

Does Sweeping of Membranes in Nulliparous Women Reduce the Need for Formal Induction of Labor?

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Objective: To evaluate the effectiveness of sweeping of the membranes in nulliparous women to reduce the need for a formal induction of labor. **Design:** A randomized controlled clinical trial. **Place and duration of study:** The study was conducted in the Gynae unit 1 of Jinnah Hospital Complex, Lahore, from April 2001 to March 2003. **Patients and methods:** 100 nulliparous women attending the antenatal clinic at 39 weeks of gestation were randomly allocated for the study. 50 women were randomized to sweeping of membranes and 50 to control group. Their outcome measures in terms of proportion of women achieving spontaneous labor, duration of labor and bishop score at the time of admission to the hospital were assessed. **Results:** Spontaneous labor occurred more often in the sweeping of the membranes group than in the control group (38/50 (76%) vs. 19/50 (38%) $P = 0.002$). In addition a greater proportion of women in the sweeping group had a cervical dilatation of 4 cm or more at the first vaginal examination in the labor ward (25/50 (49%) vs. 8/50 (16%) $P = 0.005$). Women allocated to sweeping showed a trend towards having a shorter randomization-delivery interval: 9.4 days vs. 10.6 days in the controls $P = 0.087$. The need for induction of labor was significantly reduced in those women who underwent sweeping (11% vs 26% $P = 0.004$). **Conclusion:** Sweeping of membranes in nulliparous women at 39 weeks of gestation significantly decreases the number that will reach 41 weeks of gestation.

Key words: Induction of labor, sweeping of membranes, nulliparous women

Induction of labor by different methods for various indications is an old procedure carried out through out the world in the labor rooms. The first induction of labor was carried out by artificial rupture of membranes by Denman in 1793. This was then followed by evolution of other methods of inducing labor, both physical and pharmacological.

One of the commonest indication of induction of labor is post term pregnancy. The incidence and prevalence of prolonged/post term pregnancy is higher in the primigravidas than in the multigravida. About 66% of primigravidas deliver beyond their expected date of delivery if they enter into term with an unripe cervix¹. Approximately 3% to 12% of the births will occur beyond 41 completed weeks and will be labeled as post term. It is the degree of ripeness of cervix at term which would predict the likelihood of the pregnancy proceeding beyond term.² Several clinical trials have been carried out in which labor was induced in primigravidas by amniotomy and intravenous oxytocin regardless of the condition of the cervix³. Results revealed unacceptably high rates of prolonged labor, caesarian section, maternal pyrexia and depressed neonatal apgar score in subjects with poor bishop score⁴.

Further more all currently available methods of cervical ripening, though reasonable efficient, have documented side effects⁵. Sweeping of membranes is a relatively noninvasive technique which could be performed in situations where the indication to induce labor is not urgent⁶. The goal of intervention is to avoid more formal methods of labor induction. Separation of inferior pole of membranes from lower uterine segments was shown to increase the release of prostaglandin F₂ alpha metabolites, the activity of the phospholipase A₂,

and the frequency of uterine contractions^{7,8}. Several randomized controlled trials have evaluated sweeping of the membranes as a method to promote labor^{9,10}. The results of most of these studies suggest that the procedure is effective in shortening the pregnancy^{11,12}. However there have been concerns about women's discomfort during the procedure and a slight increase in the incidence of premature rupture of membranes. These issues need to be further addressed before recommendations can be made regarding this intervention^{13,14}.

The main aim of my study was to evaluate the effectiveness of sweeping of membranes as a means of reducing significantly the number of women reaching 41 weeks, in order to avoid difficult discussions about formal induction of labor.

Methods: This randomized controlled trial was conducted in the gynae unit 1 of Jinnah hospital complex, Lahore between April 2001 to March 2002. A total of 100 patients attending the antenatal clinic were randomly allocated to undergo sweeping of membranes or to act as control. In the antenatal clinic the gestational age was calculated from the last menstrual period and an ultrasound examination carried out in the middle trimester. Women presenting with placenta praevia, abnormal cervical discharge, or contraindication to vaginal delivery were excluded.

After carrying out routine antenatal examination the patient was placed in lithotomic position. Clean examination gloves were used, lubricated with chlorhexidine. Examination began with assessment of bishop score, followed by intervention. Digital separation of 2-3 cm of membranes from the lower uterine segment was performed separating as much of the membranes from the lower segment as was easily possible. The finger was rotated at least twice through 360 degrees. If the cervix

would not admit a finger, it was stretched digitally until membrane sweeping could be carried out. A tightly closed cervix was vigorously massaged and encouraged to release prostaglandins. Women who underwent sweeping were told that spotting or blood stained cervical mucus might appear. Women allocated to act as controls did not have any form of vaginal examination. These patients had with them the Performa filled, and were followed till delivery. The time from first examination to delivery, week of gestation at birth, cervical score when patient came in labor, need for induction, chorioamnionitis, mode of delivery and outcome of induction were noted for all the patients. Likewise fetal and maternal outcomes were recorded. The results were compared between the two groups. The chi-square test was used to analyze the results of study. A P- value 0.05 was considered significant. Categorical outcomes in the two groups were compared by odds ratios (OR) and 95% confidence intervals (CI).

The main end point of the trial was the proportion of women in each group who went into spontaneous labor (and therefore did not require induction by more elaborate methods). Spontaneous labor was defined as self-admission of the subject to the hospital with painful regular contractions occurring twice in 10 min or more often. A cervical dilatation of 4cm or more on entry to the labor ward was considered arbitrarily to indicate the active phase of labor in women who were admitted in labor or imminent active phase in those admitted for formal induction of labor. Post-term pregnancy was defined as gestational age > 287 days when formal induction of labor was scheduled. To avoid ambiguity, the definition of 'induction of labor' was as follows: administration of oxytocin, or prostaglandins, or amniotomy performed when contractions were either absent, irregular or less frequent than every five minutes, or when regular contractions were noted, but with a cervical dilatation of <4cm and, 4 hours of observation in the maternity ward.

Results:

During the 12-month trial 50 patients were randomized to sweeping and 50 to act as control. Sweeping of membranes was possible in 38 women where as in 4 women the digital stretching was done. In 8 women the cervix was so unfavorable that only cervical message could be carried out. Primary outcome of the trial was reduction in need for formal induction of labor in swept group. Table 1 shows the outcome of the trial.

More women randomized to sweeping went into spontaneous labor than in the control group. (38/50 76% vs.19/50(37%) OR 4.65; 95% CI 1.75 to 12.31; P= 0.002). 33out of 38 women (89%) who underwent sweeping of the membranes went into labor spontaneously, compared with 1of the 8(17%) who had cervical massage. Of the 38 women in the sweeping group who achieved spontaneous labor, 31(84%) went into labor within 72 h. All the women who had a cervical dilatation of 4 cm or more on entry to the labor ward were in labor. More women randomized to sweeping had a cervical dilatation of 4 cm or more than in the control group. 25/50 (48% vs. 8/50 (16%); OR 4.39; 95% CI 1.56 to 12.32; P=0.005). The type of analgesia in labor and outcome of labor was similar in both groups. Neonatal outcome was also comparable.

A significant finding of the trial was a reduced rate of abdominal deliveries in the swiped group as compared to the control group. 9/50 (18%) vs. 18/50 (36%). There was a slight increase in the occurrence of spontaneous rupture of membranes before admission to the labor ward in the swiped group. Women assigned to sweeping were admitted with a slightly more favorable cervix than those in the control group. This might be attributed to the significantly lower rate of induction in the group that underwent sweeping of membranes. In the swiped group, a trend towards a shorter interval between randomization and delivery was noticed. However, significantly more women allocated to the control group exceeded 287 gestational days.

Table 1

	Sweeping (n = 50)	Control (n = 50)	Odds ratio	95% CI	P
Labor.					
Spontaneous labour	38 (76%)	19 (38%)	4.65	1.75, 12.31	0.002
Cervix > 4cm at 1 st examination	25 (49%)	8 (16%)	4.39	1.56, 12.32	0.005
Delay from randomization to labor onset(h)	76.5	95.1			0.01
Duration of labor(h)	8.7	8.8			0.90
Mode of delivery					
Caesarian section	7 (15%)	6 (12%)	1.24	0.31, 5.03	0.76
Forceps	3 (6%)	5 (10%)	0.63	0.10, 3.86	0.62
Spontaneous vaginal	40 (79%)	39 (78%)	1.04	0.32, 3.36	0.95
PROM	6	6			0.37
Maternal infection					
Pyrexia	0	6 (12%)	0.12	0.02, 0.88	0.04
Antibiotics.	0	6 (12%)	0.12	0.02, 0.88	0.04
Neonatal outcomes (Apgar score, < 6)					
1 min.	3 (6%)	38 (19%)	0.31	0.07, 1.37	0.12
5 min.	1 (2%)	6 (3%)	0.97	0.06, 15.84	0.98

Discussion:

The main objective of this study was to evaluate the effectiveness of sweeping of the amniotic membranes in pregnant women to avoid more formal interventions, and allowing the women to go into spontaneous labor at term. This trial shows that sweeping of the membranes is an effective method of induction of labor in primigravidas/nulliparous women. This study was confined to the nulliparous women only since these women had never been through a process of labor before; their cervix mostly remain unripe till term and they tend to enter into term with poor cervical bishop score. In some primigravidas there is no cervical effacement at all at term and an unripe cervix indicates that labor is not imminent. Studies and trials have shown that more than 60% of these women with an unripe cervix at 41 weeks of gestation will remain undelivered 7 days later¹⁵.

Comparison of outcomes in uncomplicated term and post term pregnancies following spontaneous labor has revealed that caesarean section is significantly more common in women with post term pregnancy; either due to fetal distress or failure to progress¹⁶. Also in post term primigravidas, the frequency of prolonged labor is significantly higher than those who deliver at 39 weeks¹⁷.

Currently the most common reason for induction is prolonged pregnancy, as obstetrician and midwives are concerned about the risks of post maturity.

Sweeping of membranes is now emerging as an effective, non invasive procedure of promoting the cervical ripening, thereby helping the women enter into term with a favorable cervical score with more chances of their going into spontaneous labor.

A number of trials have confirmed the effect of sweeping of the membranes at term on the outcome of pregnancy^{17,18}. The differences in the women recruited and in the methods, as well as the outcome measurements, make comparison difficult. In my study not only did more women (three quarters) in the sweeping group achieved spontaneous labour, substantially more (nearly half) were admitted to the labour ward in the active phase of labour. Membrane sweeping for induction was abandoned by Swann (1958) because of apprehension of possible introduction of infection into the extra-amniotic space that could cause chorio-amnionitis. In our trial 4 women developed pyrexia in labor or puerperium, all of whom received antibiotics for actual or supposed infection and all these women were in the control group. The study however is too small to make any definitive statements on any resulting risk of chorio-amnionitis.

In conclusion, this trial shows that sweeping of the membranes in women with prolonged pregnancy is an effective method of inducing labor, without apparent harm to mother or baby. Timing of sweeping of membranes and the number of sweeps performed may be important. Future trials should aim at elucidating the optimum gestational age at which sweeping of the membranes should start.

Another goal for future research is to determine whether the benefits in this trial of sweeping of the membranes are general; only then will it be possible to compare the effects of sweeping with the hazards of prolonged pregnancy.

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