

Study of Stripping of Membranes at Term Gestation to Reduce Post-Term Pregnancies

Nitin Kulkarni¹, Richa Patel²

Author's Affiliation:

¹Associate Professor ²Senior Resident, Department of Obstetrics and Gynaecology, ACPM Medical College, Dhule 424001 Maharashtra, India.

Corresponding Author:

Nitin Kulkarni,
Associate Professor, Department of Obstetrics and Gynaecology, ACPM Medical College, Dhule 424001 Maharashtra, India.
E-mail: kulkarnink76@gmail.com

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Abstract

Introduction: Any pregnancy which has passed beyond the expected date of delivery is called a prolonged pregnancy & which have passed 42 weeks, 294 days is called postmaturity or post term pregnancy [1], these are at an increased risk for fetal postmaturity syndrome, macrosomia, fetal intolerance of labor, oligohydramnios, meconium-stained amniotic fluid, and cesarean delivery [2]. The clinical evidence of an increased potential for these poor perinatal outcomes has triggered a movement toward increased antenatal testing between 37- 42 weeks of gestation, and cervical ripening with labor inductions at or before 42 weeks of gestation. While a ripe cervix is usually suggestive of fetal maturity to find an unripe cervix does not exclude maturity. Induction of labor is one of the most common procedures in obstetrics and is carried out in approximately 20% of pregnancies [3]. Mechanical and biochemical means have been used to affect cervical ripening and to induce labor. Methods of induction include amniotomy, membrane stripping or sweeping, prostaglandins, laminaria and oxytocin. Membrane stripping or sweeping is a commonly use procedure aimed at preventing the post term pregnancy and avoid the application of formal method of induction of labour. *Aims and Objectives:* 1. To determine the effectiveness & safety of membrane stripping at term pregnancy as a OPD procedure weekly which can reduce the incidence of Post term pregnancy, labour induction and its complication. 2. To determine what factors occurring after digital separation of the chorionic membranes from the lower uterine segment (membrane stripping) are involved in observed clinical changes compared with patients not so treated. *Material and Methods:* *Study Design:* This was a prospective study conducted at department of Obstetrics and Gynaecology at our hospital. *Study Duration:* Study was conducted during the period of duration September 2014 to September 2016. *Results:* After documenting the confirm gestational dating criteria and obtaining inform consent 200 patients at 37 complete week of gestation were randomly selected for the study. Data were collected from findings at 1,2,3 week and during labour, which is compared by pearson chi-square and fischer exact test. *Conclusion:* Stripping of membranes is a very old procedure. This causes the release of plasma prostaglandin F₂, Increase in endocervical phospholipase A activity and oxytocin release have also been observed. This will initiate uterine contraction and onset of labour. It is safe, cheap, effective and even an out patient procedure. It is associated with earlier delivery and decreased incidence of posterm gestation and hence maternal and fetal complication related to post maturity.

Keywords: Iron Deficiency Anemia; Iron Sucrose; Iron Ferric Carboxymaltose.

Introduction

Any pregnancy which has passed beyond the expected date of delivery is called a prolonged pregnancy & which have passed 42 weeks (294) days is called postmaturity or post term pregnancy [1], these are at an increased risk for fetal postmaturity syndrome, macrosomia, fetal intolerance of labor, oligohydramnios, meconium-stained amniotic fluid, and cesarean delivery [2]. The clinical evidence of an increased potential for these poor perinatal outcomes has triggered a movement toward increased antenatal testing between 37-42 weeks of gestation, and cervical ripening with labor inductions at or before 42 weeks of gestation. While a ripe cervix is usually suggestive of fetal maturity to find an unripe cervix does not exclude maturity.

Induction of labor is one of the most common procedures in obstetrics and is carried out in approximately 20% of pregnancies [3]. Mechanical and biochemical means have been used to affect cervical ripening and to induce labor. Methods of induction include amniotomy, membrane stripping or sweeping, prostaglandins, laminaria and oxytocin. Membrane stripping or sweeping is a commonly used procedure aimed at preventing the post term pregnancy and avoid the application of formal method of induction of labour.

Stripping is performed by inserting the index finger as far through the internal os as possible and rotating two to three times through 360 degrees to separate the membranes from the lower segment [4,5].

In this Procedure, use a gloved finger to gently separate the amniotic sac from the wall of the uterus it has been shown the local release of prostaglandin F2 alpha, the activity of phospholipid A2, the mechanical dilatation of cervix, and the frequency of uterine contractions. Consequently the procedure has potential of ripening of cervix & subsequently promoting the spontaneous onset of labour hence reducing the duration of pregnancy. Thus it also has potential to reduce the need for more costly formal method of induction of labour by medical or surgical method. It is anticipated to be less likely associated with risk of hyperstimulation, hypertonus, tachystole, uterine rupture, fetal distress or maternal death which is associated with most formal method of induction of labour. The goal of induction is to achieve a successful vaginal delivery that is as natural as possible.

Induction of labour is the artificial initiation of labour before its spontaneous onset to deliver the fetoplacental unit. The frequency of induction varies by location and institution.

Definitions

- *Induction of labour* is the initiation of contractions in a pregnant woman who is not in labour to help her achieve a vaginal birth within 24 to 48 hours.
- *Successful induction* is defined as a vaginal delivery within 24 to 48 hours of induction of labour.
- *Elective induction* is the induction of labour in the absence of acceptable fetal.

Aims and Objectives

1. To determine the effectiveness & safety of membrane stripping at term pregnancy as a OPD procedure weekly which can reduce the incidence of Post term pregnancy, labour induction and its complication.
2. To determine what factors occurring after digital separation of the chorionic membranes from the lower uterine segment (membrane stripping) are involved in observed clinical changes compared with patients not so treated.

Material and Methods

Study Design

This was a prospective study conducted at department of Obstetrics and Gynaecology at our hospital.

Study Duration

Study was conducted during the period of duration September 2014 to September 2016.

Study Method

This Randomized controlled trials comparing control women with women submitted to sweeping of the membranes at term were eligible for this review. Women in the control group had gentle vaginal examination. Study was conducted on 200 women who were randomly selected among the women attending the hospital Antenatal OPD basis and admissions after thorough history and investigations. Written, informed consent taken from Patient and relatives of randomly selected ones.

Inclusion Criteria

1. Singleton pregnancy

2. Vertex presentation
3. 37-40 weeks of gestation
4. As certain gestation age by LMP should be taken
5. First trimester USG and early assessment by uterus size, date discrepancy
6. Patient not in labour at full term gestation.
7. Pelvic should be adequate.
8. No cephalo pelvic disproportion.

Exclusion Criteria

1. Urgent need for delivery.
2. Uncertain gestational date criteria.
3. Non vertex presentation.
4. Known medical complication.
5. Vaginal and cervical infection.
6. Premature rupture of membrane.
7. Any contraindications for vaginal delivery.
 - a. Prior classical uterine incision.
 - b. Prior inverted T or J shape incision.
 - c. Prior uterus unification surgery.

- d. Prior myomectomy.
- e. Placenta previa.

After documenting the confirm gestational dating criteria and obtaining informed consent 200 patients at 37 complete week of gestation were randomly selected for the study.

These patients fulfilled all the inclusion criteria. Thorough general physical examination, cardiovascular system, respiratory system, per abdomen and per vaginal examination was done. A gentle pelvic examination was done to assess the status of the cervix by modified Bishop score.

Stripping of membranes was performed uniformly by separating an approximately 2-3cm section of the lower membranes from its attachment to the lower uterine segment with at least two circumferential passes of the index finger. This procedure was done weekly as a OPD procedure. Patients were informed about the spotting or blood stained cervical mucous, pain in abdomen and backache.

Membranes were ruptured when the cervix was completely effaced with a cervical dilation of >5-6 cms. If required labour was accelerated with oxytocin.

Data collected and we obtained following

Results

Age Group (years)	Group A	Group B	Total
Up to 20	24 24.0%	13 13.0%	37 18.5%
21 to 25	34 34.0%	35 35.0%	69 34.5%
26 to 30	31 31.0%	43 43.0%	74 37.0%
31 to 35	11 11.0%	9 9.0%	20 10.0%
Total	100 100%	100 100%	200 200%

Chi-Square Tests

	Value	DF	p value
Pearson Chi-Square	5.431	3	.143

In Group A and Group B, maximum cases were within 21 to 30 years age group. There was statistically no significant ($p > 0.05$) difference of age group of cases in between the Groups.

Table 2: Comparison of Parity status in between the groups

Parity	Group A	Group B	Total
Primigravida	74 74.0%	56 56.0%	130 65.0%
Multigravida	26 26.0%	44 44.0%	70 35.0%
Total	100 100.0%	100 100.0%	200 100.0%

Chi-Square Tests

	Value	DF	p value
Pearson Chi-Square	7.121	1	.008
Fisher's Exact Test			.011

Table 3: Comparison of Outcome of Labour in between the Groups

Mode of delivery	Group A	Group B	Total
Vaginal	70 70.0%	47 47.0%	117 58.5%
Instrumental	12 12.0%	16 16.0%	28 14.0%
LSCS	18 18.0%	37 37.0%	55 27.0%
Total	100 100.0%	100 100.0%	200 100.0%

Chi-Square Tests

	Value	DF	P value
Pearson Chi-Square	11.656	2	.0003

Table 4: Comparison of modified Bishops score at week 1 in between Groups

Modified Bishops score at Week 1	Group A	Group B	Total
2	21 21.0%	24 24.0%	45 45.0%
3	28 28.0%	28 28.0%	56 28.0%
4	47 47.0%	31 21.0%	78 39.0%
5	4 4.0%	14 14.0%	18 9.0%
6		3 3.0%	3 1.5%
Total	100 100.0%	100 100.0%	200 100.0%

Chi-Square Test

	Value	DF	p value
Pearson Chi-Square	12.038	4	.017

Modified Bishop score at week 1 in maximum cases was 3 to 4 in Group A while it was from 3 to 6 in Group B.

Table 5: Comparison of mode of Delivery according to Parity status in the Groups

Mode of delivery	Group A		Group B	
	Primigravid	Multigravida	Primigravid	Multigravida
Instrumental	8 10.8%	4 15.4%	10 17.9%	6 13.6%
LSCS	16 21.6%	2 7.7%	28 50.0%	9 20.5%
vaginal	50 67.6%	20 76.9%	18 32.1%	29 65.9%
Total	74 100.0%	26 100.0%	56 100.0%	44 100.0%

Chi-Square Tests

Group		Value	DF	p value
A	Pearson Chi-Square	2.650	2	.266
B	Pearson Chi-Square	12.065	2	.002

Table 6: Comparison of mean modified Bishop score in between the Groups at Week1, Week2 and Week 3

Modified bishop score	Group A		Group B		t value	p value
	Mean	Std. Deviation	Mean	Std. Deviation		
Week 1	3.34	.86	3.44	1.09	-.720	.472
Week 2	4.28	.87	4.27	.102	.077	.939
Week 3	5.28	.88	4.96	.87	2.989	.004

significant ($p < 0.01$) difference of mode of delivery according to parity status in Group B cases.

Table 7: Comparison of Indication of LSCS in between the Groups

Indication of LSCS	Group A	Group B	Total
Failure of Induction	6 33.3%	10 27.0%	16 29.1%
Fetal Distress	8 44.4%	14 37.8%	22 40.0%
Secondary Arrest of Labour	4 22.2%	7 18.9%	11 20.0%
Deep Transverse Arrest		6 16.2%	6 10.9%
Total	18 100.0%	37 100.0%	55 100.0%

Chi-Square Tests

	Value	DF	p value
Pearson Chi-Square	3.283	3	0.350

Table 8: Comparison of Indication for instrumental delivery in between the Groups

Indication of Instrumental delivery	Group A	Group B	Total
Fetal Distress	5 41.7%	6 37.5%	11 39.3%
Maternal Exhaustion	5 41.7%	6 37.5%	11 39.3%
Prolong Second Stage of Labour	2 16.7%	4 25.0%	6 21.4%
Total	12 100.0%	16 100.0%	28 100.0%

Chi-Square Tests

	Value	DF	p value
Pearson Chi-Square	.283	2	.868

Table 9: Comparison of complication of vaginal delivery in between the Groups

Complication of Vaginal	Group A	Group B	Total
Maternal Infection	2 2.9%	1 2.1%	3 2.06%
Neonatal Infection	1 1.4%	1 2.1%	2 1.7%
Pre-Labour Rupture of Membrane	3 4.3%	2 4.3%	5 4.3%
No	64 91.4%	43 91.5%	107 91.5%
Total	70 100.0%	47 100.0%	117 100.0%

Chi-Square Tests

	Value	DF	p value
Pearson Chi-Square	.139	3	.987

Table 10: Comparison of mode of delivery according to parity in different weeks of Group A

Group A	mode of delivery	Multigravida	Primigravida	Total	P value
1st week	vaginal	2	10	12	-
		100.0%	100.0%	100.0%	
	Total	2	10	12	
2nd week	Instrumental		4	4	Chi square value=3.516 P value=0.172
			11.1%	8.9%	
	LSCS	1	12	13	
		11.1%	33.3%	28.9%	
	vaginal	8	20	28	
	88.9%	55.6%	62.2%		
	Total	9	36	45	
		100.0%	100.0%	100.0%	
3rd week	Instrumental	4	4	8	Chi square value=1.477 P value=0.478
		30.8%	15.4%	20.5%	
	LSCS	1	4	5	
		7.7%	15.4%	12.8%	
	vaginal	8	18	26	
	61.5%	69.2%	66.7%		
	Total	13	26	39	
		100.0%	100.0%	100.0%	
Post term	vaginal	2	2	4	
		100.0%	100.0%	100.0%	
	Total	2	2	4	
		100.0%	100.0%	100.0%	

All 12 cases delivered at 1st week had vaginal delivery in Group A and Group B. Of those delivered at 2nd week, 88.9% multigravida cases delivered vaginally and 11.1% had LSCS while 55.6% primigravida had vaginal delivery, 33.3% primae at 2nd week were delivered by LSCS while 11.1% (4) had instrumental mode of delivery. There was statistically no significant ($p>0.05$) difference of mode of delivery at 2nd week according to the parity status.

In 3rd week delivery cases in group A, 61.5% (8) multigravida cases had vaginal delivery, 7.7% (1) had LSCS and 30.8% (4) multigravida cases had Instrumental delivery while in primis 69.2% [18] had vaginal delivery, 15.4% (4) had LSCS or instrumental delivery. There was statistically no significant ($p>0.05$) difference of mode of delivery at 3rd week according to the parity status.

All post term cases in Group A were delivered by vaginal mode either be multi or primigravida. There was statistically no significant ($p>0.05$) difference of mode of delivery in post term delivered cases according to the parity status.

In Group B of 23 cases delivered in 1st week, all 8 multigravida were delivered vaginally, while in primi

cases 20% (3) had vaginal, 66.% had LSCS and 13.3% had instrumental mode of delivery. There was statistically highly significant ($p=0.001$) difference of the mode of delivery in between the parity status of cases delivered at 1st week.

In 2nd week delivered cases of Group B, 59.1%(13) multigravida had vaginal delivery, 9.1% (2) had instrumental delivery and 31.8% (7) had LSCS while in primigravida 45.5% (10) had vaginal delivery, 36.4% (8) were needed LSCS and 18.2% (4) primi cases needed Instrumental delivery. There was statistical no significant difference of mode of delivery in between multigravida and primigravida delivered at 2nd week in Group B.

At 3rd week delivered cases of Group B, 72.7%(8) multigravida had vaginal delivery, 9.1%[1] had instrumental delivery and 18.2% (2) had LSCS while in primigravida 41.7% (5) had vaginal delivery or needed LSCS while 16.7% (2) primi cases needed Instrumental delivery. There was statistical no significant difference of mode of delivery in between multigravida and primigravida delivered at 3rd week in Group B.

Post term delivered multi gravid in Group B needed LSCS in 33.3% (1) case while instrumental assistance

Table 11: Comparison of mode of delivery according to parity in different weeks of Group B

Group B	mode of delivery	Multi	Primi	Total	Significance
1st week	Instrumental		2 13.3%	2 8.7%	Chi square value=13.382 p value=0.001
	LSCS		10 66.7%	10 43.5%	
	vaginal	8 100.0%	3 20.0%	11 47.8%	
	Total	8 100.0%	15 100.0%	23 100.0%	
2nd week	Instrumental	2 9.1%	4 18.2%	6 13.6%	Chi square value=1.125 p value=0.570
	LSCS	7 31.8%	8 36.4%	15 34.1%	
	vaginal	13 59.1%	10 45.5%	23 52.3%	
	Total	22 100.0%	22 100.0%	44 100.0%	
3rd week	Instrumental	2 18.2%	2 16.7%	4 17.4%	Chi square value=3.322 p value=0.190
	LSCS	1 9.1%	5 41.7%	6 26.1%	
	vaginal	8 72.7%	5 41.7%	13 56.5%	
	Total	11 100.0%	12 100.0%	23 100.0%	
Post term	Instrumental	2 66.7%	2 28.6%	4 40.0%	Fisher's Exact test p value=0.500
	LSCS	1 33.3%	5 71.4%	6 60.0%	
	Total	3 100.0%	7 100.0%	10 100.0%	

in 66.7% (2) cases while in primigravida 71.4%(5) needed LSCS and 28.6%(2) had instrumental mode of delivery. Irrespective of gravid status the mode of delivery in post term cases was LSCS in 60% and Instrumental in 40% with no vaginal mode. There was statistically no significant ($p>0.05$) difference of mode of delivery in post term delivered cases according to the parity status. In post term cases of Group B neither mutli or primigravida was delivered by vaginal mode.

Discusssion

History of Study on Stripping of Membrane

Theoretically sweeping of the membranes should have a powerful effect in stimulating labour, since the procedure causes an increase in prostaglandin metabolites in the maternal circulation.

James Hamilton introduced stripping of membrane [6] Sweeping, or stripping, of the membranes has been reported since early in the 19th century and continues to be a widely used technique [7]. The goal of

sweeping of the membranes is to reduce duration of pregnancy or to induce labour. The technique is relatively simple: during vaginal examination, the clinician introduces use a gloved finger to gently separate the amniotic sac from the wall of the uterus, and the inferior pole of the membranes is detached from the lower uterine segment by a circular movement of the examining finger. Increased local production of prostaglandins, which has been documented after this procedure, provides a plausible mechanism for a potential effect of this intervention [7,8]

- In 1958, swann reported that stripping of membranes was effective in women with favourable cervix.
- In this study by Swann in 1958 every third patient underwent stripping while the other two served as a either a finger control (pelvic examination only) or plain control (no pelvic examination and no stripping). Overall 69% of the patients in the membrane stripped group went in to labour compared to 26% control [9].
- In 1974 Gustavil, found that sweeping of membranes stimulated prostaglandin production by damaging decidual cells. "lysosomal hypothesis"

on the initiation of uterine contractions may explain the induction of labor after artificial rupture of the membranes or after sweeping of the membranes off the lower uterine segment [10].

- In 1990 Mc Colgin W, Sterling et al studied whether weekly membrane stripping beginning at 38 weeks could safely reduce post term pregnancy. 180 patients with firm gestational date were studied and concluded that membrane stripping was safe and was associated with earlier delivery and decrease incidence of post term gestation [11].
- In 1990 Mc Clogin S.W. et al undertook a prospective randomized study in a low risk group of pregnant women at term to determine would safely result in earlier delivery and concluded that stripping the membrane was associated with earlier delivery and was not associated with any complications [12].
- In 1992 Eltorkey and Grant randomized 33 pregnant women to induction with stripping and 32 controls at 41- 42 weeks. 6 of the 33 study subjects had massage of the cervix instead of stripping because of unfavorable cervix. 89% of the stripped women went in to spontaneous labour, 84% of them within 72 hours. Only 17% of the cervical massage subjects and 37% of the control went in to spontaneous labour [13].
- In 1993 Helen A. Allot et. al. studied 185 antenatal women with pregnancies proceeding beyond 40 weeks of gestation and concluded that sweeping of membranes is safe and usefull procedure which results in a reduced incidence of postmature pregnancies, and a subsequent reduction in labour induction rate [14].
- In Goldenberg M Dulitzky M, Feldman B, Zolti M, Bider D studied 293 patients, 152 underwent a trial of stretching and stripping; 141 served as a control group. The mean interval (hours to delivery after the procedure) was 136 h (S.D. 10), compared to 161 h (S.D. 11) in the control group ($P = 0.095$; not significant), but with only a trend towards the shorter interval in the first group. When patients were matched according to weeks of gestation and fetal and maternal parameters, only those at 41 weeks' gestation or more had a significant reduction in the interval from the procedure to delivery (mean 91 h (S.D. 8) compared to mean 125 h (S.D. 10) in the control group; $P < 0.007$). This observation was independent of cervical status and other maternal or fetal parameters [15].

- 2015 Mohamed S Emarah Department of Obstetrics and Gynaecology, Benha Teaching Hospital, Cairo, Egypt performed a randomised controlled trial to evaluate the effects of membrane stripping in low-risk pregnant women between 38-40 weeks of gestation who were routinely monitored. Membranes stripping resulted in an increase in spontaneous onset of labor within 7 days A meta-analysis of 22 randomised controlled trials (2797 women) evaluated the effect of membrane sweeping (13 studies included women 37-40 weeks' gestation and six studies included women at or beyond 40 weeks' gestation). When performed in unselected women, stripping of membranes reduced the risk of post-term pregnancy and the use of other methods of labour induction. However, routine use of stripping of membranes from 38 weeks of pregnancy onwards did not seem to produce clinically important benefits [16].

James Hamilton introduced stripping of membrane in 1810, since then method has been used widely, but poorly studied.

This study is restricted only to the patients who attended ANC OPD of obstetric and gynaecology department during September 2014 to September 2016

In the present study, 200 patients who attended ANC OPD at to hospitals between 37-40 completed weeks of gestation 100 cases were randomly selected for digital stripping of membranes includes 74 primigravida and 26 multigravida in study group, done for 3 successive weeks. Digital separation of the fetal membranes from the lower uterine segment, and cervical stretching, were performed during routine vaginal examination of the first group The goal of stripping and stretching is to achieve a successful vaginal delivery that is as natural as possible. In control group with 56 primi gravida and 44 multigravida in which weekly gentle pelvic examination done. Patients of both the groups were admitted in labour ward when the signs of onset of labour were noticed. Response to the treatment shown in the results which is compared to other authors as below.

The study by MoColgin S.W et. al. (1990) had 90 patients who underwent weekly stripping of membranes and 90 patients had weekly pelvic examination, their mean days to delivery interval was 8.6 ± 0.74 versus 15.14 ± 0.83 respectively Patients who delivered within a week were 49 (54.5%) versus 14 (15.6%) in the study and control group respectively. There was significant reduction in The incidence of postterm pregnancy in stripped group when compared with control group [3(3.3%) versus 14 (15.6%)].

In 1990 McColgin S.W. et. al. conducted another study to know the efficacy of stripping the foetal membranes at term. In this study 51 were study group and 48 were taken as control. Delivery within a week was accomplished in 59% of the stripped group compared with 21% in controls. There was significant reduction in the number of days to delivery from 6.7 in study versus 13.3 in control group. There were 2 case in study and 6 cases in control who delivered after 42 weeks of gestation.

In the study by Wiriyasirivaj el at (1997), one hundred twenty gravidas were selected, 25 of 61 patients (41%) assigned to membrane stripping delivered with in a week compared to 12 of 59 controls 20.3%. There was also a statistically significant difference in Bishop scores among those who did not deliver with in 1 week (4.0 ± 2.5 versus 2.6 ± 1.7) in the study and control group respectively.

The incidence of postterm pregnancy was one of 61 (1.6%) and 3 of 59 (5.1%) in stripping and control group respectively. No significant differences were observed in maternal and fetal complications.

In present study at 3rd week mean modified bishops score was 5.28 ± 0.88 and $4.69 \pm 0.8\%$ in study and control group respectively which was statistically highly significant.

In Group A cases, 96% females delivered at term while 4% had post term delivery. In Group B about 90% females had term delivery while 10% had post term delivery.

In Group A, 70% cases had successfully delivered by vaginal route, 12% needed instrumental mode of delivery while 18% cases had LSCS. Of Group B cases about 47% cases had vaginal delivery, 16% cases needed instrumental support while in 37% there was LSCS. There was statistically highly significant ($p < 0.01$) difference of delivery mode in between the Group A and Group B.

Higher proportion of cases in group A were delivered by vaginal mode while few needed instrumental and LSCS mode of delivery. In Group B higher proportion of cases needed LSCS and instrumental support compared to Group A.

Conclusion

Stripping of membranes is a very old procedure which was introduced by James. Hamilton in 1810. In this procedure about 2-3 cms of the chorionic membrane is separated circumferentially from the lower uterine segment under aseptic precaution. This

procedure is repeated daily for 3 days. This will cause the release of plasma prostaglandin F₂ This increase seems to be related to the surface area of detachment between the membranes and the uterine wall.

Increase in endocervical phospholipase A activity and oxytocin release have also been observed. This will initiate uterine contraction and onset of labour.

It is safe, cheap, effective and even an out patient procedure.

It is associated with earlier delivery and decreased incidence of postterm gestation and hence maternal and fetal complication related to post maturity.

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