

Effect of Membrane Sweeping at Term Pregnancy on Duration of Pregnancy and Labor Induction: A Randomized Trial

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Key Words

Membrane sweeping · Labor induction · Postterm pregnancy

Abstract

Aim: To evaluate the efficacy of sweeping of fetal membranes for induction of labor in uncomplicated term pregnancies. **Methods:** A randomized controlled trial was performed in 122 pregnant women beyond 39 weeks of gestation with no complications. The women were assigned to have their membranes swept or not (controls) for labor induction. The main outcome measures included duration of pregnancy and possible complications of sweeping of membranes, including rupture of membranes, postpartum infections, and vaginal bleeding. **Results:** Twenty-one patients did not give birth in our hospital and were, therefore, excluded from the study; 101 women completed the study (51 patients in the control group and 50 women in the study group). There were no statistically significant differences in maternal age, parity, birth weight, and Bishop score in the two groups. The mean interval between sweeping (stripping) and vaginal examination until delivery was $7.7 \pm$ (SD) 6.9 and $7.1 \pm$ 5.6 days in the sweeping and in the control group, respectively ($p = 0.61$). Of the 101 pregnant women, only 6 patients had premature rupture of membranes (2 in the

sweeping group and 4 in the control group). There were no statistically significant differences between these individuals ($p = 0.68$). Significant vaginal bleeding was not observed in the two groups. Meconium-stained amniotic fluid was seen in 13 women: 8 in the sweeping group and 5 in the control group. There were no statistically significant differences among the women who had meconium-stained fluid in case and control groups ($p = 0.39$). There were no differences between women who had puerperal fever (3 in the sweeping group and 2 in the control group; $p = 0.68$). 12 of the 101 women (6 in each group) had cesarean section performed, but there was no difference between the two groups. **Conclusion:** Sweeping of membranes at 39 weeks of gestation has no significant clinical effect on the duration of pregnancy.

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Introduction

Induction is an artificial initiation of labor before its spontaneous onset for the purpose of delivery of the fetoplacental unit. Labor induction is common in obstetric practice, and its rate varies from 9.5 to 33.7% of all pregnancies annually. If induction is indicated and the status of the cervix is unfavorable, methods for cervical ripening

may be used [1]. Sweeping of the membranes, also commonly named stripping of the membranes, is one of the nonpharmacological approaches to cervical ripening and labor induction [2]. This method causes an increase in the activities of phospholipase A₂, prostaglandin F₂α, platelet-activating factor, and cytokines as well as mechanical dilatation of the cervix which releases prostaglandins [1–4]. The membranes are stripped by inserting the clinician's finger into the internal cervical os. Then, the inferior pole of the membranes is detached from the lower uterine segment by a circular movement of the examining finger [5].

Although stripping of the amniotic membranes is commonly practiced to induce labor, several studies have yielded conflicting results regarding the efficacy of this method [6–11]. Therefore, it was decided to carry out this study to determine whether stripping of the fetal membranes is a safe and effective method for induction of labor in uncomplicated term pregnancies.

Patients and Methods

This study was conducted at the Akbarabadi Teaching Hospital in Tehran, Iran, after receiving approval from the Hospital Ethics Committee.

All women admitted in the outpatient obstetric clinic were evaluated for eligibility into this trial by the resident staff. Their evaluation included a thorough review of the obstetric history, current fetal status (continuous fetal monitoring and ultrasound, if indicated), and vaginal examination to determine the Bishop score [12].

The eligible women were then invited to participate in the study (total 152 women). Written informed consent was obtained from all participants. The following were the inclusion criteria for participation: gestational age of 39 weeks (with dates determined on the basis of the last menstrual periods and ultrasound performed during the 1st trimester), singleton gestation, vertex presentations, and intact membranes. Women were excluded, if there was clinically significant vaginal bleeding, placenta previa, severe cervicitis, evidence of spontaneous labor (more than three painful contractions in 10 min), a known contraindication to labor induction (e.g., prior vertical uterine incision, acute fetal compromise, active herpes), systemic disorder, decreased fetal movements, any sign of fetal distress and any high-risk pregnancy, or inability to give informed consent.

One hundred and twenty-two women who fulfilled the inclusion criteria were randomly (four parts, block random using sealed, sequentially distributed envelopes to which the letters A, B, C, and D had been allocated: the letters A and C to the sweeping group and the letters B and D to the control group; the patients chose the envelopes which were opened by the investigator, and according to the letters, the group of patients was determined) divided into two groups: 60 women represented the study group (sweeping of membranes) and 62 women the control group (only vaginal examination

Table 1. Baseline characteristics of the study participants (mean ± SD)

	Control group (n = 51)	Sweeping group (n = 50)
Maternal age, years	25.4 ± 8.9	25.6 ± 9.4
Parity	1.8 ± 0.5	1.7 ± 0.4
Birth weight, g	2,965 ± 0.8	2,957 ± 0.8
Bishop score	7.2 ± 2.8	7.3 ± 2.6

for determining Bishop score). Twenty-one women who did not give birth in our hospital were excluded from the study. One hundred and one pregnant women completed this study: 51 women in the control group and 50 patients in the study group.

Sweeping was performed by one of the investigators, and vaginal examination also was performed by the same investigator for the control group. Sweeping was performed based on a standard method. As much of the membranes as possible was separated from the lower segment. If the cervix did not allow a finger, it was massaged for 2 min to stimulate prostaglandin release [5]. The women were observed for a few hours after the procedure and were discharged, if they were well. The patients were instructed to admit to the labor ward, if they had leaking, labor pain, or excessive vaginal bleeding.

Women were admitted to the labor ward whenever they had labor pain. In others, pregnancies were followed till 41 weeks, in case of lack of labor pain, induction was started to terminate labor. Follow-up of the patients was performed by another investigator who was blinded to the groups of patients; therefore, at this stage, neither the investigator nor the patients knew which was the study group.

Maternal age, parity, and gestational age were collected prospectively. Data regarding premature rupture of membranes, abnormal bleeding during hospitalization, Bishop score, timing of delivery, mode of delivery, and birth weight were collected.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS, Chicago, Ill., USA). Chi-square or Fisher's exact test was used to compare categorical variables, where appropriate. Unpaired Student's t test was used to compare the continuous variables with a normal distribution. $p < 0.05$ on two-tailed analyses was considered statistically significant.

Results

Finally, a total of 101 women completed the study (51 women in the control group and 50 patients in the study group). The characteristics of the patients of the two groups according to maternal age, parity, birth weight, and Bishop score are shown in table 1.

The mean time interval between sweeping (stripping) and vaginal examination till delivery was $7.7 \pm$ (SD) 6.9 and 7.1 ± 5.6 days in the sweeping and and in the control

Table 2. Pregnancy outcomes in control and study groups

	Control group (n = 51)	Sweeping group (n = 50)	p
Delivery interval, days \pm SD	7.1 \pm 5.6	7.7 \pm 6.9	0.61
Rapture of membranes (%)	4 (8)	2 (4)	0.68
Meconium-stained liquor (%)	5 (10)	8 (16)	0.39
Puerperal fever (%)	2 (4)	3 (6)	0.68

group, respectively ($p = 0.61$). Of the 101 pregnant women only 6 had premature rupture of membranes (2 in the sweeping group and 4 in the control group). There were no statistically significant differences between these individuals (Fisher's exact test $p = 0.68$). Significant vaginal bleeding was not observed in the two groups. Meconium-stained liquor was seen in 13 women: in 8 of the sweeping group and in 5 of the control group. There were no statistically significant differences between women who had meconium-stained liquor in case and control groups ($p = 0.39$; table 2).

There were no differences between women who had puerperal fever (3 women in the sweeping group and 2 women in the control group; $p = 0.68$). 12 (6 in each group) of the 101 women had cesarean section performed, but there was no difference between the two groups.

Discussion

There are contradictory results indicating that sweeping of membranes can reduce the duration of pregnancy [6–11, 13–16]. The results of the present study showed that this method had no effect on the duration of pregnancy and the prevention of postterm pregnancy.

Two meta-analyses [6, 7] have found that sweeping of membranes at term reduced the duration of pregnancy and the rate of postterm pregnancies (>41 weeks) and increased the rate of delivery by 2 and 7 days, respectively.

In agreement with the findings of the present study, other studies have shown that sweeping of the membranes is not associated with any increased risk of infection of mother or child, premature membrane rupture, or forceps procedures or cesarean section [8, 9].

McColgin et al. [17] also reported that multiple sweeping of membranes helped to reduce the duration of pregnancy and to prevent of postterm pregnancy (>42 weeks), particularly in nulliparous women, but sweeping of mem-

branes was not compared between nulliparous and multiparous women in our study, and it seems that this should be considered in forthcoming investigations.

Some studies [7, 18] have reported a more frequent occurrence of discomfort during the examination and minor side effects, including bleeding and uterine irritability in those women undergoing sweeping membranes. However, we did not find significant complications.

Weissberg and Spellacy [13] showed that stripping of membranes had a limited effect on labor. The study performed by Foong et al. [19] has shown that sweeping alone has no clinical effect on labor, but that using of this method plus oxytocin would be effective. Magann et al. [20] have also shown that daily stripping with using prostaglandin gel reduced the rate of postterm pregnancies (41 weeks).

Some reports [10, 11, 14] indicate that sweeping of membranes is an effective and safe method to reduce the incidence of postterm pregnancies. Poma [21] recommends that membrane stripping as compared with other mechanical and pharmacological methods for labor induction is less expensive. These studies concluded that although sweeping of membranes promotes the onset of labor, it does not seem to produce clinically important benefits with regard to maternal or neonatal outcomes when used as a method of labor induction.

Conclusions

The findings of our study have shown that sweeping of membrane has no significant clinical effect on the duration of pregnancy. There were also no significant complications reported in this study. When urgent induction is needed, sweeping of membranes is not the method of choice for induction of labor, but it can be used combined with other available methods. Based on the findings of the present and of previous studies, it is recommended to perform more trials with greater sample sizes to find out the ideal method for preventing of postterm pregnancies.

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