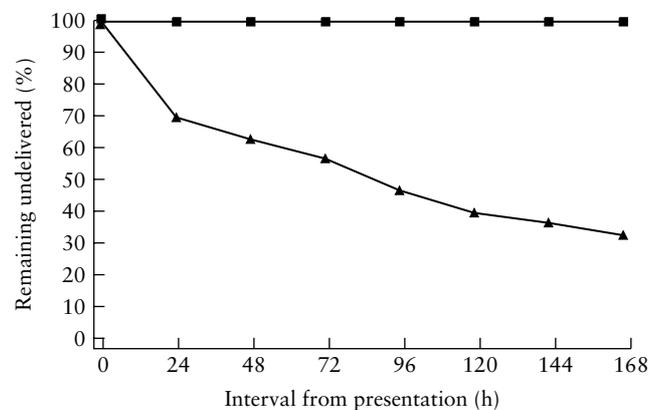
**Table 1** Logistic regression analysis for delivery within 7 days of presentation in the study population ( $n = 63$ )

| Variable                  | n (%) or median (range) | Odds ratio | 95% CI    | P     |
|---------------------------|-------------------------|------------|-----------|-------|
| Cervical length (mm)      | 15 (1–40)               | 0.67       | 0.54–0.85 | 0.001 |
| $\geq 15$                 | 33 (52%)                |            |           |       |
| $< 15$                    | 30 (48%)                |            |           |       |
| Maternal age (years)      | 24 (16–41)              | 1.07       | 0.98–1.15 | 0.095 |
| Gestational age (weeks)   | 31.3 (24–36)            | 1.15       | 0.96–1.37 | 0.127 |
| Body mass index           | 22 (14–32)              | 0.96       | 0.84–1.11 | 0.607 |
| Cigarette smoking         |                         |            |           | 0.492 |
| No                        | 37 (59%)                | 1.00       |           |       |
| Yes                       | 26 (41%)                | 0.68       | 0.22–2.04 |       |
| Parity                    |                         |            |           | 0.513 |
| Nulliparous               | 29 (46%)                | 1.00       |           |       |
| Parous                    | 34 (54%)                | 1.43       | 0.49–4.20 |       |
| Uterine contractions      |                         |            |           | 0.120 |
| One in 10 min             | 28 (44%)                | 1.00       |           |       |
| Two or more in 10 min     | 35 (56%)                | 2.44       | 0.79–7.55 |       |
| Use of tocolytics         |                         |            |           | 0.865 |
| No                        | 23 (37%)                | 1.00       |           |       |
| Yes                       | 40 (63%)                | 1.10       | 0.36–3.33 |       |
| Previous preterm delivery |                         |            |           | 0.504 |
| No                        | 47 (75%)                | 1.00       |           |       |
| Yes                       | 16 (25%)                | 0.64       | 0.17–2.32 |       |
| Use of antibiotics        |                         |            |           | 0.569 |
| No                        | 19 (30%)                | 1.00       |           |       |
| Yes                       | 44 (70%)                | 0.72       | 0.23–2.23 |       |

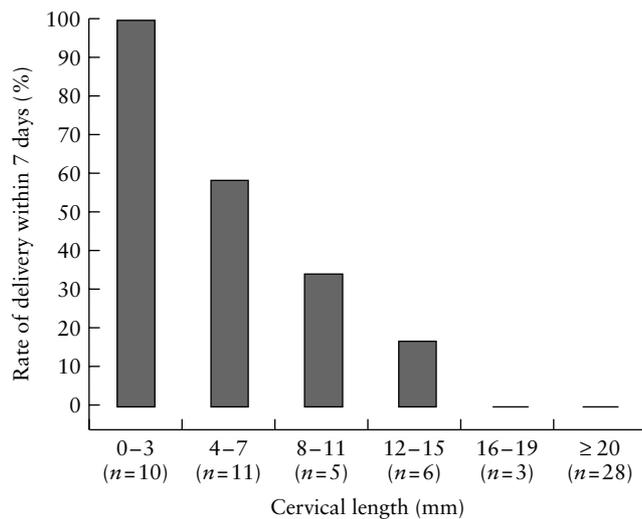
contributor in the prediction of delivery within 7 days was cervical length (Table 1).

### DISCUSSION

In this study of South African women with threatened preterm labor the rate of delivery within 7 days of presentation was substantially higher than in our previous study of women in the UK (32% vs. 8%)<sup>3</sup>. However, both studies showed that the only significant contributor in the prediction of delivery within 7 days was cervical length with no significant contribution from maternal age, gestational age, body mass index, parity, use of antibiotics,



**Figure 1** Survival curves for women according to cervical length at presentation (■, cervical length  $\geq 15$  mm; ▲, cervical length  $< 15$  mm).



**Figure 2** Rate of delivery within 7 days according to cervical length at presentation.

previous history of preterm delivery, cigarette smoking, contraction frequency or use of tocolytics. Furthermore, the rate of early delivery in South Africa was identical to that in the subgroup of women of Afro-Caribbean origin in the UK study, which was four times higher than in the Caucasian women in the study population.

The rate of early delivery was inversely related to cervical length, being 0% in those presenting with cervical length  $\geq 15$  mm and 100% for cervical length of 0–3 mm. Population difference in the rate of early delivery in women with threatened preterm labor is reflected in the

incidence of short cervix at presentation. The findings of this study confirm that sonographic measurement of cervical length in women presenting in threatened preterm labor helps distinguish between those that are likely to deliver within 7 days from those that are not. Furthermore, the results suggest measurement of cervical length is equally effective in populations at high risk and those at low risk of early delivery.

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