



Stripping of Fetal Membranes as a Method of Labor Induction in Term Pregnancy

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Abstract: Background: Stripping of membranes is a safe method to reduce the length of term in pregnancy and the incidence of prolonged gestation, it is performed to facilitate delivery and prevent complications of hard labor in both mother and her neonate. Objective: To assess the efficacy of stripping of foetal membranes as a simple non pharmacological method for induction of labor in term pregnancy. Patients and Methods: This prospective, randomized, control, clinical study was carried on 200 pregnant women came for antenatal care at the department of Obstetrics and Gynecology, Qous central Hospital. In the period from September 2020 to September 2021. Women were classified into 2 equal groups according to whether Stripping of fetal membranes was performed or not. Group A (stripping of membranes) and Group B (vaginal examination without stripping of membranes). Each group was followed up throughout the duration of delivery for assessment of mode of delivery and fetal score. Results: Compared to without stripping of membranes, the (stripping of membranes group was significantly higher in as regard onset of labor, first stage by hours and vaginal delivery (p-value 0.01, 0.02 and 0.01) respectively. Conclusion: In term pregnancies with spontaneous vaginal deliveries, stripping of membrane is safe method of labor induction, It result in rapid onset of labor, less time of first stage and less incidence of caesarian section.

[Mahmoud Ibrahim Almolakab Belrashidy, Khaled M. Abdallah, Hanaa Atia Mobarak Abdallah **Stripping of Fetal Membranes as a Method of Labor Induction in Term Pregnancy** *Nat Sci* 2021;19(10):10-15]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature> 2. doi:[10.7537/marsnsj191021.02](https://doi.org/10.7537/marsnsj191021.02).

Keywords: stripping of membrane, onset of labor, mode of delivery.

1. Introduction

Stripping of membranes is a safe procedure to reduce the length of term in pregnancy. Stripping the membranes not increases the risk of maternal or neonatal complications (1).

Stripping of membranes is the digital separation of the chorioamniotic membranes from the lower uterine segment, so, it leads to an increase local prostaglandin production (2).

Membrane sweeping is used to induce the normal physiological onset of labor by releasing localized PGF₂ α , phospholipase A₂ and cytokines from the intrauterine tissues (3).

The hormones act on the cervix to augment cervical ripening initiating uterine contractions. The stretching of the cervix initiate the Ferguson reflex by releasing oxytocin, so, increasing uterine activity (3).

Sweeping of membrane is to soften and ripen the cervix, increasing cervical favourability and promoting uterine activity, to stimulate spontaneous uterine contractions leading to the normal onset of labor and decrease induction of labor (2).

Membrane sweep, also known as membrane stripping, Hamilton maneuver, or "stretch and sweep". The procedure is done by a midwife or doctor as an internal vaginal examination, doctor puts a couple of lubricated, gloved fingers into the

women's vagina and inserts their index finger into the opening of the cervix (4).

Aim of the Work

The aim of this study was to assess the efficacy of stripping of foetal membranes as a simple non pharmacological method for induction of labor in term pregnancy

2. Patients and Methods

This observational, prospective, randomized, control, clinical study was carried on 200 pregnant women came for antenatal care at the department of Obstetrics and Gynecology, in Qous central Hospital.

Based on (foong et al., 2000) study which reported a nonsignificant increase in the spontaneous vaginal delivery rate from 75% to 85% with sweeping, sample size calculation using an α of 0.05 and β of 0.8 indicated that 270 women were needed in each group for an appropriately powered randomized study on the effect of membrane sweeping in conjunction with formal labor induction.

An ethical committee was consulted before the study began, and each patient selected for this study signed an informed consent form.

Full history taking:

All Patients which included in this study subjected to a full history taking (age, parity,

gestational age) general and local clinical examination (head station, Bishop score).

Type of the study:

Prospective randomized controlled clinical trial.

Inclusion criteria:

Pregnant women aged 20 - 35 years old, Para 1 or para 2, at a certain gestational age of 39-40 weeks, uncomplicated singleton pregnancy, stable cephalic presentation, normal foetal biophysical profile, no bad obstetric history, and no contraindications to expectant management until completed 41 weeks gestation.

Gestational age determined by reliable date from the first day last menstrual period or by ultrasonography before 12 weeks gestation.

Exclusion criteria:

Chronic maternal Disease with pregnancy like (diabetes, hypertension, kidney or liver diseases), cases of premature rupture of membranes or cases in labor, or both, non-reassuring foetal status (as absent foetal movements, or abnormal foetal heart rate and/or expected foetal growth restriction), known foetal abnormalities (including abnormal karyotype) that could influence perinatal outcome, contraindications to induction of labor (including previous uterine scar of caesarean section or myomectomy and malpresentation like breech) and contraindications to expectant management (like pregnancy induced hypertension or placenta praevia).

Procedures:

200 Women allocated to induction of labor were scheduled for the procedure at 39 - 40 weeks and followed up to 41 weeks+0 day, and classified in to two equal groups, each one include 100 women.

Group A undergo stripping of foetal membranes every other day and followed up for progression of labor up to 41 weeks gestation.

Group B undergo spontaneous delivery without any manipulations as a primary care.

Monitoring typically involved serial assessment of Bishop score and combination of cardiotocography, and sonographic assessment of amniotic fluid every other day.

Participants in our study underwent digital vaginal examination to determine the Bishop score which is used to assess the ripening of the cervix before planning of our procedure.

It rates position, consistency, length and dilatation of the cervix and engagement of the foetal head (station) in a single score.

Sweeping of the foetal membranes was optional. Participants were randomly allocated by a web based program (ALEA) using randomly permuted block sizes of 4 and 2, stratified by centre to induction of labor at 39 weeks up to 41 weeks +0 day.

Evaluation of onset of labor within 24 hours up to one week.

Measure of stages of labor by hours and evaluation of mode of delivery.

After labor evaluation of postpartum state of uterine contraction, postpartum haemorrhage.

Foetal weight, Apgar score in the first 5 minutes and NICU admission was evaluated for each fetus.

Owing to the nature of the intervention it was not possible to blind the women or caregivers to treatment allocation.

3. Results

Table (1): comparison between studied groups as regard age and BMI.

		Group A (N = 100)	Group B (N = 100)	T	P-value
Age (years)	Mean	28.22	27.52	0.98	0.967 NS
	±SD	5.946	6.3575		
BMI (kg/m ²)	Mean	2.16	2.20	0.960	0.850 NS
	±SD	0.650	0.6181		

T: Independent sample T test.

NS: P-value > 0.05 is considered non-significant.

Table (2): comparison between studied groups as regard Parity, Gestational age

		Group A (N = 100)	Group B (N = 100)	X ²	P-value
Parity	Nullipara	16 16%	15 15%	0.146	0.06
	Multipara	84 84%	85 85%		
Gestational age	39 W	46 (46%)	26 (26%)	0.996	0.732
	40 W	24 (24%)	62 (62%)	0.993	0.894
	41 W	30 (30%)	12 (12%)	0.984	0.658

X²: Chi-square test. S: p-value < 0.05 is considered significant. NS: p-value > 0.05 is considered non-significant

Table (3): Comparison between the two group as regard Head station

Groups	Head station (Mean)
Group A (n=100)	+1.60±1.234
Group B (n=100)	+1.40±1.067
P	0.16

Paired Samples Test

Table (4): Comparison between the two group as regard Bishop score

Groups	Bishop score (Mean)
Group A (n=100)	9.56±1.875
Group B (n=100)	7.551±2.1800
P	0.09

Paired Samples Test

Table (5): Comparison between the two group as regard Onset of labor

		Group A (N = 100)	Group B (N = 100)	P-value
Onset of labor	24 hours (1day)	65 (65%)	30 (30%)	0.01 S
	One week (7 days)	35 (35%)	70 (70%)	0.9 NS

One way Anova.

Table (6): Comparison between the two group as regard First stage by hours

Groups	First stage 1 by hours Mean
Group A (n=100)	5.19 ± 1.359
Group B (n=100)	5.86 ± 1.215
P	0.02 S

Paired Samples Test

Table (7): Comparison between the two group as regard Second stage by hours

Groups	Second stage by hours (Mean)
Group A (n=100)	1.33±0.472
Group B (n=100)	1.80 ±0.651
P	0.09

Paired Samples Test

Table (8): Comparison between the two group as regard Mode of delivery

Mode of delivery	Group A (N = 100)	Group B (N = 100)	P-value
Normal labor	67 (67%)	33(33%)	0.01 S
Ventose	19 (19%)	34 (34%)	0.06 NS
C.S	14 (14%)	33 (33%)	0.03 S

Table (9): Comparison between the two group as regard Post partum haemorrhage

		Group A (N = 100)	Group B (N = 100)	X ²	P-value
Post partum haemorrhage	Yes	11 11%	13 13%	0.986	0.170
	No	89 89%	87 87%		

Table (10): Comparison between the two group as regard Fetal weight

Groups	Fetal weight (Mean)
Group A (n=100)	2.844 ±0.3240
Group B (n=100)	3.018±0.3794
P	0.145

Paired Samples Test

Table (11): Comparison between the two group as regards the Apgar score at 5 minutes

Groups	Apgar score Mean
Group A (n=100)	8.3±1.081
Group B (n=100)	8.1±0.3030
P	0.375

Paired Samples Test

Table (12): Comparison between the two group as regard NICU admission

		Group A (N = 100)	Group B (N = 100)	X ²	P-value
NICU admission	Yes	7 7%	6 6%	0.384	0.06 NS
	No	93 93%	94 94%		

4. Discussion

Membrane sweeping is a mechanical technique that a clinician inserts one or two fingers into the cervix and using a continuous circular sweeping motion to detaches the inferior pole of the membranes from the lower uterine segment. This lead to hormone release that encourage effacement and dilatation potentially promoting labor (**Sukumaran and Chandrarah, 2021**) (5).

Studies have shown decreased rate of cesarean section rate and decreased maternal and neonatal complications in women treated with elective induction of labor especially in obese nulliparous and parous women (**Inshirah et al., 2019; Anna et al., 2020; Sibiude, 2020**) (6,7,8).

Gokhan et al., 2010; Mohamed, 2015 reported that no statistically significant differences between the two groups as regard maternal age, parity or Bishop score, same results reported in this study p-value 0.967, 0.06, 0.09 respectively (9,1).

Gokhan et al., (2010) in a prospective study included 351 antenatal women who were randomly assigned to one of two groups: a sweeping of the membranes group (n = 181) and a no sweeping control group (n = 170). The primary outcome measure was the proportion of women who entered spontaneous labor within 1 week of entry into the study. Secondary outcome measures included mode of delivery and maternal and fetal complications (9).

Mohamed, 2015 study included 140 antenatal women who were randomly assigned to one of two groups: a stripping of the membranes group (n=70)

and no stripping control group (n=70). The primary outcome measure was the proportion of women who entered spontaneous labor within 1 week of entry into the study. Secondary outcome measures included mode of delivery and maternal and fetal complications (1).

In our study there were statistically significant difference between studied groups as regard onset of labor 65 (65%) in group A after 1 day, 30 (30%) in group B with P- value 0.01, 35 (35%) in group A after 7 day, 70 (70%) in group B.

On the contrary, in **Odessa et al., (2020)** Membrane sweeping have no effect on the onset of labor (RR 1.05, 95% CI 0.92–1.20). There was no significant difference for the rate of spontaneous vaginal delivery (RR 1.06, 95% CI 0.84–1.34), operative vaginal delivery (RR 0.97, 95% CI 0.25–3.78), or cesarean delivery (RR 1.00, 95% CI 0.87–1.14) (10).

Unlike **Mohamed, 2015** study membranes stripping resulted in an increase in spontaneous onset of labor within 7 days (1).

Gokhan et al., (2010) reported the patients who entered in spontaneous labor before 41 weeks of gestation were significantly different between the two groups (p < 0.0001) (9)

In this study there were statistically significant difference between studied groups as regard mode of delivery, normal labor 67 (67%) in group A, 33(33%) in group B, while C.S 14 (14%) in group A, 33 (33%) in group B with P-value 0.03.

On contrast the study of **Gokhan et al., (2010)** the mode of delivery showed no significant difference between the groups **(9)**.

In this study there were no statistically significant difference between studied groups as regard post partum haemorrhage, Fetal weight, Apgar score with p- value 0.170, 0.145, 0.375 respectively, as in other study **Gokhan et al., (2010) (9)**.

A single membrane sweeping procedure at 38 - 40 weeks of gestation is effective and no significant difference has been found in the percentage of women who enter spontaneous labor within 7 days or before 41 weeks **(Putnam et al., 2011) (11)**.

In the **Tarik et al., (2014)** study, sweeping of the membranes was performed weekly at 38 weeks onwards improved an unfavorable BS on women admission in labor (4.0 ± 1.3 vs. 2.0 ± 1.1 , $P = 0.001$). Most of the women (81.3%) enter spontaneous labor following a single membrane sweeping, and delivered 1 week earlier than the control group. Few women in the study needed repeated membrane sweeping **(12)**.

Sweeping of membranes is a safe method to reduce the length of term in pregnancy and the prevalence of prolonged gestation in a low-risk population. There is no evidence that sweeping the membranes increases the risk of maternal or neonatal adverse outcomes **(Mohamed, 2015) (1)**.

Kamal, 2021 reported that stripping of membranes and vaginal misoprostol was the same, but the induction-delivery was significantly lower in misoprostol. There were no statistically significant differences between the two groups in the results of neonatal outcome. Both methods were effective and safe in the induction of labor; however, misoprostol needs hospital admission, with no increases in the risk of neonatal outcome and minimal adverse effects **(13)**.

Avdiyovski et al 2019 Pregnant women with a low-risk singleton cephalic pregnancy of term (37–42 weeks.) membrane sweeping is both a safe and effective procedure of promoting a spontaneous labor and therefore reducing the induction of labor for post maturity. It was also used to demonstrate that membrane sweeping is effective when performed from 38 weeks of gestation, and that a single membrane sweep may be as effective as multiple membrane sweeps.” **(14)**

Finucane et al., (2020) comparing membrane sweeping for labor induction with placebo. It showed that membrane sweeping may be effective in achieving a spontaneous onset of labor **(4)**,

Mozurkewich et al., (2011) reported of the non-pharmacologic methods, as membrane sweeping appeared to have the strongest method. It was successful in reducing post-term gestations without

increasing clinically important harms.” As same results in this study **(15)**.

Conclusion and Recommendations

Sweeping of membrane is safe method of labor induction. It results in rapid onset of labor, less time of first stage and less C.S. No differ in second stage time and postpartum hemorrhage, no differ in Fetal weight, Apgar score and NICU admission.

We recommend performing more researches on membrane sweeping for its efficacy and its role in decreasing time of labor combined methods of labor induction may result in improving time of labor. More number of patients in further researches.

Disclosure

The authors report no conflicts of interest in this work.

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10/7/2021