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# Diagnosis of early preterm labour

Andreas Herbst\*, Christer Nilsson

*Department of Obstetrics and Gynaecology, Lund University Hospital, Sweden*

## ABSTRACT

While preterm contractions occur almost as often extremely preterm as they do closer to term, birth due to spontaneous preterm labour before 27 weeks' gestation is rare, accounting for 0.05–0.7% of all births in different populations. Although the likelihood that uterine contractions before 27 weeks' gestation represent true preterm labour is low, the risk of adverse outcome in such cases is high. A correct diagnosis is important and a useful diagnostic test should have a high sensitivity. In most reports, only 30–40% of women hospitalised for spontaneous preterm labour experience a preterm birth, suggesting a low positive predictive value of clinical diagnosis based on uterine contractions and vaginal examination. Transvaginal ultrasonographic scanning (TVUSS) of cervical length has shown a high sensitivity for preterm birth, 90–100% for preterm birth before 33–35 weeks, using a liberal cut-off at 30 mm. Assessment of cervico-vaginal fetal fibronectin (FFN) levels has shown a sensitivity of about 80%. Adding FFN assessment to TVUSS might contribute insignificantly to the prediction of preterm birth. In a retrospective study of 147 women with spontaneous preterm labour and intact membranes before 27 weeks in our Department, 61% of hospitalised women and 77% of women receiving tocolytic infusion therapy delivered before 32 weeks. Among 66 singleton pregnancies delivered before 32 weeks, at admission, 94% either had an effaced or  $\geq 2$  cm dilated cervix (74%), vaginal bleeding (61%), or serum C-reactive protein (s-CRP)  $>20$  (40%), whereas one of these findings only was present in 18% of women who delivered at later gestations. Among 132 women with symptoms of spontaneous preterm labour before 27 weeks not admitted for hospital care, only two (1.5%) delivered before 32 weeks, not significantly higher than for all other women (0.6%). Although TVUSS may be useful when the diagnosis of spontaneous preterm labour is in doubt, the main predicament in early spontaneous preterm labour may not be to predict preterm birth, but to prevent it, since many women appear in advanced labour or with manifest chorioamnionitis.

## INTRODUCTION

Spontaneous preterm labour is usually defined as labour before 37 completed weeks of gestation. It is at very early gestational ages that the consequences of preterm birth are often serious. This article will focus on very early preterm birth, particularly before 27 weeks' gestation, when mortality is considerable and morbidity expected.

## INCIDENCE OF EXTREMELY PRETERM LABOUR

Spontaneous preterm birth is a rare event in the early preterm period, though the rate varies between studies, due to different populations and classifications. In an American study, the rate of preterm birth before 27 weeks due to spontaneous preterm labour was 0.7% of all births (36% of these early births)<sup>1</sup>. In a population based study from northern Sweden, singleton preterm births due to spontaneous preterm labour represented 0.05% of all births and 20% of these early births<sup>2</sup>. In the latter study, preterm birth before 27 weeks was less often due to spontaneous preterm labour (RR 0.6; 95% CI 0.4–0.8), and more often due to preterm prelabour rupture of the membranes (PPROM) (RR 4.1; 95%CI 3.1–5.6), compared with in weeks 32–36<sup>2</sup>.

Despite the fact that uterine activity normally increases with advancing gestational age<sup>3</sup>, pregnant women frequently seek medical advice for preterm contractions at early gestation. As early preterm birth is rare, the likelihood that uterine contractions in the early preterm period represent true spontaneous preterm labour is low<sup>4</sup>. Since the risk of adverse outcome is high with true preterm labour, and decreases significantly with advancing gestational age<sup>2</sup>, corticosteroid treatment<sup>5</sup>, and referral to a perinatal centre<sup>6</sup>, a correct diagnosis of early preterm labour is important.

## SYMPTOMS OF SPONTANEOUS PRETERM LABOUR

The characteristics of uterine contractions and the presence of associated symptoms may provide clues as to whether preterm birth threatens. Regular painful uterine contractions of sudden onset are probably more likely to represent spontaneous preterm labour than a longer period of irregular contractions. In a study with prospective monitoring of uterine activity, women who went into spontaneous preterm labour had no measurable increase in uterine activity or subjective symptoms until the day labour started<sup>7</sup>. In other prospective studies a high uterine activity has been associated with later spontaneous preterm labour. A maximum evening contraction rate of > 4 per hour in weeks 22–28 was associated with a threefold risk of preterm birth before 35 gestational weeks<sup>8</sup>. In another study, >6 contractions per hour on one occasion in weeks 28–32 weeks identified 12 of 16 women who later gave birth preterm (sensitivity 75%)<sup>9</sup>. A sensitivity of 75% for predicting delivery within 6 days was also achieved using power density spectrum analysis of electromyographic activity during contractions in women with spontaneous preterm contractions<sup>10</sup>.

Uterine contractions are not the only symptom of impending spontaneous preterm birth. Women may present with menstrual cramps, backache, pelvic pressure, vaginal discharge, urinary frequency or diarrhea<sup>7,11</sup>. The presence of vaginal bleeding increases the risk of preterm birth<sup>12</sup>, and has been associated with intrauterine infection<sup>13</sup>.

## SIGNS OF SPONTANEOUS PRETERM LABOUR

An effaced or dilated cervix confirms the diagnosis of spontaneous preterm labour. McWeeney *et al.* assessed the risk of preterm birth in 3,496 women admitted for spontaneous preterm labour in relation to cervical dilation after stabilisation with tocolytic treatment<sup>14</sup>. At a cervical dilation of 0, 1, 2, 3, and 4 cm, the risk of preterm birth before 28 weeks was 2.5%, 4%, 17%, 29% and 75%, respectively. The estimated risk of preterm birth was higher the earlier in gestation a woman with a defined cervical dilatation was admitted (Figure 1)<sup>14</sup>.

Digital examination of the cervix may not be sufficient to rule out true spontaneous preterm labour, and additional diagnostic methods have been suggested. Considering the consequences of preterm birth, the sensitivity of such a test should be high, especially in early spontaneous preterm labour, and the positive predictive value (PPV) reasonable, so that a disproportionate number of women are not hospitalised. A few studies have compared the diagnostic value of digital and TVUSS assessment of the cervix in spontaneous preterm labour<sup>15–19</sup>. Iams *et al.* reported that a digital examination finding of dilatation  $\geq 2$  cm had a sensitivity of 62% in predicting preterm birth (PPV 40%), effacement  $\geq 50\%$  a sensitivity of 83% (PPV 48%), and cervical length < 30 mm using TVUSS, a sensitivity of 100% (PPV 55%)<sup>15</sup>. Onderglou *et al.* found that palpated dilatation >2 cm had a sensitivity of 66% (PPV 57%), effacement >40% a sensitivity of 62% (PPV 52%), and cervical length <29 mm at transperineal ultrasonography, a sensitivity of 78% (PPV 71%)<sup>16</sup>. In two other studies, the risk of preterm birth increased with high Bishop scores as well as with short cervical length on TVUSS, but the confidence intervals overlapped<sup>17,18</sup>, and in one report cervical length and funnelling were associated with preterm birth while digital assessment was not<sup>19</sup>.

## CERVICAL ASSESSMENT BY ULTRASONOGRAPHY

The inter-observer reliability for estimation of cervical length is higher for TVUSS than for digital assessment<sup>20</sup>. It provides additional information, since only the vaginal portion of the cervix is palpable when the cervix is closed, and dilation of the internal cervical os is difficult to detect by palpation. The mean cervical length decreases from about 40 mm at 20 gestational weeks to about 34 mm in week 34, with corresponding lower statistical limits ( $-2$  SD) of 29 mm and 20 mm, respectively<sup>21</sup>. A short cervix is a risk factor for preterm birth, and screening for cervical length in mid second trimester has been evaluated in high risk pregnancies, and as a population screening<sup>22</sup>. In a recent report including 39,284 women screened in gestational weeks 22–24, cervical length was normally distributed (mean 36 mm), and the risk of preterm birth before 32 weeks increased progressively with decreasing cervical length below 16 mm<sup>23</sup>. About half of these early deliveries could be predicted by TVUSS alone when a false positive rate of 5–10% was accepted. A dilation of the internal cervical os, “funnelling”, is usually reflected by a decreased cervical length, but may be an additional independent risk factor for early preterm birth<sup>24,25</sup>, as may a minor cervical canal dilation (2–4 mm)<sup>26</sup>.

Table 1 presents studies of cervical length in women with spontaneous preterm labour<sup>15-19,27-41</sup>. With 30–32 mm as cut-off, the sensitivity was 81–100% for predicting delivery before 36–37 gestational weeks and 88–100% for preterm birth before 34–35 weeks, with positive predictive values of 54–69% and 20–64%, respectively. Most studies excluded women with a cervical dilation  $\geq 3$  cm, since further diagnostic procedures were considered unnecessary in these cases. Some studies only included women with cervical shortening or dilation,<sup>15-19,28,29,31,32</sup> eliminating the possibility of identifying cases of possible preterm birth without palpable changes. Two trials only included women after successful tocolysis,<sup>15,28</sup> which might be considered too late to evaluate a diagnostic test, and one study excluded birth within 24 hours<sup>30</sup>. Although no study specifically assessed very early spontaneous preterm labour, some of the studies using 30–32 mm as a cut-off assessed patients admitted before 34 or 35 gestational weeks<sup>29,31,32,34</sup>, and one study presented a sub-analysis of spontaneous preterm labour before 32 weeks' gestation<sup>33</sup>. The sensitivity for predicting preterm birth (81–100%) was similar to studies that included spontaneous preterm labour at later gestations.

Cervical length is usually assessed between contractions but measurement of cervical length during a uterine contraction may be at least as good a predictor of preterm birth as measurement of the length at rest<sup>42</sup>. Funnelling has also been evaluated as predictor of preterm birth in women with spontaneous preterm labour, with a reported sensitivity of 77–100%<sup>9,43</sup>. Other authors have concluded that funnelling is not an independent predictor of preterm birth in spontaneous preterm labour<sup>29,31</sup>.

## LABORATORY TESTS

An elevated white blood cell count and serum levels of C-reactive protein (CRP) have been associated with preterm birth in women in spontaneously preterm labour<sup>12,44,45</sup>. A CRP level of 15 mg/L represented the 90<sup>th</sup> percentile in a pregnant population<sup>46</sup>. An elevated CRP in early pregnancy has also been associated with later preterm birth<sup>47</sup>. A high CRP may reflect infection, but also labour, since CRP also rises during labour without signs of infection<sup>48,49</sup>.

Fetal fibronectin (FFN) is a glycoprotein found in high concentrations in the placenta and amniotic fluid. FFN is detectable in the cervico-vaginal secretion in about 4% of pregnant women after 20 gestational weeks, possibly reflecting transudation of amniotic fluid or disruption of the chorio-decidual interface<sup>50</sup>. Honest *et al.* conducted a meta-analysis of the predictive value of FFN for preterm birth in women in spontaneous preterm labour<sup>51</sup>. In eight studies, the sensitivity to predict preterm birth before 34 weeks ranged from 21–94% (median 80%), whereas the PPV ranged from 12–79% (median 48%). The sensitivity was higher at 50–100% (median 86%) for birth within 7–10 days (17 studies).

Elevated levels of interleukin 6 (IL-6) in the amniotic fluid and in cervical secretion have been shown to predict preterm birth in women in spontaneous preterm labour<sup>50,52</sup>. In one study, a cervical IL-6 level above 20 pg/mL had a sensitivity of 100% (PPV 47%) for predicting birth before 34 weeks<sup>52</sup>. Elevated levels of IL-6 in cervical fluid has been associated with intraamniotic inflammation<sup>53</sup>, but also with term and spontaneous preterm labour without signs of infection<sup>49</sup>.

## TVUSS COMBINED WITH FFN

The potential to improve the diagnosis of spontaneous preterm labour by combining TVUSS with the assessment of cervicovaginal FFN has been evaluated.<sup>17,31,33,34,35,38,53</sup> Hincz *et al.* reported a sensitivity of 86% (PPV 63%) for birth within 4 weeks of either a cervical length  $< 21$  mm or a cervical length of 21–30 mm + FFN  $> 50$  ng/mL<sup>31</sup>. Gomez *et al.* reported a sensitivity of 89% (PPV 30%) for spontaneous preterm labour and preterm birth before 32 weeks with a cervical length  $< 15$  mm, or FFN  $> 50$  ng/mL<sup>33</sup>. Schmitz *et al.* reported a sensitivity of 90% (PPV 20%) for preterm birth before 35 weeks for a cervical length  $\leq 15$  mm or a length of 16–30 mm + FFN  $> 50$  ng/mL.<sup>34</sup> While some authors found that the combination improved the diagnostic efficiency over TVUSS<sup>17,38</sup>, others found TVUSS alone to be equally efficient<sup>35,53</sup>.

## LABOUR BEFORE 27 GESTATIONAL WEEKS: A HOSPITAL-BASED STUDY

In most reports, only 30–40% of women hospitalised for spontaneous preterm labour experience preterm birth (Table 1), suggesting a low PPV of the clinical diagnosis. Few studies have specifically focused on very early spontaneous preterm labour, the period when a correct diagnosis matters most. A retrospective study was undertaken to assess the rate of preterm birth in women treated for spontaneous preterm labour before 27 weeks' gestation, and to study the associations between symptoms and signs at admission and very early preterm birth.

### METHODS

The study included all women admitted to Lund University Hospital for spontaneous preterm labour with intact membranes at admission, between January 2000 and August 2005. The hospital is a referral unit for Southern Sweden, an area with approximately 16,000 deliveries each year. During the study period, cervical assessment by TVUSS was optional, but not mandatory, for a diagnosis of spontaneous preterm labour; FFN was not measured. The medical files were assessed for all in-patients with a diagnosis of spontaneous preterm contractions or threatened spontaneous preterm labour (ICD-10: O47) or PPROM (ICD-10: O42). Only women with intact membranes at admission were included. Recorded data included symptoms and findings at admission, tocolytic and other medical treatment, complications, latency period from admission to delivery, and gestational age at birth. For statistical comparisons, Fisher's exact test was used for categorical variables and Mann-Whitney test for continuous variables.

### RESULTS

In total, 222 women received hospital care for spontaneous preterm labour before 27 weeks' gestation during the study period; 149 (67%) with intact membranes at admission. The median gestational age at admission was 24+4 weeks. Two women were discharged undelivered and could not be traced. Of the remaining 147 women, 110 (75%) delivered preterm; 90 (61%) before 32 weeks and 20 (14%) between 32 and 36 weeks. Of 32 multiple pregnancies, 24 delivered before 32 weeks and eight in weeks 33–36.

Of 115 singleton pregnancies, 66 (57%) were delivered before 32 weeks (all before 30 weeks) spontaneously or due to complications associated with spontaneous preterm labour (chorioamnionitis, abruption). Thirteen women (11%) delivered preterm after 32 weeks (all after 33 weeks), and 36 (31%) gave birth at term.

Of the 115 singleton pregnancies with intact membranes, 65 had contractions requiring tocolytic infusion therapy with atosiban ( $n=52$ ), terbutaline ( $n=11$ ) or both ( $n=2$ ). Of these women, 50 (77%) delivered before 32 weeks, six gave birth in weeks 33–36 and nine at term. The median latency period from admission to delivery for those receiving tocolytic treatment and being delivered before 32 weeks ("true spontaneous preterm labour") was 5 days (range 0–32). For 34 women, tocolytic infusion therapy was considered unnecessary, and none of them delivered before 32 weeks. They had a short median hospital stay of 2 days. In 14 cases tocolysis was considered contraindicated due to suspected chorioamnionitis, abruption or both, and two cases were considered too late to treat. These 16 women all delivered before 32 weeks.

The symptoms, signs, and CRP-level at admission in relation to the rate of early preterm birth are presented in Table 2. Among 66 women delivered before 32 weeks, 62 (94%) had an effaced or  $\geq 2$  cm dilated cervix or bulging membranes (74%), vaginal bleeding (61%), or a CRP-level above 20 (40%), whereas one of these findings was present in 18% of women who delivered later. The four women without any of these signs who delivered before 32 weeks all had a cervical length on TVUSS below 20 mm (range 10–18 mm).

## **PRETERM CONTRACTIONS BEFORE 27 WEEKS' GESTATION: A POPULATION-BASED STUDY**

A second study was undertaken to evaluate if there was an under-diagnosis of early spontaneous preterm labour which could indicate the necessity for additional diagnostic methods. In the area studied, routine pregnancy care was provided by midwives at antenatal clinics. During office hours women with complaints could present to these units and were sent to the hospital if an obstetric opinion was required. Women with acute symptoms could also present directly at the hospital, which was the only option during non-office hours.

### **METHODS**

The rate of spontaneous preterm birth (starting with spontaneous preterm labour or PPROM), during June 2001 to August 2005 at Lund University Hospital was assessed for women living in the primary uptake area, and was compared for women with and without registered outpatient visits for preterm contractions during January 2001 to August 2005. The medical files of women with registered outpatient visits or hospital care for spontaneous preterm labour during gestational weeks 22–27 were analysed. For patients with more than one visit, only the first visit was considered. Fisher's exact test was used to analyse differences between groups.

### **RESULTS**

Preterm birth before 37, 32 and 27 gestational weeks occurred in 6.7%, 0.95% and 0.24% of the population, and spontaneous preterm birth in 4.6%, 0.54% and 0.12%, respectively. The rates of spontaneous preterm birth for women with and without previous visits for preterm contractions are shown in Table 3.

In total, 503 of 11,406 women (4.4%) had registered outpatient hospital visits for preterm contractions. The rate of spontaneous preterm birth among these women was low (7.6%), and only significantly increased among those with a first visit in the late preterm period. Only four (1.3%) of 306 women with previous outpatient visits for preterm contractions delivered spontaneously before 32 weeks, a rate not significantly higher than for other women. Only 7.2% of women with spontaneous preterm birth had a previous outpatient visit for preterm contractions.

Spontaneous preterm labour between 22 and 26 gestational weeks was studied more closely. In this gestational period, 33 women had been admitted for hospital care due to spontaneous preterm labour, and 132 women had outpatient visits with a diagnosis of preterm contractions, but were sent home. In three of 132 outpatient visits the diagnosis of preterm contractions had been given without documented symptoms. In nine cases the files were missing or contained no information about the visit. Six women had received hospital care for spontaneous preterm labour before the outpatient visit. Among the remaining 113 outpatient women with documented symptoms, 93 came for current contractions (two also had bleeding, one vaginal discharge, five a sense of vaginal pressure, and one symptoms of cystitis), and six came for other reasons but reported contractions as well. The main reason for 14 visits was an appeal for sick-leave from work due to contractions.

Among the 113 women with verified outpatient visits for preterm contractions, a digital vaginal examination was performed in 70 (62%); the cervix was assessed to be  $\geq 2$  cm long or unaffected in 67, and to be closed or open for less than 1.5 cm in all. In nine women (8%) only a speculum examination was done, and the cervix was considered to be unchanged in all women. Cervical length was measured by TVUSS in 12 women (11%), and was  $< 20$  mm in one, and 20–29 mm in two. In 26 patients (including the 14 sick-leave cases) no examination was performed.

Of the 113 outpatients, 15 (13%) delivered preterm (eight spontaneously). Only two delivered before 32 weeks, one classified as a spontaneous preterm birth, since the woman had contractions and PPROM before being delivered by Caesarean section for placental abruption.

Of the 33 women admitted for hospital care at the first visit, 18 (55%) delivered preterm (12 spontaneously); 11 before 32 weeks (eight spontaneously). Only seven women received tocolytic infusion therapy, six of whom delivered preterm, all before 32 weeks (five spontaneously).



## CONCLUSIONS

In the very preterm period, most cases of true spontaneous preterm labour may be identified by vaginal bleeding or a dilated cervix on vaginal examination. A high maternal serum CRP level, often reflecting chorioamnionitis, is also common, and should induce hospital admission. In doubtful cases, measurement of the cervical length by TVUSS is a useful adjunct. If cervical length is more than 30 mm, preterm birth is so unlikely that it is reasonable to send the patient home, provided no other signs of complications are present. It is doubtful whether additional predictive markers for preterm birth are needed in symptomatic women. In contrast, a problem in early spontaneous preterm labour is that many women appear in advanced labour or with manifest chorioamnionitis. In order to decrease the rate of very early preterm birth, we must direct our attention to the possibility of screening and to preventative measures.

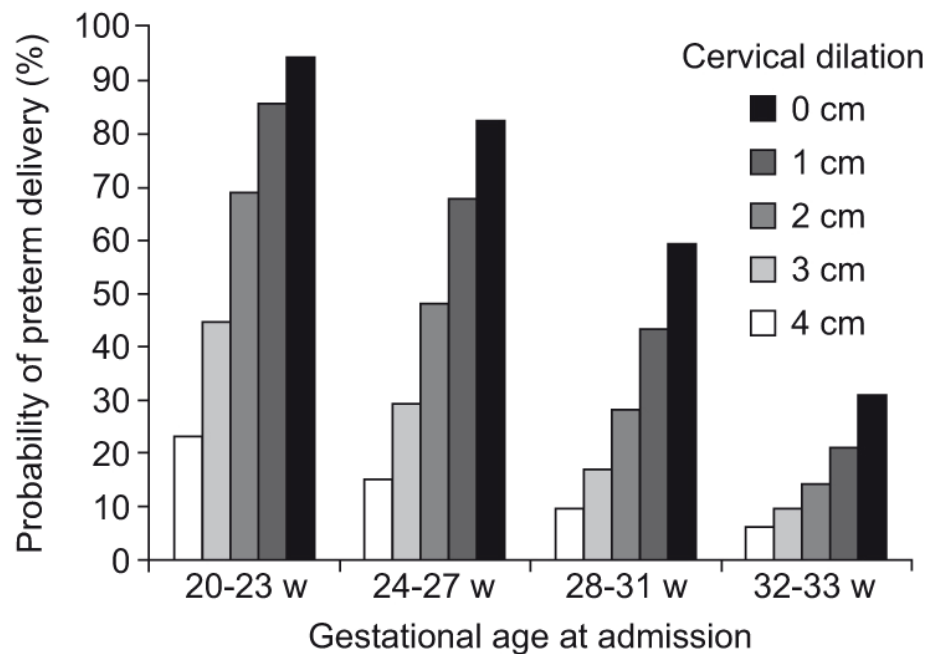
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**Figure 1.** Probability of preterm delivery before 35 weeks in women hospitalised for preterm labour, according to gestational age at admission and cervical dilation after stabilisation, estimated by logistic regression (adapted from McWeeney *et al.* 2006<sup>14</sup>).



**Table 1.** Studies of cervical length measured by transvaginal or transperineal (Önderglou *et al.*<sup>16</sup>) ultrasonography to predict preterm birth in women hospitalised for preterm labour. Only the originally presented cut-off level with the highest sensitivity is presented here. None of the studies included women with ruptured membranes

<u>Authors, year of publication, ref</u>	<u>N</u>	<u>Cut-off below</u>	<u>Gest..age at inclusion</u>	<u>Main inclusion criteria*</u>	<u>Main exclusion criteria**</u>	<u>Ourcome (birth or spont. birth)</u>	<u>Outcome rate</u>	<u>Sensi-tivity</u>	<u>NPV</u>	<u>PPV</u>
Murakawa et al., 1993 <sup>27</sup>	32	30 mm	25-35	A,B		< 37 weeks	34%	100%	100%	65%
Iams et al., 1994 <sup>15</sup>	60	30 mm	24-35	B,C,D,E		<36 weeks	40%	100%	100%	69%
Crane et al., 1997 <sup>29</sup>	162	30 mm	23-33	B,C,D	F <sub>2</sub> ,G,H,I	< 37 weeks	33%	81%	90%	46%
Cetin et al., 1997 <sup>28</sup>	57	30 mm	26-35	A,B,C,D,E	F <sub>3</sub> ,H	recurrent PTL	43%	100%	100%	58%
Venditelli et al., 2000 <sup>30</sup>	200	30 mm	18-36	B	F <sub>2</sub> ,G,J	< 37 weeks	41%	83%	81%	54%
Hincz et al.,2002 <sup>31</sup>	82	32 mm	24-34	A,B,C	F <sub>2</sub> ,G,H	within 4 weeks	17%	100%	100%	28%
Daskalakis et al., 2005 <sup>32</sup>	172	30 mm	24-34	A,B,C,D	F <sub>2</sub> ,G	< 34 weeks	37%	100%	100%	64%
Gomez et al., 2005 <sup>33</sup>	215	30 mm	22-35	A,B	F <sub>2</sub>	< 36 weeks	16%	88%	96%	28%
subgroup week 22-31	101		22-32			< 33 weeks	9%	100%	100%	18%
Schmitz et al., 2006 <sup>34</sup>	359	31 mm	18-34	A,B	F <sub>2</sub> ,G,H	< 35 weeks	13%	90%	97%	20%
Önderglou et al., 1997 <sup>16</sup>	90	29 mm	25-36	A,B	F <sub>2</sub> ,H	< 37 weeks	36%	78%	87%	71%
Volumenie et al., 2004 <sup>18</sup>	59	28 mm	18-34	A,C	F <sub>2</sub> ,H	< 37 weeks	39%	70%	77%	55%
Rozenberg et al., 1997 <sup>35</sup>	76	27 mm	24-34	A,B,C	F <sub>1</sub> ,H	< 37 weeks	26%	75%	89%	50%
Tekesin et al., 2003 <sup>17</sup>	68	26 mm	20-35	A,B,C		< 37 weeks	41%	82%	83%	62%
Fuchs et al., 2004 <sup>36</sup>	87	26 mm	24-36	twins, B <sub>2</sub> .	F <sub>2</sub>	within 1 week	22%	100%	100%	29%
Tsoi et al., 2005 <sup>37</sup>	510	21 mm	24-34	A,B.	F <sub>2</sub>	< 35 weeks	15%	78%	95%	35%
Rizzo et al., 1996 <sup>38</sup>	108	21 mm	24-36	A,B	F <sub>2</sub>	<37 weeks	44%	68%	76%	71%
Gomez et al., 1994 <sup>19</sup>	59	19 mm	20-35	A,C	F <sub>2</sub>	<36 weeks	37%	73%	83%	67%
Fuchs et al., 2004 <sup>39</sup>	253	15 mm	24-35	A, B <sub>2</sub>	F <sub>2</sub>	within 1 week	8%	81%	98%	47%
subgroup weeks 24-31	162		24-31				7%	75%	98%	47%
Tsoi et al., 2003 <sup>40</sup>	216	15 mm	24-36	A, B <sub>2</sub>	F <sub>2</sub>	within 1 week	8%	94%	99%	37%
Tsoi et al., 2004 <sup>41</sup>	63	15 mm	24-36	A, B <sub>2</sub>	F <sub>2</sub>	within 1 week	32%	100%	100%	67%

**\* Inclusion criteria:**

A = Singletons only  
B = Regular contractions  
B<sub>2</sub> = Regular painful contractions  
C = Cervical affection at palpation  
D = Tocolytic treatment  
E = Successful tocolysis

**\*\* Exclusion criteria:**

F<sub>1</sub> = Cervical dilation ≥2 cm  
F<sub>2</sub> = Cervical dilation >3cm or ≥3 cm  
F<sub>3</sub> = Cervical dilation >5cm  
G = Vaginal bleeding  
H = Other main pregnancy complications  
I = Diagnosis PTL not in doubt  
J = Birth within 24h

**Table 2.** Symptoms and signs at admission in 115 women with singleton pregnancy hospitalised for threatened preterm birth before 27 weeks, in relation to gestational age at delivery.

	<b>Birth before 32 weeks <u>N=66</u></b>	<b>Birth after 32 weeks <u>N=49</u></b>	<b>P value</b>
<b>Background data and treatment</b>			
Primiparous, n (%)	33 (50%)	23 (47%)	
Previous preterm birth or late abortion, n (%)	17 (26%)	9 (18%)	
Hospital stay (before delivery), days, median (range)	4 (1-39)	2 (1-32)	p<0.01
Tocolytic infusion therapy n (%)	50 (76%)	15 (31%)	p<0.01
<b>Symptoms noted at admission, n (%)</b>			
Regular contractions	32 (48%)	22 (45%)	
Painful contractions	28 (42%)	13 (28%)	
Low abdominal pain or menstrual ache	21 (32 %)	23 (47%)	
Backache	8 (10%)	6 (18%)	
Vaginal bleeding	40 (61%)	6 (13%)	p<0.01
Vaginal discharge	14 (22%)	7 (15%)	
Fever	2 (3%)	0	
Duration of symptoms less than a day	34 (54%)	18 (39%)	
<b>Signs at admission, n (%)</b>			
<b><i>Palpation and speculum examination:</i></b>			
	<b><u>N=64</u></b>	<b><u>N=49</u></b>	
Effaced cervix	42 (66%)	3 (6%)	p<0.01
Cervical dilation $\geq 2$ cm	41 (64%)	0	p<0.01
Bulging membranes	41 (64%)	2 (4%)	p<0.01
Presenting part on pelvic floor	2 (3%)	0	
<b><i>Ultrasonography:</i></b>			
	<b><u>N=24</u></b>	<b><u>N=21</u></b>	
Cervical length <5 mm	11 (46%)	0	p<0.01
5-20 mm	6 (25%)	4 (19%)	
20-29 mm	4 (17%)	2 (10%)	
$\geq 30$ mm	3 (12%)	15 (71%)	p<0.01
<b><i>C-reactive protein (CRP):</i></b>			
	<b><u>N=65</u></b>	<b><u>N=47</u></b>	
<10 mg/L	14 (22%)	31 (66%)	p<0.01
10-14 mg/L	9 (14%)	7 (15%)	
15-19 mg/L	7 (11%)	3 (6%)	
>20 mg/L	26 (40%)	1 (2%)	p<0.01

**Table 3.** Rates of spontaneous preterm birth (after spontaneous labour or rupture of the membranes) in women living in the primary uptake area delivered at Lund University Hospital between June 1<sup>st</sup> 2001 and August 31<sup>st</sup> 2005, with and without registered outpatient visits for preterm labour during January 1<sup>st</sup> 2001 and August 31<sup>st</sup> 2005.

	All N=11,406	No visit N=10,898	Any visit be- fore 37 weeks N=503	Visit before 22 weeks N=43	Visit during week 22-26 N=132	Visit during week 27-31 N=133	Visit during week 32-36 N=197
Spontaneous birth before 37 weeks <i>P (compared to patients with no visit)</i>	525 (4.6%)	487 (4.5%)	38 (7.6%) <i>0.001</i>	2 (4.7%) <i>0.95</i>	10 (7.6%) <i>0.09</i>	9 (6.8%) <i>0.22</i>	17 (8.6%) <i>0.005</i>
Spontaneous birth before 32 weeks <i>P (compared to patients with no visit)</i>	62 (0.54%)	59 (0.5%)	3 (0.6%) <i>0.87</i>	0 -	1 (0.8%) -	2 (1.5%) -	- -
Spontaneous birth before 27 weeks <i>P (compared to patients with no visit)</i>	14 (0.12%)	13 (0.1%)	1 (0.2%) <i>0.62</i>	0 -	1 (0.8%) -	- -	- -