

To compare the Fetomaternal outcome of natural birth versus induced birth after previous one caesarean section: A prospective Observational study

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Abstract

Background: Caesarean section is one of the most common surgery worldwide. In instances when there has already been a caesarean surgery, induction of labour is attempted very cautiously by the obstetrician. In this study we compare the fetomaternal outcomes of natural birth versus induced birth in previous caesarean antenatal women.

Objectives: To compare the Fetomaternal outcome of natural birth versus induced birth in cases of previous one caesarean section.

Patients and Methods: A one-year prospective study on 100 antenatal women who had lower segment caesarean sections in the past were planned at a tertiary care facility. The cases were split into two groups, with 50 going into natural birth and the other 50 being induced labour in a previous one caesarean section. Their fetomaternal outcomes were compared for the following factors in both groups: demographic profile, indication of prior caesarean delivery and induction in the current pregnancy, and safety profile for vaginal delivery.

Results: The cases' demographic profiles were comparable, 52% of induced labour cases resulted in a vaginal delivery, compared to 78% of natural birth cases. The group receiving induced labour experienced a higher rate of repeat LSCS. Induced labour was more frequently associated with the need for augmentation of labour, mean duration of active labour (hours), and mother's hospital stay. In 22% of cases, induction was found to have failed. Both groups' prior vaginal deliveries were noted to be favourable variables for vaginal delivery. There was no difference between the two groups in the frequency of uterine rupture.

Conclusion: Comparison of natural versus induced labour in previous one caesarean section showed comparable perinatal, maternal morbidity and mortality profiles and no increase in complications. Safe induction of labour can be tried with judicious selection of cases at a set up with facilities for emergency caesarean section.

Keywords: VBAC; Induction of labour; spontaneous labour; previous one caesarean section; vaginal delivery; Uterine rupture; Hospital Stay.

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Introduction

The Caesarean section can save both the mother and the foetus' lives. The caesarean section rate has dramatically increased over the past few years, and this has increased the number of repeat caesarean sections, which continue to be one of the most frequent causes of repeat caesarean sections. (Bhasin et al. 2011) Repeat caesarean deliveries may raise the risk of maternal morbidity and mortality (Liu, 2007).

A feasible approach to lower the operative load as well as maternal morbidity and mortality is vaginal birth after caesarean section (VBAC). According to Green Top Guidelines No.45 of the Royal College of Obstetrics and Gynaecology (RCOG), most women with singleton pregnancies of cephalic presentation at 37+0 weeks or later who have had a single prior lower segment caesarean delivery with or without a history of prior vaginal birth are eligible for and may choose to undergo planned VBAC. (Royal College of Obstetricians & Gynaecologists, 2015)

A planned VBAC is not advised if the mother has a history of a classic scar, a ruptured uterus, or any other condition that would absolutely preclude a vaginal birth (Royal College of Obstetricians & Gynaecologists, 2015). After a caesarean section, vaginal birth shortens the hospital stay and fosters stronger mother-child relationships. (He et al. 2016)

In the event of a prior caesarean section, inducing labour can be difficult, but it must be done if the patient is willing to try labour after the previous caesarean section. There is very little data about safe and preferable method of induction of labour after caesarean section.

Numerous studies have attempted to induce labour in patients who have already undergone a caesarean section using a variety of techniques, including mechanical approaches and prostaglandin analogues like PGE1 and PGE2. (Balachandran et al., 2014; Pandis et al, 2001; West et al, 2017). RCOG recommendations state that 72 to 75% of VBAC attempts are successful. (Royal College of Obstetricians & Gynaecologists, 2015) It shows that the adage "once a caesarean, always a caesarean" is no longer valid in modern society. A small number of cases of previous one caesarean undergoes natural labour and deliver successfully by vaginal route, while a small number of cases need to have induction of labour to achieve vaginal birth. This led to the hypothesis of the current study, which is to compare whether there is any difference in the outcome of natural versus induced labour in cases of previous one caesarean.

The aim of this study is to examine the fetomaternal outcomes of natural labour and induced labour in instances of one previous caesarean section in order to determine the safety profile of cases and whether IOL is a safe alternative in cases of one previous caesarean surgery.

Patients and Methods

This prospective observational study was conducted over a period of one year on 100 pregnant women with singleton pregnancy with previous one caesarean section who delivered in the labour room of Department of Obstetrics and gynaecology, Pt B.D. Sharma PGIMS, Rohtak, Haryana, India.

The study group divided in to two subgroups each having 50 antenatal women with previous one caesarean section group A constitutes the women

who spontaneously goes in Labour, and Group B who required induction of labour. Methods of induction of labour was chosen by consultant on duty and recruitment of patient was done accordingly.

Exclusion criteria

- Women with classical caesarean section,
- Previous caesarean section less than 1 year back
- Previous history of myomectomy
- Placenta previa
- Malpresentation
- Recurrent indication of caesarean
- Multiple gestation
- scar thickness < 2.5 mm on Ultrasonography (USG)

A thorough antenatal, obstetrical, medical, past obstetrical history that included details of prior caesarean section and personal history taken, general and systemic examination was performed. For inclusion in the study, a written and informed consent was obtained. Additionally, the benefits and risks of vaginal delivery after a caesarean section were explained, as well as the procedure for induction after the prior caesarean surgery. The usual protocol was followed when conducting the investigations.

Induction of labour done after 37 completed weeks in accordance with IOL requirements. Bishop scoring done, cut off set at 8. If the Bishop Score was less than 8, the obstetrician recommended intracervical placement of a Foley catheter instilled with 30 ml saline or Dinoprostone 0.5 mg intracervical gel for cervical ripening. If the Bishop Score was greater than 8, an amniotomy was performed, and oxytocin augmentation was used to expedite labour. If the patient goes into

labour before the 24-hour mark, the Foley catheter was removed early. A maximum of two doses of Dinoprostone were administered at least six hours apart. Inductions were considered failed if Inductions were considered failed if the Bishop Score is not improved or remain less than 6 even after two gel doses, 24 hours following intracervical Foley insertion, or if the patient did not experience active labour while receiving 12 hours of oxytocin.

Various labour events were plotted for both groups on the partograph. If necessary, both groups' labour is augmented to expedite delivery in accordance with protocol.

Mode of delivery was used to measure the primary outcome. Third stage of labour complications, scar dehiscence, and uterine rupture were used as secondary outcomes to quantify success. Neonatal outcome was measured in terms of APGAR score at 1- and 5-minute, admission to nursery and condition of the baby at time of discharge.

Statistical analysis

The collected data was analysed using the Chi Square test, percentages, and proportions. Significant difference was defined as a P-value of 0.05 or less.

Results

Age, education level, residential location, socioeconomic level, are comparable between the two groups in the current study, as indicated in (**Table 1**). In contrast to that gestational age at admission is showing significant difference which explains that natural labour has not set in, 50% cases admitted in window of 40 to 41 weeks while 38% cases in natural group needs admission at 39 to 40 weeks.

Table 1. Demographic Profile of cases in both the groups

Age (years)	Group A		Group B		Statistical significance
	n=50	%	n=50	%	
20-25	35	70	30	60	p=0.294
26-30	15	30	19	38	p=0.398
31-35	0		1	2	p=0.314
mean±SD	24.76±2.13		25.22±2.47		p= 0.321
Education status					
Illiterate	0	0	3	6	p=0.078
Primary	8	16	8	16	p=1
Secondary	26	52	25	51	p=0.841
≥Graduate	16	32	14	30	p=0.662
Residential status					
Rural	35	70	42	84	p=0.096
urban	15	30	8	16	p=0.096
Socio-economic status					
Upper	1	2	1	2	P=1
Upper middle	4	8	4	8	P=1
Lower middle	7	14	3	6	P=0.182
Upper Lower	5	10	6	12	P=0.749
Lower	33	66	36	72	P=0.516
Gestational age at admission(weeks)					
37-38	12	24	1	2	
38 ⁺ -39	9	18	7	14	
39 ⁺ -40	19	38	13	26	
40 ⁺ -41	5	10	25	50	
>41.1	5	10	4	8	
Mean	38.74±1.33		39.74±0.94		P=0.001

Nonprogression of labour (NPOL) and foetal distress were the most common indications of a previous caesarean section. For both groups, the mean time between pregnancies ranged from 35 to 41 months.

Cases were mostly induced via a foley's catheter, with "post-dated pregnancy" as the most common indication.as shown in (Table 2, Fig. 1 & 2).

Table 2. Distribution of cases according to History of Previous surgery Indication and interval between the pregnancies:

Indication of previous LSCS	Group A		Group B		Statistical significance
	N=50	%	N=50	%	
Malpresentation	8	16	9	18	p=0.790
Non progress of labour	16	32	6	12	p=<0.01
Foetal distress	19	38	26	54	p=0.159
Antepartum Haemorrhage	3	6	4	8	p=0.695
Pregnancy induced hypertension	3	6	2	4	p=0.646
Cephalopelvic Disproportion	0		1	2	p=0.314

Failed Induction	1	2	2	4	p=0.557
Interval between pregnancies (Months)					
13-24	15	30	9	18	P=0.160
25-36	18	36	23	46	P=0.309
37-48	12	24	9	18	P=0.461
48-60	4	8	2	4	p=0.399
>60	1	2	7	14	P = <0.05
Mean ± SD	35.64±12.66		41.82±20.64		P= >0.05

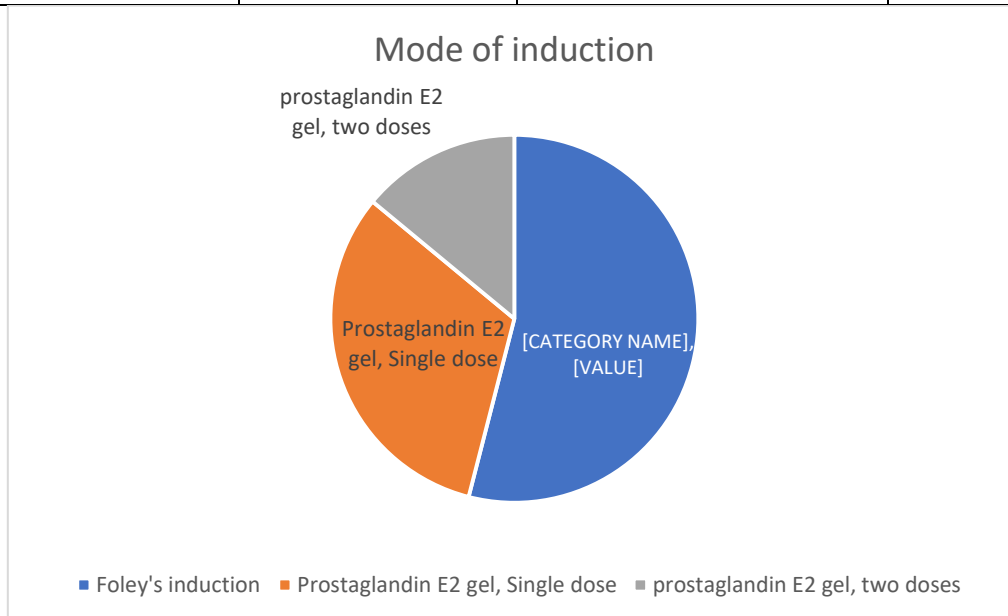


Fig.1. Distribution of cases according to mode of Induction In the group B

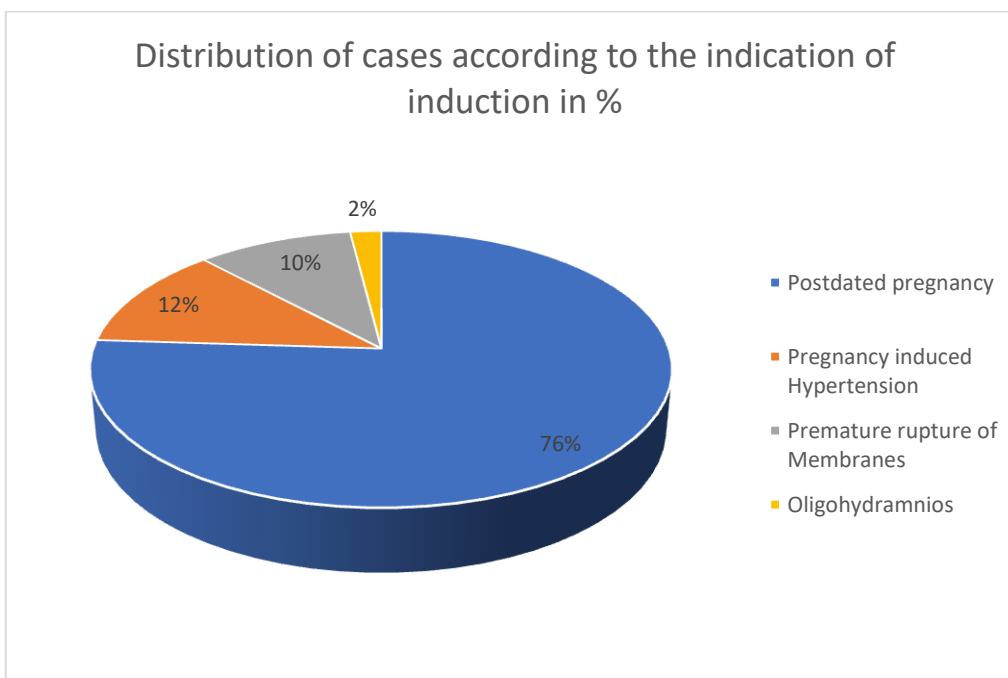


Fig.2. Distribution of cases according to Indication of the induction in the group B

The primary outcome of the study was to determine the mode of delivery and analysis of (**Table 3**) revealed that vaginal delivery was more common in the natural group than the induced group (78% vs.52%) and more LSCS was seen in induced groups at 22% vs. 48%. (p value <0.05)

In order to assess the safety of inducing labour in individuals who had previously undergone a caesarean section, secondary outcomes were examined. The need for augmentation of labour, Mean Duration of active labour (Hours), and Mother's Hospital Stay were found to have a significant difference with a p value 0.05

and were found to be higher in group B. However, the APGAR score at 1- and 5-minutes, admission to the nursery, and the baby's condition at the time of discharge were comparable in both groups with a p value >0.05. (**Table 3**)

Although no difference was seen in the indication of repeat caesarean sections between the two groups, the rate of repeat section was greater seen in the induction group with a statistically significant variation (p value < 0.05). (**Table 3**). In 22% of cases, the attempt at induction failed, resulting in a repeat caesarean procedure. (**Table 3**).

Table 3. Fetomaternal outcome

Outcomes	Group A	Group B	Statistical analysis
Primary Outcome			
Vaginal delivery	37 (74%)	26(52%)	P <0.01% (S)*
Instrumental delivery	2 (4%)	0	
LSCS	11(22%)	24 (48%)	P <0.05%
Indication of LSCS			
Foetal Distress	11(22%)	10 (20%)	P=0.806 (NS)
Scar tenderness	0	3(6%)	P=0.278(NS)
Failed Induction	0	11(22%)	P=0.278(NS)
Secondary Outcomes			
Scar Dehiscence	4 (8%)	2(4%)	P=0.399 (NS)
Rupture Uterus	1(2%)	1(2%)	P=1(NS)
PPH	3	1	P=0.307 (NS)
Retained Placenta	1	1	P=1(NS)
Augmentation of Labour required with oxytocin	8	18	P< 0.05 (S)
Mean Duration of active labour (Hours)	6.54±2.13	4.78±2.41	P=0.002(S)

APGAR score<7 • 1 min • 5 min	12 2	13 1	P=0.817 (NS) P=0.557 (NS)
Satisfactory Discharge of Baby	49	50	P=0.314 (NS)
Admission to nursery	2	3	P=0.646(NS)
Still birth	1	0	NS
Hospital Stay of Mother • < 3days • 3-7 days • >7 days	33 16 1	13 30 7	P<0.001 *** (HS) P<0.01(S) P<0.05 (S)
Hospital Stay of Baby in NICU (Mean duration in days)	4.5±0.70	3.33±1.52	P=0.336 (NS)

The success rate of vaginal deliveries in relationship to prior obstetric history was also observed, and it was

found that a successful VBAC is facilitated by a prior history of vaginal deliveries (Table 4).

Table 4. Success rate of vaginal delivery in relation to previous obstetric History

Groups	History of vaginal delivery		No history of vaginal delivery		Statistical significance
	Total no. of cases	Successful VBAC	Total no. of cases	Successful VBAC	
Group A	4(8%)	4(100%)	46 (92%)	33(71.73%)	P <0.01% (S)
Group B	11(22%)	9(81.81%)	39(78%)	17(43.58%)	P=0.025 (S)

According to the method used for labour induction, there was no difference in the primary outcome, and the results

were comparable within group B and statistically insignificant (Table 5)

Table 5. Outcomes in relation to Method of induction in Induction of labour group (B)

Outcomes in group B according to method of Induction	Foley's induction(n=27)	Prostaglandin E2 gel (N=23)	Statistical significance
Vaginal delivery	12	14	0.246, (NS)
LSCS	15	9	0.360(NS)
Scar dehiscence	1	1	0.907(NS)
Rupture uterus	0	1	0.27 (NS)

Discussion

Few healthcare facilities are still hesitant of VBAC due to concerns about uterine rupture, medical malpractice lawsuits, and a lack of adequate infrastructure, physician's choice all of which serve to reinforce the adage that once a caesarean always a caesarean. (Barger, 2013)

VBAC has become a safe and reasonable choice for both pregnant women and obstetricians thanks to enhanced maternity care, institutional deliveries, thorough foetal monitoring, and selective recruitment of the candidates.

According to recommendations made by the American College of Obstetricians and Gynaecologists (ACOG) and the RCOG, most women who have had caesarean sections in the past should be able to deliver vaginally if there are no other reasons not to (Royal College of Obstetricians & Gynaecologists, 2015; The American College of Obstetricians & Gynaecologists, 2019).

In order to determine how safely induction of labour may be recommended to females who have previously had caesarean sections, the current study evaluated the maternal and foetal outcomes of natural and induced labour in women who had previously undergone caesarean sections.

The major end measure in a cohort study by Anna Locatelli et al. on 310 women who had previous caesarean section was the incidence of uterine rupture in the natural and induced groups, cases were adjusted for maternal age and parity. Similarly, Age, education levels, place of residence, and level of literacy were all matched in our study. (Locatelli et al., 2004)

When the data for the previous caesarean section were analysed, it was

discovered that foetal distress, lack of progress in labour, and malpresentation were the most common indications. Wallstrom T et al. conducted a retrospective cohort research on women with a history of c-section and induction of labour with a viable foetus, cephalic presentation, singleton, at 34 weeks, (n = 910) at the four largest clinics in Stockholm between 2012 and 2015. The study's aim was to compare the proportion of uterine ruptures caused by the three IOL techniques with unfavourable cervix, and they discovered that the main indications of the previous LSCS were foetal distress and malpresentation (breech presentation) like our study.

Premature rupture of membrane (PROM) and post-dated pregnancy were noted as indications of IOL in the study mentioned above, which is consistent with this study. (Wallstrom et al., 2018) in contrast to study done by Sheikh et al they found PROM was major indication for IOL followed by post-dated pregnancy. (Al Shaikh & Al Mandeel, 2013).

According to a prospective cohort study by Al Sheikh et al to evaluate the success rate of vaginal birth after caesarean birth on 320 women, 52 of whom needed an IOL, the major approach employed by the researchers in 40.6% of cases was mechanical dilatation of the cervix using a foley's catheter, which was like our study, where we used a foley's catheter in 54% of cases with the intention of performing gradual dilatation. (Al Shaikh & Al Mandeel, 2013)

As having a vaginal delivery was the primary goal for both groups in the current study, it was found that both groups observed vaginal deliveries, but that the natural group encountered more vaginal deliveries than the induced group,

with a statistically significant difference between the two groups (76% vs. 52%). They also found rate of vaginal delivery is on lower side in induced group than IOL groups, in study done by Al Sheikh et al it was observed that 72% females deliver vaginally in natural group while 63.5% in induced group in study done Kiwan R et al found 66.6% vs 50 % in natural and induced group respectively (**Al Shaikh & Al Mandeel , 2013; Gyamfi et al., 2004**)

The results of our study showed that the repeat caesarean rate in the induced group was much higher than in the natural group (48% vs. 22%). The most frequent cause of LSCS in both groups was foetal distress, which was followed by failed induction in the induced group. Due to the continuous, meticulous observation of labour's events, foetal distress may be seen more frequently. A few IOL attempt (22%) that failed after giving a full trial of scar to succeed, ended up in LSCS. The same finding that the rate of LSCS is higher in the induced group is supported by a study by Al Sheikh et al. In contrast to our study, a prospective study conducted by Islam A et al supported the evidence for the same, and the most common indication in their study was failed induction followed by foetal distress (**Al Shaikh & Al Mandeel, 2013; Kiwan & Al Qahtani., 2018**)

Augmentation of labour was more required in induction group as compared to natural group which led to overall less mean duration of active labour and these findings are comparable with studies done by this is not in synchrony as a study done by Islam A et al in their study induction of labour in previous one caesarean case is significantly reduced with successful vaginal delivery (**Islam et al.,2011**)

Mean duration of active labour was seen less in induced group than natural group (4.78 ± 2.41 vs 6.54 ± 2.13) which could be justified that induction group patient were more in need of augmentation of labour by oxytocin which expedite the vaginal delivery it contrasts with study done by **Islam et al. (2011)**.

There were no significant differences in maternal complications such as postpartum haemorrhage, scar dehiscence, rupture uterus, and retained placenta, and it was discovered that induction of labour can be chosen wisely when the patient for induction of labour is chosen. These findings are consistent with a systematic review and meta-analysis conducted by **Rossi et al. (2008)**, and the main concern is that uterine rupture is found to be much less common in the induction group. The findings are similar to those of **Flamm et al. (1997)** who discovered a non-significant increase in the rate of uterine rupture

Scar dehiscence rate of 3.7% with Foley's induction and 4.3% with PGE2 induction and no scar dehiscence were seen in the candidates who required oxytocin augmentation, no significant differences were noted when compared with the natural group, and inference was made that the induction can be done safely, which is consistent with a study done in India by Ziyauddin F et al authors who compared transcervical foleys vs PGE2 gel. (None of their cases had scar dehiscence, which supports our study's conclusion that the safety profile is appropriate for induction of labour in cases of previous LSCS (**Ziyauddin et al., 2013**)

There was no significant difference was observed in neonatal outcomes which were measured in the

terms of APGAR score at birth, admission to NICU, still Birth, and hospital stay, and our data was like study done by. Tan PC et al. where they found less neonatal admissions after successful VBAC (**Tan et al. ,2007**)

The success rate of vaginal delivery was higher in cases with a history of previous vaginal delivery, and it was discovered in the current study that a history of previous vaginal delivery was a significant good predictor of current vaginal delivery, which is comparable to the findings of Landon MB et al. They conducted a four-year prospective cohort study and discovered that previous vaginal delivery, is the best predictor of successful TOL. (**Landon, 2005**)

In present study mode of induction of labour, used were mechanical dilatation by Foley's and PGE2 gel and it was found that both methods are equally effective and used safely according to Bishop score at the time of induction.

Conclusion

According to the study's findings, natural labour had a higher chance than induced labour of resulting in a successful vaginal birth. Success rates of vaginal delivery increased if they had previously given birth vaginally. If the candidates for induction of labour are carefully identified, there is no increase in maternal or perinatal morbidity or death when induction of labour is used as the labour and delivery management approach.

Although uterine rupture is not considerably more likely to occur when a woman has had a previous caesarean surgery, it is nevertheless important to utilise prostaglandin E2 and oxytocin cautiously. The patient recruited for trial of labour after caesarean section itself should be chosen carefully. Based on our findings,

we arrive at the conclusion that women who have previously undergone a caesarean section may consider inducing labour if a vaginal delivery is not contraindicated. Strict institutional protocol must be followed for these women, and uterine rupture or scar dehiscence must be constantly monitored.

Conflicts of Interest: None

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References

- **Bhasin SK, Roy R, Agrawal S, Sharma R. (2011).** An epidemiological study of major surgical procedures in an urban population of East Delhi. *Indian Journal of Surgery*, 73: 131-135.
- **Liu S, Liston RM, Joseph KS, Heaman M, Sauve R, Kramer MS. (2007).** Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term. *CMAJ*, 176(4):455-460.
- **Birth After Previous Caesarean Birth (2015).** Green-top Guideline No. 45 October 2015. Available at: https://www.rcog.org.uk/media/kpkjwd/5h/gtg_45.pdf (Accessed: February 9, 2023).
- **He L, ChenM, He GL, Liu XX. (2016).** Clinical study on vaginal birth after cesarean. *Zhonghua fu Chan ke za zhi*, 51(8):586-591.

- **Balachandran L, Vaswani PR, Mogotlane R. (2014).** Pregnancy outcome in women with previous one cesarean section. *Journal of clinical and diagnostic research*, 8(2):99.
- **Pandis GK, Papageorghiou AT, Otigbah CM, Howard RJ, Nicolaides KH. (2001).** Randomized study of vaginal misoprostol (PGE1) and dinoprostone gel (PGE2) for induction of labor at term. *Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology*, 18(6):.629-635.
- **West HM, Jozwiak M, Dodd JM. (2017).** Methods of term labour induction for women with a previous caesarean section. *Cochrane Database of Systematic Reviews*, 6(6):CD009792
- **Barger MK, Dunn JT, Bearman S, DeLain M, Gates E. (2013)** .A survey of access to trial of labor in California hospitals in 2012. *BMC Pregnancy and Childbirth*, 13:83. doi: 10.1186/1471-2393-13-83.
- **Obstetricians ACo G. (2019)** .ACOG practice Bulletin No. 205: vaginal birth after cesarean delivery. *Obstet Gynecol*, 133:.e110-27.
- **Locatelli A, Regalia AL, Ghidini A, Ciriello E, Biffi A, Pezzullo JC. (2004).** Risks of induction of labour in women with a uterine scar from previous low transverse caesarean section. *BJOG: An International Journal of Obstetrics & Gynaecology*, 111(12):1394-1399.
- **Wallstrom T, Bjorklund J, Frykman J, Jarnbert-Pettersson H, Akerud H, Darj E, et al. (2018).** Induction of labor after one previous Cesarean section in women with an unfavorable cervix: A retrospective cohort study. *PLoS One*, 13(7): p.e0200024.
- **Al-Shaikh G, Al-Mandeel H. (2013).** The outcomes of trial of labour after cesarean section following induction of labour compared to spontaneous labour. *Archives of gynecology and obstetrics*, 287:.1099-1103.
- **Gyamfi C, Juhasz G, Gyamfi P, Stone JL. (2004).** Increased success of trial of labor after previous vaginal birth after cesarean. *Obstetrics & Gynecology*, 104(4):715-719.
- **Kiwan R, Al Qahtani N. (2018).** Outcome of vaginal birth after cesarean section: A retrospective comparative analysis of spontaneous versus induced labor in women with one previous cesarean section. *Annals of African medicine*, 17(3):145.
- **Islam A, Ehsan A, Arif S, Murtaza J, Hanif A. (2011).** Evaluating trial of scar in patients with a history of caesarean section. *North American journal of medical sciences*, 3(4): 201.
- **Rossi AC, D'Addario V. (2008).** Maternal morbidity following a trial of labor after cesarean section vs elective repeat cesarean delivery: a systematic review with metaanalysis. *American journal of obstetrics and gynecology*, 199(3): 224-231.
- **Flamm BL, Anton D, Goings JR, Newman J. (1997).** Prostaglandin E2 for cervical ripening: a multicenter study of patients with prior cesarean delivery. *American journal of perinatology*, 14(03):157-160.
- **Ziyauddin F, Hakim S, Beriwal S. (2013).** The transcervical foley catheter versus the vaginal prostaglandin e2 gel

in the induction of labour in a previous one caesarean section—a clinical study. *Journal of clinical and diagnostic research*, 7(1):140.

- **Tan PC, Subramaniam RN, Omar SZ. (2007).** Labour and perinatal outcome in women at term with one previous lower-segment Caesarean: A review of 1000 consecutive cases. *Australian and New Zealand journal of*

obstetrics and gynaecology, 47(1):31-36.

- **Landon MB, Leindecker S, Spong CY, Hauth JC, Bloom S, Varner MW, et al. (2005).** The MFMU Cesarean Registry: factors affecting the success of trial of labor after previous cesarean delivery. *American journal of obstetrics and gynecology*, 193(3); 1016-1023.