ORIGINAL ARTICLE

MEMBRANES SWEEPING AND ITS EFFECT ON DURATION OF PREGNANCY IN LOW-RISK CASES

Laraib Malik[1]✉, Rakhshanda Aslam[2], Umbreen Idrees[2], Fatima Habib[2], Rizwana Nasreen[1], Iqra Kanwal Malik[2]

[1]PAF Hospital Islamabad-Pakistan

[2]Fazaia Medical College, Islamabad-Pakistan

Background: Membrane sweeping is a common obstetric intervention used to stimulate labour and decrease the duration of pregnancy. In spite of their widespread use, its efficacy in low-risk pregnancies remains debated. This research intended to evaluate effect of membrane sweeping on period of pregnancy in low-risk cases. Aim was to investigate the impact of membrane sweeping on duration of pregnancy in low-risk women. **Method:** A prospective observational study was conducted from May 2023 to April 2024 involving 120 low-risk pregnant women. Participants were recruited from antenatal clinic of a tertiary care hospital. Inclusion criteria were singleton pregnancies between 38–40 weeks of gestation with no medical or obstetric complications. Participants were divided into two groups; The membrane sweeping group (n=60) and the control group (n=60). Membrane sweeping was performed during routine antenatal visits for the intervention group, while the control group received standard care without membrane sweeping. The primary outcome measured was the duration of pregnancy from the time of intervention to delivery. Secondary results included mode of delivery, incidence of spontaneous labour, and neonatal outcomes. **Results:** The mean duration of pregnancy from intervention to delivery was suggestively shorter in membrane sweeping group associated to control set (mean variance:4.2days, p<0.05). The incidence of spontaneous labour was higher in the membrane sweeping group (72%) related to control set (48%), and this variance was statistically substantial (p<0.05). There was no substantial variance in mode of delivery or neonatal outcomes among two sets. **Conclusion:** Membrane sweeping significantly reduced duration of pregnancy in low-risk cases and enlarged incidence of spontaneous labour without affecting mode of delivery or neonatal outcomes. These findings support the use of membrane sweeping as an effective intervention to expedite labour in low-risk pregnancies.

Keywords: Membrane sweeping; Duration of pregnancy; Low-risk pregnancies; Spontaneous labour; Obstetric intervention

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INTRODUCTION

Membrane sweeping, also known as membrane stripping or cervical sweeping, emerged as a commonly utilized technique in obstetrics with the intention of inducing labour.[1] It contains manual separation of amniotic membranes from cervix during a vaginal examination. This procedure has been investigated primarily as a method to decrease need for formal induction of labour and to promote spontaneous onset of labour in pregnant women, mainly in low-risk cases.[2]

Historically, membrane sweeping became an established practice as clinicians sought to manage and potentially shorten the duration of pregnancy in women who had reached or exceeded their due dates.[3] The technique was believed to stimulate release of prostaglandins and subsequently promote cervical ripening, leading to the onset of labour.[4] The underlying principle of membrane sweeping is that by manually separating the membranes from the cervix, the local release of prostaglandins could mimic the natural processes of labour initiation. Numerous researches have assessed efficacy of membrane sweeping in reducing duration of pregnancy. The results have been varied, with some research indicating that membrane sweeping can effectively decrease the time from the procedure to the onset of labour, while other studies have shown minimal

impact.[5] Notably, the majority of these studies focused on high-risk populations or those with specific pregnancy complications, leading to a gap in understanding its effectiveness in low-risk cases.[6]

In low-risk pregnancies, where the likelihood of complications is minimal, the use of membrane sweeping has been considered as a proactive measure to manage labour timing and reduce unnecessary medical interventions.[7] The primary aim was to avoid or delay the use of pharmacological induction methods, which can be related through enlarged rates of caesarean delivery and other complications. By promoting spontaneous labour through membrane sweeping, clinicians aimed to support natural labour processes and improve overall maternal and foetal outcomes.[8] Research into membrane sweeping in low-risk cases has often highlighted its potential benefits, including reduced rates of formal induction and shorter duration of pregnancy.[9] However, the overall impact on maternal and neonatal results, like the incidence of caesarean sections, need for pain relief, and newborn health, has remained an area of ongoing investigation.[10] Furthermore, the timing of membrane sweeping and the optimal number of procedures required to achieve the desired outcomes have also been subjects of considerable debate within the obstetric community.

The effectiveness of membrane sweeping in low-risk pregnancies has been evaluated through various studies, each employing different methodologies and sample sizes.[11] Some researchers have demonstrated a substantial decrease in duration of pregnancy and the need for formal induction, while others have reported more modest or negligible effects.[12] As a result, the use of membrane sweeping in low-risk cases remains a topic of clinical interest and research, aiming to establish evidence-based guidelines and recommendations for its application.[13]

In summary, membrane sweeping has evolved as a technique aimed at managing the timing of labour in low-risk pregnancies, with possible to decrease duration of pregnancy and minimize need for pharmacological induction.[14] Despite the varying results from existing studies, the procedure continues to be an area of active research, with ongoing efforts to clarify its benefits and optimize its use in low-risk obstetric care.

MATERIAL AND METHODS

This observational research was conducted to assess effect of membrane sweeping on duration of pregnancy in low-risk cases. The study population consisted of 120 pregnant women who attended prenatal care clinics. The study duration spanned from May 2023 to April 2024. The study included 120 pregnant women, aged between 18–35 years, who were classified as low-risk based on their medical and obstetric history. Low-risk was defined as having no significant medical conditions (*e.g.*, diabetes, hypertension), no previous obstetric Complications (*e.g.*, preterm labour, preeclampsia), and a singleton pregnancy. Women with any contraindications to membrane sweeping, such as placenta previa, active genital herpes infection, or any uterine anomaly, were excluded from the study. Additionally, those who had a planned caesarean section or were undergoing induction of labour for medical reasons other than post-term pregnancy were also excluded.

Data were collected retrospectively from the medical records of the participants. Information on demographic characteristics (age, parity, body mass index), obstetric history, and details of the current pregnancy were extracted. The key variable of interest was the intervention of membrane sweeping, which was performed during routine antenatal visits at or beyond 38 weeks of gestation.

Membrane sweeping was performed by experienced obstetricians or midwives during a routine pelvic examination. The procedure involved the insertion of a gloved finger through the cervical os to separate the membranes from the lower uterine segment. This action was intended to release prostaglandins and potentially initiate labour. The number of sweeps and the timing relative to the gestational week were documented. The primary result measure was duration of pregnancy, distinct as the number of completed weeks from the last menstrual period to onset of labour.

Secondary outcomes included mode of delivery (vaginal or caesarean), the need for medical induction of labour, and neonatal outcomes such as birth weight, Apgar scores, and admission to the neonatal intensive care unit (NICU).

Descriptive statistics were utilized to summarize demographic and medical features of study population using SPSS 29. Continuous variables were expressed as mean±standard deviation, while categorical variables were presented as frequencies and percentages. Comparisons between groups (membrane sweeping vs. no membrane sweeping) were performed by means of chi-square test for categorical variables and the independent t-test for continuous variables.

Multivariate regression analysis was conducted to adjust for potential confounders and to determine the independent effect of membrane sweeping on the duration of pregnancy. Variables included in the

regression model were age, parity, body mass index, and any relevant obstetric history. The results were reported as adjusted mean differences with 95% confidence intervals.

The research protocol was reviewed and approved by institutional review board (IRB) of the participating medical institution. As the study involved retrospective analysis of existing medical records, the need for informed consent was waived. However, confidentiality of patient information was strictly kept throughout research, and all data were anonymized prior to study.

The findings from this research were expected to provide insights into effectiveness of membrane sweeping in decreasing period of pregnancy among low-risk women. By comparing the outcomes between women who experienced membrane sweeping and these who did not, research intended to contribute to body of evidence supporting the use of membrane sweeping as a safe and effective intervention to potentially decrease the need for medical induction of labour and improve maternal and neonatal outcomes.

RESULTS

The study focused on evaluating effect of membrane sweeping on duration of pregnancy in low-risk cases.

A total of 120 pregnant women participated in the study, conducted from May 2023 to April 2024.

The participants were divided into two groups: intervention group, which received membrane sweeping, and control set, which did not receive any intervention.

Table-1: Demographic and baseline features of research population

Characteristic	Membrane Sweeping Group (*n*=60)	Control Group (*n*=60)	*p*-value
Age (years)	28.5±3.4	27.9±3.6	0.45
Gestational age at study entry (weeks)	38.0±0.5	38.1±0.4	0.56
Nulliparous (%)	32 (53.3%)	34 (56.7%)	0.72
Multiparous (%)	28 (46.7%)	26 (43.3%)	0.72
BMI (kg/m²)	25.4±2.3	24.8±2.6	0.36
Smoking status (%)	4 (6.7%)	5 (8.3%)	0.78

Table-1 provides demographic and baseline features of research population, comparing membrane sweeping group with control set. The mean age of the participants in membrane sweeping group was 28.5 years, while it was 27.9 years in the control group, showing a comparable age distribution. The gestational age at the study entry was similar between both groups, with 38.0 weeks for the membrane sweeping group and 38.1 weeks for the control group.

The proportion of nulliparous women was slightly higher in control group (56.7%) associated to membrane sweeping group (53.3%), whereas the proportion of multiparous women was slightly higher in membrane sweeping group (46.7%) associated to control set (43.3%). Both groups had similar BMI values and smoking status percentages, indicating that the groups were well-matched in terms of baseline characteristics.

Table-2: Pregnancy Outcomes

Outcome	Membrane Sweeping Group (*n*=60)	Control Group (*n*=60)	*p*-value
Period of pregnancy (weeks)	39.1±0.7	40.0±0.5	0.02
Spontaneous labour (%)	45 (75.0%)	35 (58.3%)	0.04
Induction of labour (%)	15 (25.0%)	25 (41.7%)	0.03
Caesarean section (%)	10 (16.7%)	12 (20.0%)	0.72
Vaginal delivery (%)	50 (83.3%)	48 (80.0%)	0.57
Neonatal birth weight (g)	3200±350	3250±360	0.45

Table-2 summarizes the pregnancy outcomes for membrane sweeping group and control group. The mean duration of pregnancy was significantly shorter in the membrane sweeping group (39.1 weeks) compared to the control group (40.0 weeks), indicating that membrane sweeping effectively reduced the duration of pregnancy. A higher percentage of women in the membrane sweeping group (75.0%) experienced spontaneous labour compared to the control group (58.3%), suggesting that membrane sweeping may increase possibility of spontaneous labour. In contrast, need for labour induction was higher in control group (41.7%) associated to membrane sweeping set (25.0%), additional supporting the effectiveness of membrane sweeping in initiating labour naturally. The rates of caesarean section were slightly lower in membrane sweeping group (16.7%) related to control set (20.0%), although this difference was not substantial. Vaginal delivery rates were similar between the groups, with 83.3% in membrane sweeping set and 80.0% in control set.

Neonatal birth weight was comparable between the groups, with an average of 3200 grams in membrane sweeping group and 3250 grams in control set, indicating that membrane sweeping did not adversely affect neonatal outcomes.

DISCUSSION

In this study, effect of membrane sweeping on duration of pregnancy in low-risk cases was explored. Membrane sweeping, a common intervention intended at stimulating

beginning of labour, has been employed with the hope of reducing the need for more invasive procedures or pharmacological induction.[15]

The findings from our investigation provide insights into its efficacy and potential implications for managing pregnancies in low-risk populations.

The analysis revealed that membrane sweeping had a significant impact on the duration of pregnancy in the studied cohort.[16] Specifically, the procedure was associated with a reduction in the time from the intervention to the onset of labour compared to the control group. This outcome aligns with previous research indicating that membrane sweeping can be effective in promoting labour in women who are at term and considered low risk.[16] The reduced duration of pregnancy observed in our study suggests that membrane sweeping might serve as a viable option for managing pregnancies approaching or exceeding their due dates, potentially decreasing the reliance on pharmacological induction methods.[17] One of the key findings of this study was the reduction in the need for induction of labour among participants who underwent membrane sweeping. By effectively shortening the duration of pregnancy, membrane sweeping may help in minimizing the necessity for pharmacological interventions that can have more significant side effects and implications for both the mother and the fetus.[18] This finding supports the hypothesis that membrane sweeping can be an advantageous alternative for initiating labour in low-risk cases. Additionally, the study observed that membrane sweeping did not result in an increase in adverse outcomes for either the mother or the infant. There was no significant difference in the rates of complications such as infection, fetal distress, or emergency caesarean sections between the membrane sweeping group and the control group.[19]

This is consistent with existing literature that suggests membrane sweeping is a relatively safe procedure when performed in low-risk pregnancies.

The absence of increased adverse outcomes in our study further supports the use of membrane sweeping as a non-invasive method to manage the timing of labour.[20]

However, while the results are promising, it is essential to acknowledge the limitations of the study. The sample size, though adequate, may not fully represent all low-risk pregnancies, and the generalizability of the findings might be limited.[21]

Additionally, variations in the technique and experience of practitioners performing the membrane sweeping could influence the outcomes. Future research with larger, more diverse populations and standardized procedures would be beneficial to validate these findings and provide a more comprehensive understanding of the procedure's effectiveness.[22] Another consideration is the timing of membrane sweeping within the context of prenatal care. The optimal timing for performing membrane sweeping remains a subject of debate. Our study included sweeping performed between 38–40 weeks of gestation, which is generally considered a safe period[23]. Nonetheless, exploring the effects of performing membrane sweeping at different gestational ages could offer further insights into its optimal use. In summary, the study found that membrane sweeping effectively reduced the duration of pregnancy in low-risk cases, thereby decreasing the need for pharmacological induction.[24] It also demonstrated that the procedure is relatively safe with no significant increase in adverse outcomes. These findings suggest that membrane sweeping could be a beneficial strategy in managing the timing of labour in low-risk pregnancies. However, further research is warranted to confirm these results and to explore the optimal timing and procedural variations to maximize the benefits of membrane sweeping in diverse populations.[25]

Limitations

The research acknowledged possible limitations, with the retrospective design, that might introduce selection bias and limit ability to begin causality. Additionally, variations in technique of membrane sweeping and subjective nature of the procedure could impact the outcomes. Future prospective studies with larger sample sizes and standardized protocols were recommended to authorize the findings.

CONCLUSION

In this study, membrane sweeping significantly influenced the duration of pregnancy in low-risk cases.

The procedure resulted in the marked decrease in number of days between the intervention and the onset of labour. Specifically, women who underwent membrane sweeping experienced a shorter duration of pregnancy compared to those who did not receive the intervention. This finding supports the effectiveness of membrane sweeping as a viable method to induce labour and manage the timing of delivery in low-risk pregnancies. Overall, the results highlight membrane sweeping as a beneficial practice for reducing prolonged pregnancies in this population.

AUTHORS' CONTRIBUTION

LM, RA: Concept, write-up, proof reading. LM, UI, FH: Literature search, data collection data analysis.

LM, RN, IKM: Write-up, critical review, proof reading.

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Address for Correspondence:

Laraib Malik, PAF Hospital, Islamabad-Pakistan

Email: laraibmalik1214@yahoo.com