

THE MODE OF DELIVERY OF GRAND MULTIPAROUS WITH POST-CAESAREAN SINGLE UTERINE SCAR

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Abstract: Background: The incidence of great multiparity is high in developing countries. Grand multiparity is accompanied by different obstetrical complications. Post cesarean single uterine scar is the prevalent adverse outcome of grand-multiparity.

Aim: To assess the mode of delivery and its maternal and neonatal outcomes in grand-multiparous women with a single uterine scar.

Methods: This study is an observational prospective case-control study conducted in Labour room of Basra Maternity and Children Teaching Hospital in Basra city/Iraq for duration of one year from 1st of January, till 31st of December 2024 on sample of 600 grand-multiparous pregnant women. The ultrasound examination was done by Radiologist in the hospital to assess the caesarean section uterine scar. The neonatal outcomes were assessed by following neonates one day after labour. The neonatal Apgar score was assessed by the Pediatrician at Labour room.

Results: The caesarean section uterine scar was present in 24.5% of grand multiparous pregnant women. Significant factors related to caesarean section uterine scar are increased age, previous caesarean section, previous labour complications, recent emergency caesarean section, breech indication and prolonged labour ($p \leq 0.05$). The caesarean section uterine scar leads to better Apgar score at 5 minutes.

Conclusions: The proportion of caesarean section uterine scar in grand-multiparous pregnant women is within acceptable range. The risk of fetal distress was not increased by the presence of a uterine scar. Although The chance of an emergency caesarean section was elevated in the scar group, there was no noticeable drop of the newborn outcomes, Grand multipara women with scarred uteri should be given the opportunity to give birth vaginally if there are no additional fetomaternal complications.

Keywords: Grand-multiparous, Cesarean section, Uterine scar.

1. Introduction

Ensuring maternal health, a key Sustainable Development Goal (SDG), is challenged in developing countries where 99% of maternal mortalities occur (1). Rising Caesarean section (CS) rates, from 6.7% in 1990 to 19.1% in 2014 (2), have increased the prevalence of scarred uteri. This is the most significant risk factor for uterine rupture (3), a major cause of maternal death, especially in developing nations (4).

Grand multiparity—five or more births (5)—further complicates this. While rare in developed countries (3–4%), it is common in developing nations (10–33.6%) (6). Grand multiparity independently increases obstetric risks (7, 8, 9) and elevates the risk of uterine rupture in women with a scarred uterus, yet studies combining these two risk factors are scarce (10).

The integrity of the post-caesarean scar is crucial. Poor healing can lead to defects (isthmoceles), influenced by incision location and closure technique (11). Evidence conflicts on single- versus double-layer closure; while some meta-analyses favor double-layer for better scar thickness (12), clinical rupture rates may be unaffected (13).

Women with a previous CS face a choice: planned elective repeat caesarean delivery (ERCD) or planned vaginal birth after caesarean (VBAC) (14). ERCD carries risks of operative injury and abnormal placental adherence in future pregnancies (15). Planned VBAC is often preferred, with success rates over 60%, offering shorter recovery (16). However, this trial of labor after caesarean (TOLAC) carries the primary risk of uterine rupture (17). Uterine rupture is a catastrophic event associated with severe maternal morbidity (haemorrhage, hysterectomy) (18) and devastating neonatal outcomes, including hypoxic-ischemic encephalopathy and perinatal death (19). A failed TOLAC requiring emergency CS also increases morbidity (20). Predicting TOLAC success is vital, especially for high-risk cohorts like grand multiparous women with a uterine scar. Therefore, the current study aims to assess the mode of delivery and its maternal and neonatal outcomes in grand-multiparous women with a single uterine scar.

2. Methods

This observational prospective case-control study was conducted in the labour room of Basra Maternity and Children Teaching Hospital in Basra, Iraq. The study spanned one year, from January 1st to December 31st, 2024. The study population included all grand-multiparous (five or more deliveries) pregnant women admitted to the labour room. Women were included if they were adults, at ≥ 37 weeks gestation, and had a singleton pregnancy. Women were excluded if they had unknown or multiple uterine scars, a previous classical cesarean section, previous uterine/cervical surgeries, preterm gestation, twin pregnancies, fetal congenital anomalies, or opted for an elective cesarean section.

A convenient sample of 600 eligible women was selected and divided into two groups: Group 1 (Case group) included 147 grand-multiparous women with a single lower uterine segment transverse scar, and Group 2 (Control group) included 453 grand-multiparous women without a uterine scar.

Data were collected directly from the women and their medical records using a questionnaire designed by the researcher and supervisor. Information gathered included age, gestational history (gravidity, parity, miscarriage), antenatal care, chronic medical illnesses, previous mode of delivery, and complications. For the recent delivery, the mode, duration, and indication for emergency CS were recorded. Fetal outcomes (birth weight, Apgar scores, NICU admission, status) were assessed by a pediatrician at 1 and 5 minutes and followed up one day post-delivery. Gestational age was confirmed by LMP or early ultrasound, and the uterine scar was assessed by a hospital radiologist via ultrasound.

Ethical approval was obtained from the Iraqi Board of Medical Specialization, and agreement was secured from the hospital authorities. Oral informed consent was obtained from all participants.

All data were analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Descriptive statistics were presented as mean \pm standard deviation (SD) or frequencies and percentages. The Chi-square test, or Fisher's exact test when appropriate (expected variable $< 20\%$), was used for categorical variables. A p -value ≤ 0.05 was considered statistically significant.

3. Results

This study included (600) grand-multiparous pregnant women, which include: (147) grand multipara with single lower segment uterine scar 24.5%, and (453) grand multipara without uterine scar 75.5%.

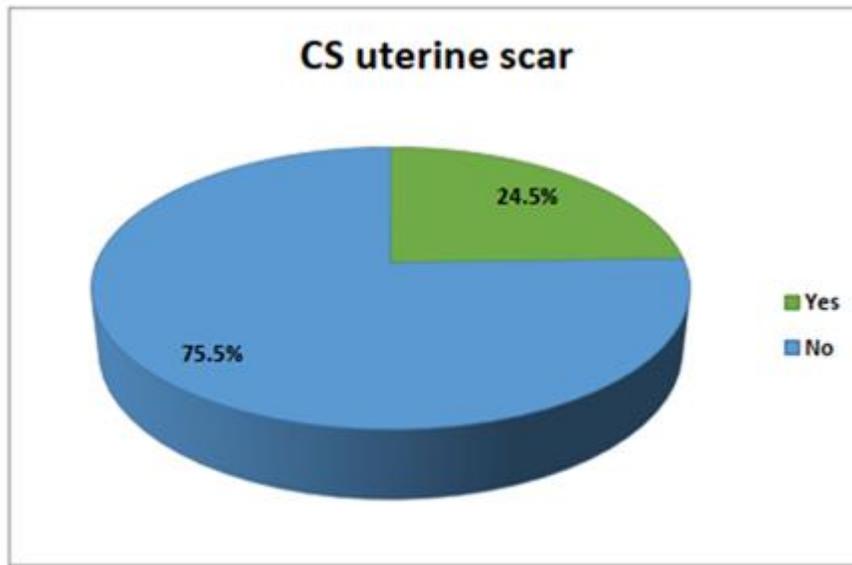


Figure (3-1): Percentage of CS uterine scar in pregnant women.

More than two-thirds (76.5%) of pregnant women were delivered by normal vaginal delivery, while 20.5% of them were delivered by emergency caesarean section and 3% were delivered by instrumental vaginal delivery.

Table (3-1): Recent mode of delivery of pregnant women

Variable	No.	%
Recent delivery mode		
NVD (Normal Vaginal Delivery)	459	76.5
Instrumental VD	18	3.0
Emergency CS	123	20.5

There was a significant association between increased age of pregnant women and CS uterine scar ($p=0.01$).

Table (3-2): Distribution of age according to CS uterine scar

Age Group	CS uterine scar – Yes		CS uterine scar – No		P-value
	No.	%	No.	%	
20–29 years	13	8.8	84	18.5	0.01*
30–39 years	113	76.9	300	66.2	
≥40 years	21	14.3	69	15.2	

* Chi-square test, **S = Significant**

No significant differences were observed between pregnant women with CS uterine scar and pregnant women without CS uterine scar regarding gravidity ($p=0.2$), parity ($p=0.1$), miscarriage ($p=0.5$), number of miscarriages ($p=0.7$) and gestational age ($p=0.3$).

Table (3-3): Distribution of gestational characteristics according to CS uterine scar

Variable	CS uterine scar – Yes		CS uterine scar – No		P-value
	No.	%	No.	%	
Gravidity					
Gravida 6–7	108	73.5	309	68.2	0.2 ^{Ns}
Gravida ≥8	39	26.5	144	31.8	
Parity					
Para 5–6	132	89.8	384	84.8	0.1 ^{Ns}
Para ≥7	15	10.2	69	15.2	
Miscarriage					
Yes	54	36.7	153	33.8	0.5 ^{Ns}
No	93	63.3	300	66.2	
Number of previous miscarriages					
Previous one	36	66.7	99	64.7	0.7 ^{Ns}
Previous more than one	18	33.3	54	35.3	
Gestational age					
37–39 weeks	135	91.8	405	89.4	0.3 ^{Ns}
40–41 weeks	12	8.2	48	10.6	

Chi-square test, NS = Not significant.

There was a highly significant association between positive antenatal care and pregnant women with CS uterine scar ($p < 0.001$). No significant differences were observed between pregnant women with CS uterine scar and pregnant women without CS uterine scar regarding chronic medical illness history ($p = 0.5$). There was a highly significant association between previous labour complications and pregnant women with CS uterine scar ($p < 0.001$).

Table (3-4): Distribution of clinical and obstetrical history according to CS uterine scar

Variable	CS uterine scar – Yes		CS uterine scar – No		P-value
	No.	%	No.	%	
Antenatal care					
Yes	132	89.8	285	62.9	<0.001*
No	15	10.2	168	37.1	
Chronic medical illness					
Yes	51	34.7	138	30.5	0.5 ^{Ns}
No	96	65.3	315	69.5	
Medical illness type					
Hypertension	14	27.5	39	28.3	0.3 ^{Ns}
Anemia	15	29.4	34	24.6	
G6PD deficiency	0	–	10	7.2	
Diabetes Mellitus	12	23.5	22	15.9	
Heart disease	6	11.8	10	7.2	
Asthma	3	5.9	16	11.6	
Epilepsy	0	–	7	5.0	
Sickle cell trait	1	1.9	6	4.3	
Labour complications in previous delivery					
Positive	78	53.1	42	9.3	<0.001*
Negative	69	46.9	411	90.7	

*Chi-square test, Fisher's exact test; *S = Significant, ^{Ns} = Not significant.*

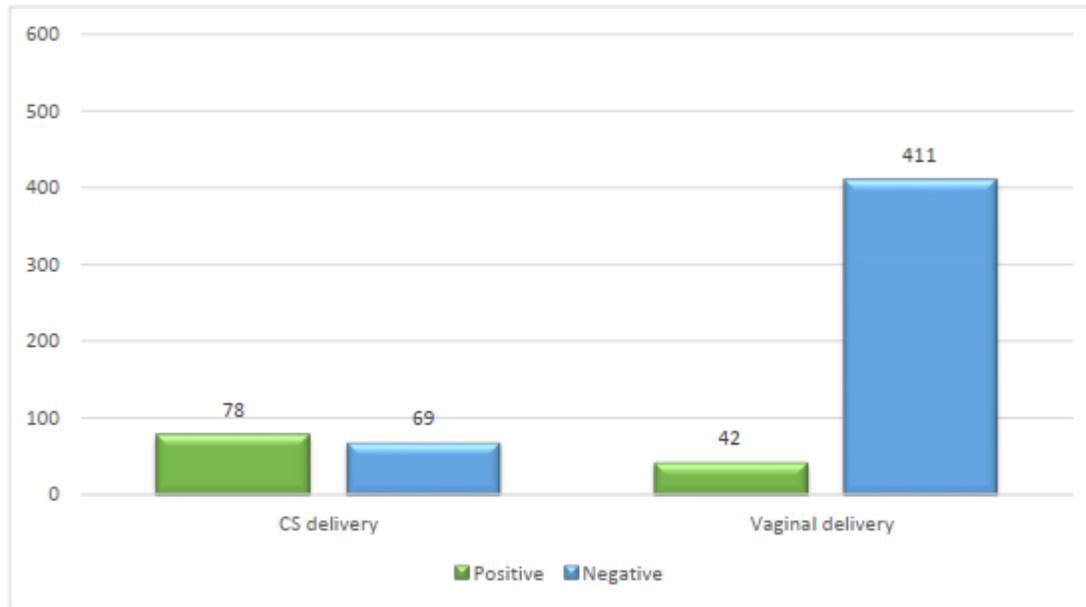


Figure (3-2): Distribution of previous labour complications according to CS uterine scar.

There was a highly significant association between emergency CS recent delivery mode and pregnant women with CS uterine scar ($p < 0.001$). The VBAC successful in 53.1%, There was a significant association between breech urgent indication and pregnant women with CS uterine scar ($p < 0.001$). A highly significant association was observed between prolonged labour duration of pregnant women and CS uterine scar ($p < 0.001$).

Table (3-5): Distribution of recent labour characteristics according to CS uterine scar

Variable	CS uterine scar – Yes		CS uterine scar – No		P-value
	No.	%	No.	%	
Recent delivery mode					
NVD	69	46.9	390	86.1	<0.001*
Instrumental VD	9	6.2	9	2.0	
Emergency CS	69	46.9	54	11.9	
Indications of emergency CS					
Failure to progress	16	23.1	12	22.2	<0.001*
Breech	15	21.7	10	18.5	
Macrosomia >4 kg	10	14.5	8	14.8	
Meconium-stained liquor	7	10.1	5	9.3	
Prolonged 2nd stage	7	10.1	3	5.6	
Sustained fetal bradycardia	4	5.8	2	3.7	
Post-date	5	7.2	1	1.9	
Pre-eclampsia / eclampsia	3	4.3	2	3.7	
Intrapartum hemorrhage (placental abruption)	4	5.8	2	3.7	
Cord prolapse	2	2.9	2	3.7	
Ruptured uterus	2	2.9	1	1.9	

Duration of recent labour					<0.001*
≤6 hours	66	16.9	327	83.1	
>6 hours	72	84.2	52	16.0	

* Chi-square test, Fisher's exact test; S = Significant.

No significant differences were observed between pregnant women with CS uterine scar and pregnant woman without scar regarding birth weight ($p=0.3$), NICU admissions ($p=0.9$), fetal statues ($p=0.16$) and Apgar score at 1 minute. There was a highly significant association between normal Apgar score (≥ 7) at the fifth minute and CS uterine scar ($p<0.03$).

Table (3-6): Distribution of fetal outcomes according to CS uterine scar

Variable	CS uterine scar – Yes		CS uterine scar – No		P-value
	No.	%	No.	%	
Birth weight					0.3 ^{Ns}
Normal ≥ 2.5 kg	109	74.2	335	74.0	
Low < 2.5 kg	30	20.4	90	19.9	
Macrosomia > 4 kg	8	5.4	27	6.0	
Apgar score after 1 minute					0.1 ^{Ns}
Normal ≥ 7	130	88.4	398	85.6	
Low < 7	17	11.6	67	14.4	
Apgar score after 5 minutes					0.03*
Normal ≥ 7	146	99.3	433	95.6	
Low < 7	1	0.7	20	4.4	
NICU admission					0.9 ^{Ns}
Yes	20	13.7	53	11.4	
No	127	86.3	437	88.6	
Fetal status					0.16 ^{Ns}
Dead	2	1.1	4	0.8	
Alive	145	98.9	489	99.2	

*Fisher's exact test, Chi-square test; *S = Significant, ^{Ns} = Not significant.*

4. Discussion

The global incidence of caesarean section delivery mode has unfortunately increased, leading to higher rates of single uterine scar, especially among grand multiparous women. Identifying risk factors related to the caesarean section uterine scar is essential in preventing maternal and neonatal adverse outcomes (21).

The current study found that the caesarean section uterine scar was present in 24.5% of pregnant women, this prevalence rate of caesarean section uterine scar among multiparous women was lower than the rate of (37%) reported by Al-Omda et al (22) study in Egypt. However, this prevalence rate is close to the results of Bij de Vaate et al (23) observational prospective cohort study in the Netherlands, which found that the prevalence rate of the caesarean section (24%). Different authors reported that the prevalence of caesarean section uterine scars among multipara women was ranging between 24%-70% (24). In Iraq, a cross-sectional study conducted by Abbass et al (25) found that 51.6% of grand multipara women had a caesarean section uterine scar. Fakhr et al (26) cross-sectional study in Iran reported that about 65.3% of grand multipara women had a caesarean section uterine scar. These differences in prevalence of caesarean section uterine scar in grand multipara women might be attributed to differences in definition and diagnostic tools between different studies in addition to differences in study methodology, duration, and sample size between different studies.

The result of our study shows that recent delivery modes were normal vaginal delivery (76.5%), (3%) instrumental vaginal delivery, and (20.5%) were delivered by emergency caesarean section. These findings are close to the results of Dasa et al (27) prospective cohort study in Nigeria, which reported that 20.5% of grand multiparous pregnant women were delivered by caesarean section.

In the present study (53.1%) of grand multipara with scar delivered by VBAC. This finding is consistent with the study finding of (53.6 %) in Saudia (28), (53.1%) in Nigeria (29), (57%) in China (30). Present study showed a highly significant association between increased age of pregnant women and CS uterine scar ($p=0.01$). This finding is consistent with the results of Wang et al (31) retrospective cohort study in China which found an increased age of pregnant women with caesarean section uterine scars compared to women without scar. Which can be explained by the decrease uterine elasticity with age and multiple deliveries, weakened uterine musculature, multiple deliveries can cause weakening of the uterine muscles and reducing the effectiveness of contractions and higher incidence of obstetric complications in older grand multipara However, Budny-Wińska et al (32) study in Poland found no significant effect of women's age on the development of caesarean section uterine scar.

The current study found a highly significant association between positive antenatal care and pregnant women with CS uterine scar ($p<0.001$). This finding further supports the results of Eleje et al (33), case report study in Nigeria, which stated that grand multiparous women with a history of previous caesarean sections were regarded as high-risk group pregnant women that received strict antenatal care. Our study found a highly significant association between previous labour complications and pregnant women with CS uterine scar ($p<0.001$). This finding coincides with the results of Ye et al (34). Study in China which reported that previous labour complications lead to a higher risk of caesarean section uterine scar development. This study found a highly significant association between emergency CS recent delivery mode and pregnant women with CS uterine scar ($p<0.001$). This finding is parallel to the results of Hua and Oualja study in Morocco which found that emergency caesarean section was the predominant recent delivery mode of pregnant women with uterine scar (35).

Our study found a highly significant association between breech urgent indication and pregnant women with CS uterine scar ($p<0.001$). This finding is consistent with reports of Zhu et al (36) retrospective review study in China, which revealed that abnormal lie, especially breech labour, was the common indication for emergency caesarean section. In our study, a highly significant association was observed between prolonged labour duration of pregnant women and CS uterine scar ($p<0.001$), this finding further support Deshmukh et al (37), expert review study that documented a longer labour duration for pregnant women with a caesarean section uterine scar. Prolonged labour can be explained by reduced contractility from presence of the scar, cervical resistance and less flexibility fear of uterine rupture make health care providers more cautious with labour augmentation and adhesion from previous scar can also affect the ability of uterus to contract efficiently so close monitoring and early intervention, including repeat CS if necessary are essential for safe delivery.

The present study showed no significant differences between pregnant women with CS uterine scar and pregnant women without CS uterine scar regarding birth weight ($p=0.3$) NICU admissions ($p=0.9$), and fetal statues ($p=0.16$) These findings are consistent with the results of Tarik et al (38) retrospective study in Saudi Arabia, which reported that no significant differences were observed regarding the fetal weight and fetal statues in grand multipara with previous scar compared to non-scarred uterus in grand multipara .

In our study, the Apgar score at the fifth minute was better and highly significant in the pregnant women with CS uterine scar ($p<0.03$) This result coincides with the result of Valère et al (10) retrospective cohort study in Cameroon, which reported that the Apgar score was better in the scarred uterus grand multipara group. This is explained by the presence of additional risk factors (GM and

scarred uterus) in our study, which improves the outcomes of neonates by increasing awareness of the second but more significant morbidity which is the uterine scar.

5. Conclusion

The rate of caesarean section uterine scars among grand multiparous women in this study was within a normal range. Emergency caesarean delivery was mainly due to failure of labour to progress and breech presentation. A previous caesarean scar was significantly associated with older maternal age, prior caesarean delivery, previous labour complications, better antenatal care, recent emergency caesarean section, and prolonged labour.

Fetal outcomes showed that NICU admission and low birth weight were more related to grand multiparity itself, likely due to accompanying conditions such as hypertension, anaemia, and diabetes. Notably, Apgar scores at five minutes were higher among grand multiparous women with a uterine scar, possibly reflecting heightened clinical attention and monitoring for this higher-risk group.

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