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Factors Contributing to Uterine Scar Dehiscence in Pregnant Women with Previous One Caesarean Section at Al-Elwiya Maternity Teaching Hospital

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Abstract: **Background:** Uterine scar dehiscence is considered an incomplete division of the three layers of the uterus: the perimetrium, myometrium and endometrium, allowing visibility of the fetus through the perimetrium. The reported incidence of the cesarean section scar dehiscence ranges from 0.2% to 4.3%. Previous cesarean section scar dehiscence is a well-known risk factor for uterine rupture during trial of labor in subsequent pregnancy. An appropriate screening method for such cases and the best surgical approach for repairing scar dehiscence during delivery does not exist or has not been established.

Aim of the study: To estimate the incidence and risk factors for cesarean section scar dehiscence in pregnant women with previous one cesarean section scar who undergo second cesarean section delivery at Al-Elwiya Maternity Teaching hospital.

Patients and methods: This is a cohort study conducted in the Department of Obstetrics and Gynecology at Al-Elwiya Maternity Teaching Hospital / Baghdad during a period extending from the 1st of January 2022 till the 1st of October 2022. The study included all pregnant women with a viable fetus and a history of previous one cesarean section who became a candidates for cesarean section delivery. Follow-up of the cases was done to estimate the risk factors, presentation, maternal and neonatal outcomes.

Results: The study included 727 women who had a history of previous cesarean section and according to the status of the uterus, they were divided into two groups, first group those with scar dehiscence were 177 cases (24.3%) and the second group without dehiscence were 550 cases. The mean maternal age, body mass index, and parity were not different between the two groups. The current pregnancy gestational age was not different between the two groups, on the contrary, the mean gestational age of previous pregnancy was significantly lower in the first group. Regarding the interpregnancy interval, the first group had a significantly shorter interpregnancy interval less than 2 years. Pregnants who had their previous cesarean section in a private hospital had significantly higher dehiscent scar. The presentation was statistically different between the two groups, the scar tenderness, uterine contraction and bleeding were significantly higher in the first group, while the rate of active labor was significantly lower in the fisrt group compared to those in the second group. Regarding intraoperative findings cases with upper uterine segment scar were significantly higher in the first group than those in the second group. Regarding maternal outcome there was no difference in the rate of morbidity or mortality between the two groups, also neonatal outcome, no difference was found in Apgar score or birthweight between the two groups.

Conclusion: The incidence of uterine scar dehiscence in pregnants with previous one cesarean was 24.3%. Previous delivery before 37 weeks of gestation, shorter interpregnancy interval less than 24 months, upper segment uterine scar and delivery in a private hospital were the most common risk

factors for uterine scar dehiscence. Scar tenderness, vaginal bleeding, uterine contractions and failure to achieve active labor were the most common presentation of uterine scar dehiscence.

1. INTRODUCTION:

1.1. Cesarean section:

Cesarean delivery defines the birth of a fetus via laparotomy and then hysterotomy. This definition is not applied to removal of the fetus from the abdominal cavity in the case of uterine rupture or with abdominal pregnancy. Cesarean delivery has higher maternal surgical risks for the current and subsequent pregnancies compared with spontaneous vaginal birth[1]. Cesarean section (CS) rates have increased over the past 40 years from approximately 5% to more than 30% in many industrialized countries[2]. Recommendations of the world health organization (WHO) about optimal CS rates, addressing that the best outcomes of mothers and babies appear to occur with CS rates of 5% to 10%, while rates above 15% seem to do more harm than good[3].

In Iraq, the overall rate of cesarean section increased remarkably from 18.0% in 2008 to 24.4% in 2012; the rate increased in all the governorates during this period except Maysan. The increase was highest for Erbil, Basrah, Al-Sulaimaniya and Kirkuk with a relative change of 116.6, 90.8, 58.0 and 52.0%, respectively [4]. These dramatic increase in the rate of CS lead to increased rate of the cesarean section scar dehiscence (CSSD).

The reported incidence of CSSD ranges from 0.2% to 4.3%. Previous CSSD is a well-known risk factor for uterine rupture during trial of labor (TOL) in subsequent pregnancy. However, the clinical significance of CSSD in cases of repeated CS remains unclear. In addition, an appropriate screening method for such cases and the best surgical approach for repairing CSSD during delivery does not exist or has not been established[5].

1.2. Definitions of uterine rupture and uterine scare dehiscence:

Uterine rupture is a complete division of all three layers of the uterus: the perimetrium, myometrium and endometrium.

Uterine scar dehiscence is considered an incomplete division of the three layers, allowing visibility of the fetus through the perimetrium. Uterine dehiscence is often asymptomatic[6].

1.3. Pathophysiology:

Uterine strength after cesarean section is very important for predicting the outcome of future pregnancies. This is especially important in women who have had repeat cesarean deliveries. Cesarean section scars put women at an increased risk for menstruation problems, ectopic scar pregnancies, uterine dehiscence, uterine rupture and poor performance in labor[7].

Uterine incision closure methods may have a large effect on the strength of the uterus in future pregnancies. Patients who have had a “modified two-layer closure” of their uterus report less bleeding, greater scar thickness at six weeks post operation and fewer instances of scar dehiscence[8].

Tissue healing is comprised of two critical components: regeneration and repair. The two are distinguished by the resulting tissue. In regeneration, damaged specialized tissues are replaced by the growth of unharmed specialized cells in the surrounding area. When damaged tissue is repaired, it is replaced with granulation tissue that grows to produce scar tissue. The simplest method to explain the healing process is to break it down into major phases that are not mutually exclusive and overlap significantly. While there are other methods to 'split up' the complete process, the typical division into four stages is bleeding, inflammation, proliferation and remodeling[9]. The difficulty of obtaining serial samples of the hysterotomy scar significantly limits our understanding of what occurs during postpartum remodeling of the uterine incision after cesarean delivery. As a consequence, nothing is known about the regeneration of uterine scar tissue after surgery. For example, nothing is known about whether the mammalian myometrium includes reserve cells that

develop into myometrial myocytes to permit scarless uterine regeneration[10]. The injured tissue is patched rather than restored to its original structure in the majority of mammals (i.e. repair). Even when complete healing occurs, the fibroproliferative response dominates wound repair and thus a fibrotic scar persists[11]. The majority of fenestrations or incomplete uterine ruptures are asymptomatic and may appear quite subtle at first. They may be observed during subsequent cesarean sections or laparotomies. Inadequate scarring during a cesarean section has become one of the prominent problems of this procedure. It is uncertain what causes and how partial scar healing occurs, as well as the degree to which this leads in functional uterine insufficiency[12].

A scar dehiscence develops as a weakened uterus, usually from a previous cesarean section, grows during pregnancy. As the gestation progresses and the uterus expands, the scar may lose integrity, leading to the separation of uterine layers, starting with the inner layers of the uterus and working outward. The defect is considered a dehiscence as long as the serosa layer of the uterus stays intact. Complications of uterine dehiscence are influenced by fetal position, location of the defect and location of the placenta. Location of the placenta in relation to the defect may also put patients at risk for abnormal adherence of the placenta to the uterine wall. Placenta percreta occurs when placental vessels penetrate the uterine wall. If this occurs, the mother is at risk for severe hemorrhage, hysterectomy, organ reconstruction and possibly death. Separation of the serosa is considered a uterine rupture. The overall incidence of uterine rupture is increasing due to the increasing number of cesarean deliveries being performed. One study found that uterine rupture occurred in 5 of 1000 mothers with a history of cesarean section[13].

Uterine rupture has many adverse outcomes for both the mother and neonate. One study found that almost half of mothers diagnosed with uterine rupture after a trial of labor developed moderate postpartum hemorrhage, 15% developed severe postpartum hemorrhage, and 3.8% required a peripartum hysterectomy. In the same study, 57.7% of neonates were found to have perinatal complications, of which 9.3% were considered serious. These included perinatal death, severe asphyxia and post-hypoxic encephalopathy[14].

1.4. Causes

The cause for a uterine scar dehiscence is based on the etiology behind the uterine scar defect or any event that would predispose the cesarean scar to dehisce. Underlying anatomical defects in the uterus which would have been corrected prior to pregnancy like uterine septum or fibroid uterus may weaken the uterus and the resultant scar of the cesarean section. In cesarean sections, risk of rupture in classical (i.e. vertical) incision in subsequent pregnancies is greater with the vertical incision as compared to the transverse incision. Risk factors for uterine rupture include myomectomy, septoplasty, metroplasty, trauma, congenital uterine anomalies (especially ectopic pregnancy in the rudimentary horn), inadequate treatment of endometriosis, placental abruption and mid-forceps delivery. Sometimes postpartum ruptures occur in patients giving birth by vaginal delivery following previous cesarean sections[15]. Typical important causes would be previous lower segment cesarean section, classical cesarean section, previous uterine trauma, congenital anomaly, abnormal placenta implantation and inappropriate oxytocin administration [16].

Repeated CS creates yet another scar that further weakens the lower segment of the uterus, thus increasing the risk of dehiscence. That the odds of a scar becoming deficient increase with the number of previous sections. An analogy to this observation is where repeated trauma to a wound can disrupt the normal healing process. Furthermore, this can be interrupting the final stage of wound healing in the skin, whereby the highly vascular granulation tissue is replaced by avascular scar tissue. Thus, further injury to the scar tissue, an area with poor vascular perfusion, will compromise the pathways involved in healing[17].

After induction of labor contraction of uterine muscle led to decrease in the thickness of uterine scar and dehiscence of the scar is more likely[18].

infection of the scar, could subsequently impair healing ability of the scar, thereby increasing the chance for dehiscence[19].

women operated during active stage, the lower segment is already formed and the incision in these cases is done mostly without cutting the uterus muscle itself. In women not in active labor, the incision is often done in the muscle itself, even if per-formed in the lower segment[20].

Uterine retroflexion was another variable that was associated with deficient scars. The chance of a woman with a retroflexed uterus having a deficient scar was more than twice that of a woman with an anteflexed uterus. The flexion point of the uterus is at the level of the internal os. In a retroflexed uterus the lower segment of the uterus is therefore under a degree of tension, which may compromise healing of a Cesarean section scar. This could be the result of mechanical traction to the scar or reduced vascular perfusion caused by stretching of the lower uterine segment. Impaired tissue perfusion results in reduced wound oxygen tension, which has been reported to delay wound healing by slowing the production of collagen[21].

1.5. Delivery after previous caesarean section:

There are two basic choices. First, a trial of labor after cesarean (TOLAC) offers the goal of achieving vaginal birth after cesarean (VBAC). If cesarean delivery becomes necessary during the trial, then it is termed a "failed trial of labor".

A second choice is elective repeat cesarean delivery (ERCD). This includes scheduled cesarean delivery as well as unscheduled but planned cesarean delivery for spontaneous labor or another indication.

The ultimate decision should weigh clinical factors known to influence TOLAC success as well as benefits and risks. As expected, these rates vary between institutions and providers. Factors that influence a successful TOLAC are listed in Table 1. Finally, economic, staffing, and medicolegal factors may shape the decision to offer TOLAC. To note that patients who had prior vaginal delivery had the highest success rate for TOLAC, patient who appropriately counseled antenatally were more cooperative with higher success rate. On the other hand, macrosomia associated with decreased success rate (relative contraindication). while prior uterine incision other than transverse incision (such as classical or T incision, or Transfundal surgery), history of previous uterine rupture, obstetrical complications such as placenta previa or accreta were contraindicated for TOLAC as they are associated with high risk for dehiscence of the scar or even complete uterine rupture.

It is problematic that both options have risks and benefits to mother and fetus but that these are not always congruent. Rates of uterine rupture and associated complications clearly are increased with TOLAC[22].

Table 1: Factors that influence a successful TOLAC[22].

Low risk	Increased failure rate	High risk*
➢ Transverse incision ➢ Prior vaginal delivery ➢ Appropriate counseling ➢ Sufficient personnel and equipment	➢ Single mother ➢ Increased maternal age ➢ Macrosomic fetus ➢ Obesity ➢ Breech ➢ Multifetal pregnancy ➢ Preeclampsia ➢ EGA >40 weeks ➢ Low-vertical incision ➢ Unknown incision ➢ Labor induction ➢ Medical disease ➢ Multiple prior cesarean deliveries ➢ Education <12 years ➢ Short interdelivery interval ➢ Liability concerns	➢ Classical or T incision ➢ Prior rupture ➢ Patient refusal ➢ Transfundal surgery ➢ Obstetrical contraindication, e.g., previa ➢ Inadequate facilities ***Most consider these absolute contraindications**
Favors success		
➢ Teaching hospital ➢ White race ➢ Spontaneous labor ➢ Prior fetal malpresentation ➢ 1 or 2 prior transverse incisions ➢ Nonrecurrent indication ➢ Current preterm pregnancy		

1.6. Benefits and risks associated with a trial of labor after previous CS

In addition to providing an option for those who want to experience a vaginal birth, VBAC is associated with several potential health advantages for women. For example, women who achieve VBAC avoid major abdominal surgery and have lower rates of hemorrhage, thromboembolism, and infection and a shorter recovery period than women who have an elective repeat cesarean delivery[23]. Additionally, for those considering future pregnancies, VBAC may decrease the risk of maternal consequences related to multiple cesarean deliveries (eg, hysterectomy, bowel or bladder injury, transfusion, infection and abnormal placentation such as placenta previa and placenta accreta).

However, elective repeat cesarean delivery and TOLAC are associated with maternal and neonatal risk. The risks of either approach include maternal hemorrhage, infection, operative injury, thromboembolism, hysterectomy and death. Most maternal morbidity related to TOLAC occurs when repeat cesarean delivery becomes necessary. Thus, VBAC is associated with fewer complications than elective repeat cesarean delivery, whereas a failed TOLAC is associated with more complications. Consequently, the risk of maternal morbidity is integrally related to a woman's probability of achieving VBAC[24].

Uterine rupture or dehiscence associated with TOLAC results in the most significant increase in the likelihood of additional maternal and neonatal morbidity. It should be noted that the terms "uterine rupture" and "uterine dehiscence" are not consistently distinguished from each other in the literature and often are used interchangeably. Furthermore, the reported incidence of uterine rupture varies in part because some studies have grouped true, catastrophic uterine rupture together with asymptomatic scar dehiscence. Additionally, early case series did not stratify rupture rates by the type of prior cesarean incision (eg, low transverse versus classical)[25].

Although some connotations may suggest that dehiscence is less morbid than rupture, that convention is not used in this document, and both terms refer to symptomatic or clinically significant events unless otherwise noted. One factor that markedly influences the likelihood of uterine rupture is the location of the prior incision on the uterus.The risk of uterine rupture is higher in women with other types of hysterotomies, with the exception of low vertical incision (a vertical incision performed in the lower uterine segment)[24].

1.7. Diagnosis of Uterine Scar Dehiscence

1.7.1. Clinical presentation:

Uterine dehiscence can produce a uterine window a thinning of the uterine wall that may allow the fetus to be seen through the myometrium. Often uterine dehiscence is an occult finding an asymptomatic patient. Patients that present with abdominal pain, may mark the presence of frank uterine rupture. High index of suspension should be practiced in the presence of any of risk factors of both dehiscence and uterine rupture[26].

Cesarean scar dehiscence can present in multiple ways. The presentation may be silent in many, but may cause symptoms like dysmenorrhea, inter menstrual bleeding, irregular genital bleeding, chronic pelvic pain, dyspareunia and secondary infertility[27]. During labor symptoms of eminent uterine rupture would include vaginal bleeding, sharp pain between contractions, abdominal pain or tenderness, recession of the fetal head, bulging under the pubic bone and onset of sharp pain at the site of previous scar[28]. Uterine scar dehiscence can thence occur either immediately after childbirth or some may have presentation after about 2-4 weeks of delivery. Presentation can be with post-partum hemorrhage, endomyometritis and peritonitis (generalized/localized). Once peritonitis occurs as a result, sepsis may ensue risking the life of the patient[29]. Rare and unusual presentations have been reported in associations with wound infections, secondary PPH concurrent postpartum uterine and abdominal wall dehiscence, site of implantation for ectopic pregnancy, etc. Infections with Streptococcus anginosus and Staphylococcus aureus have been reported also indicating the wide spectrum of infection possible in such a circumstance[30].

1.7.2. Imaging:

Sonography is a useful modality used to follow patients and monitor changes in the defect throughout pregnancy. When evaluating a cesarean scar dehiscence in a pregnant woman, both transabdominal and endovaginal sonography are recommended. Depending on the location of the defect, the gestational age of the fetus and the habitus of the mom, a transabdominal approach may provide a better overall view of the defect in relation to the fetus and the bladder. An endovaginal approach may provide more detail about the size of the defect and whether the serosa layer of the uterus is still intact. However, The Magnetic resonance imaging MRI is considered the gold standard for the diagnosis of uterine dehiscence. The neck of the defect should be measured in addition to the size of the sac protruding through the defect, when possible[14].

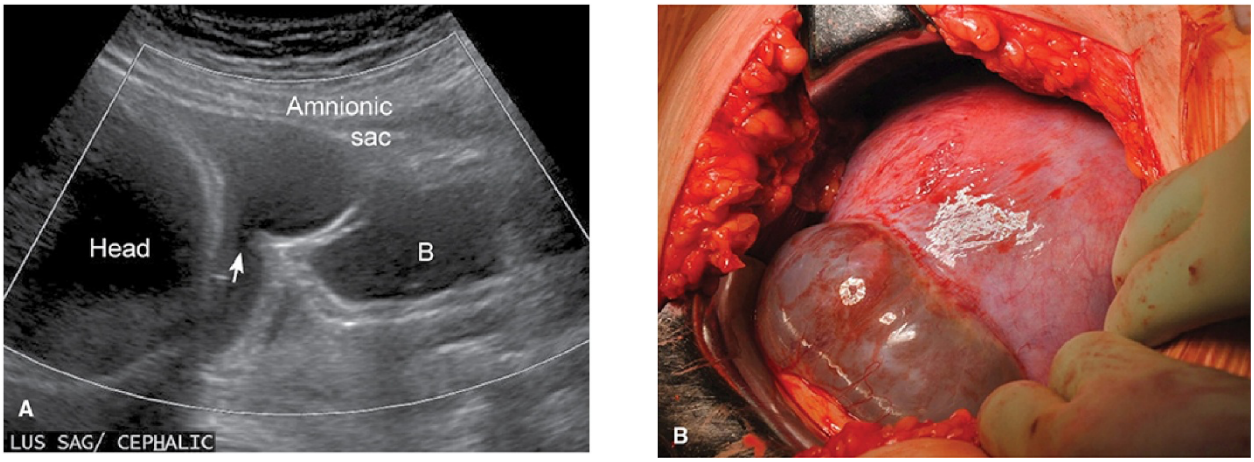

Figure 1: Uterine window[22].

Extensive “uterine window” in a woman at term with one prior low transverse cesarean delivery. A. Transabdominal sonogram shows the uterine defect (arrow), bulging amnionic sac, and adjacent anatomy. B = Bladder.

B. At the time of cesarean delivery, the amnionic sac is seen protruding through the defect and is visible beneath the thin vesicocervical peritoneum.

Figure 2: Sagittal MRI image showing the defect in the anterior lower uterine segment (arrow)[14].

1.8. Management

There is no standard for managing uterine dehiscence in a parturient with a stable fetal heart rate tracing. Uterine dehiscence in a full-term pregnancy is often managed by cesarean delivery, while

expectant management has been shown to be successful when there is uterine dehiscence in the preterm period[31].

There are several treatment options for uterine dehiscence, including pregnancy termination followed by repair of the defect, attempted repair of the defect with the pregnancy in utero, or expectant management with preterm delivery. Repair of the defect with the pregnancy in utero carries a significant risk of uterine rupture. This option should only be considered if the dehiscence is symptomatic. At the time of delivery, the defect may be repaired; however, hysterectomy may be necessary if damage to the uterus is extensive[14].

1.9. Red flags that require a surgical intervention:

- ✓ The presence of a bladder flap hematoma > 5 cm.
- ✓ large pelvic hematomas.
- ✓ Gas within the uterine defect, extending from the endometrial cavity to the extra uterine parametrium in association with hemoperitoneum is highly suspicious for uterine rupture.
- ✓ Demonstration of a continuous pathway between the endometrial cavity and the extrauterine collection, either by computerized tomography (CT) or MRI, is a pathognomonic finding for uterine rupture.

Differential diagnosis is important because uterine dehiscence can be managed conservatively instead uterine rupture require a surgical treatment[19].

1.10. AIM OF THE STUDY:

To estimate the incidence and risk factors for CS scar dehiscence in women with previous one CS scar that undergo second CS delivery at Al-Elwiya Maternity Teaching hospital.

Patients & methods

2. PATIENTS AND METHODS:

2.1. Study design, setting and data collection time

This is a cohort study conducted in the Department of Obstetrics and Gynecology at Al-Elwiya Maternity Teaching Hospital / Baghdad during a period extended from the 1st of January 2022 till the 1st of October 2022.

2.2. Study patients and Inclusion criteria

The study included all pregnant ladies with viable fetus and history of previous one CS, that are candidate for C/S delivery.

2.3. Exclusion criteria

- ✓ History of more than one CS.
- ✓ Patient delivered vaginally.
- ✓ Abnormally invasive placenta.
- ✓ Intra uterine fetal death
- ✓ Uterine rupture

2.4. Data collection tools

The data were arranged on a questionnaire paper which was designed for the study including the following information:

- ✓ Maternal age.
- ✓ Gestational age (GA).

- ✓ Gravida and Parity.
- ✓ Measurement of body mass index (BMI).
- ✓ Occupation and residency.
- ✓ Past medical and surgical history.
- ✓ Indication of previous CS.
- ✓ Location of the previous CS (private or general hospital).
- ✓ Presentation and cervical examination characteristics.

Patients that undergo TOLAC were followed and if VBAC achieved then they were excluded from the study. Cases that undergone CS either ERCD or emergency CS were included in the study.

Operation was done and intraoperative findings were recorded. Dehiscence was identified as thin lower segment with visualization of amniotic membrane or fetal part in cases of rupture membrane, cases of frank rupture of uterus were excluded, injury to surrounding organs and adhesion to other structures also was reported.

Finally maternal and neonatal outcome were recorded for each case.

According to the operative findings the studied sample were divided into two groups, first group: patients with scar dehiscence, second group: patient without scar dehiscence.

2.5. Ethical considerations and official approvals

Verbal permission was obtained from each patient prior to collecting data, and information was anonymous. Names were removed and replaced by identification codes. All information kept confidential in a password secured laptop and data used exclusively for the research purposes.

Administrative approvals were granted from Council of Iraqi Board of Medical Specialization. Also, Approval of the Department of Obstetrics and Gynecology at Al-Elwiya Maternity Teaching Hospital.

2.6. Statistical analysis

All data were introduced into Microsoft Excel 16 and statistical analysis were conducted using IBM-SPSS (USA Chicago) and data were presented in the form of counts, percentage, mean, standard deviation (SD), minimum (Min) and maximum (Max) and presented in the form of tables, charts, or graphs.

Testing of the level of significance of the categorical data were conducted using Chi square or Fisher exact test while continuous variables were tested using student t test. P-value <0.05 considered statistically significant.

3. RESULTS:

A Total number of 1148 pregnant women with history of previous CS, 421 whom successful VBAC was achieved and excluded from the study, the remaining 727 cases undergone CS and included in the study and according to the status of uterus they were divided into two groups, first group: those with scar dehiscence 177 cases (24.3%) and second group: the remaining 550 cases (75.7%) without dehiscence, as shown in Figure 3.

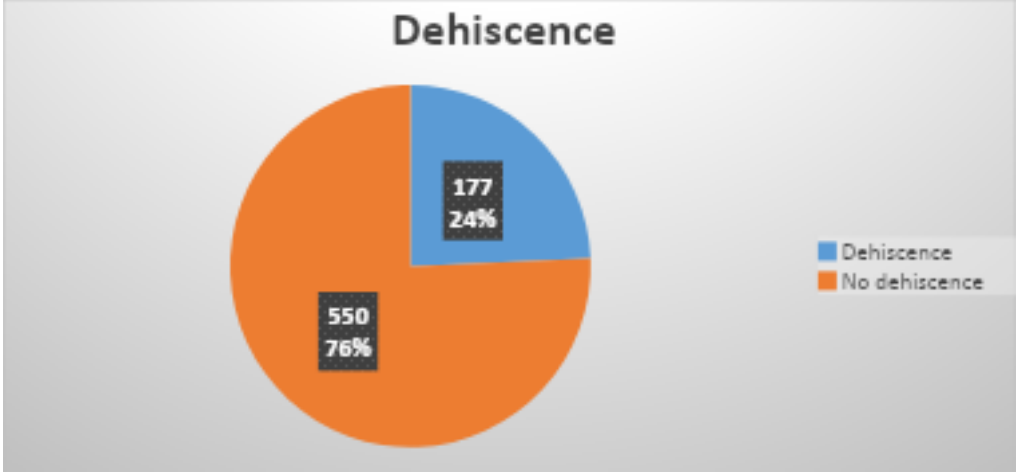

Figure 3: Distribution of the groups of the study.

The mean maternal age, BMI and parity were not different between the two groups. The current pregnancy gestational age was not different between the two groups, on contrary the mean gestational age of previous pregnancy was significantly lower in the first group, as shown in Table 2.

Table 2: Distribution of age, parity, BMI, and gestational age.

Variables	Dehiscence		No dehiscence		P Value
	Mean	SD	Mean	SD	
Age (years)	21.46	7.98	22.69	7.76	0.26
BMI (prepregnancy)	30.64	4.84	30.08	4.97	0.189
Parity	3.34	2.39	3.64	2.36	0.155
GA of current CS (weeks)	39.02	1.45	39.01	1.43	0.902
GA of previous CS(weeks)	35.49	1.1	39.52	1.1	**<0.0001**

Gestational age of previous CS before 37 weeks is significantly higher in the first group (85.3%) compared to the second group (8.9%), as shown in Table3.

Table 3: GA of previous C/S.

GA of previous C/S	Dehiscence		No dehiscence		P Value
	No.	%	No.	%	
<37 weeks	151	85.3	49	8.9	**<0.0001**
≥37 weeks	26	14.7	501	91.1	

Regarding interpregnancy interval, the first group had significantly shorter interpregnancy interval (p value **<0.0001**), (27.7%) of dehiscent cases is with inerpregnancy interval less than 6 months, (41.8%) was between 6 and 12 months, (16.9%) was between 12 and 18 months, (9%) was between 18 and 24 months and only (4.5%) was with more than 24 months interpregnancy interval , as shown in Table 4.

Interpregnancy interval	Dehiscence		No dehiscence		P Value
	No.	%	No.	%	
<6months	49	27.7	2	0.4	**<0.0001**
6months-12 months	74	41.8	2	0.4	
12-18 months	30	16.9	65	11.8	
18-24 months	16	9	227	41.2	
≥24months	8	4.5	254	46.2	

Table 4: Interpregnancy interval.

Regarding the indication of current and previous C/S, no statistical significance was found (P value 0.841), as shown in Table 5 and Table 6, respectively. The most common indication of previous CS in the first group was cephalopelvic disproportion(CPD) (15.8%), as shown in Table 6.

Table 5: Indication of current C/S.

Indication of current C/S	Dehiscence		No dehiscence	
	No.	%	No.	%
Failure of progress	22	12.4	62	11.3
Fetal distress	21	11.9	63	11.5
Malpresentation	22	12.4	48	8.7
CPD	20	11.3	67	12.2
Antepartum hemorrhage	20	11.3	56	10.2
Post date	12	6.8	47	8.5
Multiple pregnancy	18	10.2	70	12.7
Contractions with tender scar	18	10.2	69	12.5
Severe preeclampsia	13	7.3	44	24.9
Complicated diabetes	11	6.2	24	13.6

Table 6: Indication of previous C/S.

Indication of previous C/S	Dehiscence		No dehiscence	
	No.	%	No.	%
Failure of progress	26	14.7	62	11.3
Fetal distress	20	11.3	65	11.8
Malpresentation	18	10.2	57	10.4
CPD	28	15.8	68	12.4
Antepartum hemorrhage	17	9.6	61	11.1
Post date	16	9	58	10.5
Multiple pregnancy	22	12.4	65	11.8
Severe preeclampsia	14	7.9	56	10.2
Complicated diabetes	16	9	58	10.5

Regarding the type of CS whether it was elective or emergency, the rate of emergency CS was significantly higher in the first group as shown in 7.

Table 7: Type of CS.

Type of CS	Dehiscence		No dehiscence		P value
	No.	%	No.	%	
Elective	28	15.8	190	34.5	<0.0001
Emergency	149	84.1	360	65.4	

Regarding the place where the previous cesarean section was done, whether it was in a private hospital or general hospital, the delivery of the previous pregnancy in private hospital was higher in the first group (79.7%) and this was significantly different from the second group (29.8%), as shown in Figure 4.

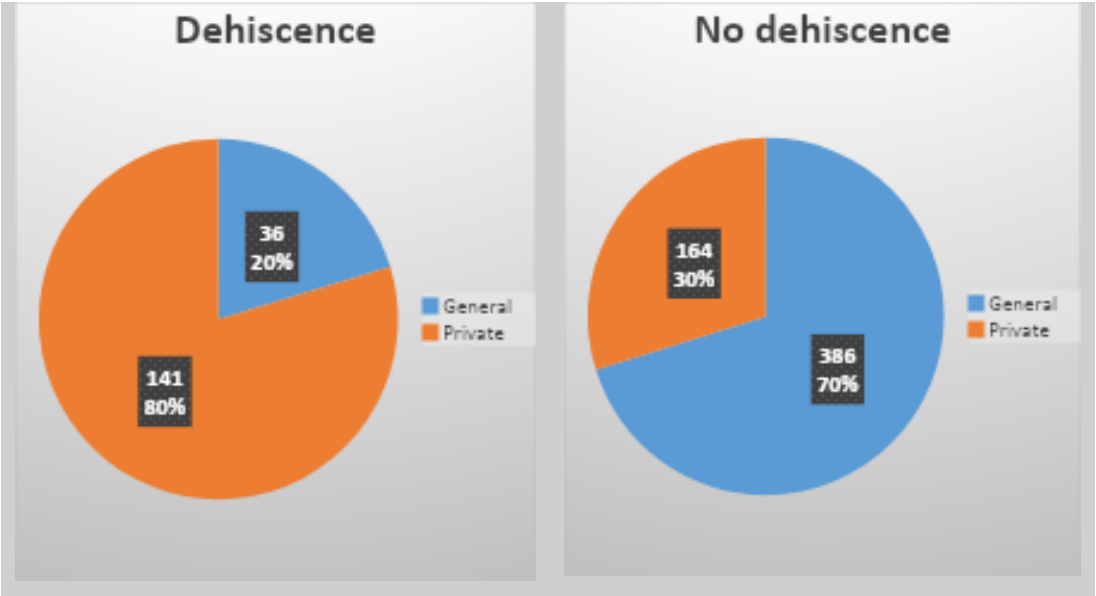

Figure 4: place of previous delivery.

Regarding maternal vital signs presentation and fetal heart rate(FHR), the maternal pulse rate(PR)was not different between the two group, so as the blood pressure and fetal heart rate, as shown in Table .

Table 8: Distribution of maternal and fetal vital signs at presentation

Variables	Dehiscence		No dehiscence		P Value
	Mean	SD	Mean	SD	
PR (beat/minute)	95.28	10.63	95.25	10.02	0.972
SBP (mmHg)	112.3	13.6	110.8	12.7	0.180
DBP (mmHg)	71.2	8.5	70.4	10.3	0.350
FHR (beat/minute)	149.58	11.8	147.99	10.81	0.113

The presentation was statistically different between the two groups, the scar tenderness, uterine contraction and bleeding were significantly higher in first group, while the rate of active labor was significantly lower in the first group than those in the second group, as shown in Table.

Table 9: Presentation of the cases.

Variables		Dehiscence		No dehiscence		P Value
		No.	%	No.	%	
Scar tenderness	**Yes**	143	80.8	139	25.3	**<0.0001**
	No	34	19.2	411	74.7	
Uterine contraction	**Yes**	145	81.9	151	27.5	**<0.0001**
	No	32	18.1	399	72.5	
bleeding	**Yes**	140	79	141	25,6	**<0.0001**
	No	37	20.9	409	74.4	
Phase of labor	**Latent phase**	91	74	111	28.9	**<0.0001**
	Active phase	33	26	274	71.1	

Regarding intraoperative findings, site of previous uterine scar in the upper segment was higher in the first group (59.3%), compared to (17.3%) in the second group, while adhesions was not different in the two groups, as shown in Table 10.

Table 10: Intraoperative findings.

Variables	Dehiscence		No dehiscence		P Value
	No.	%	No.	%	

Site of scar	**Upper segment**	105	59.3	95	17.3	**<0.0001**
	Lower segment	72	40.7	455	82.7	
Adhesions	**Yes**	23	13	81	14.7	0.566
	No	154	87	469	85.3	

Regarding maternal outcome no difference were found in the rate of morbidity and mortality between the two groups, as shown in table 11.

Table 7: Maternal complications.

Variables		**Dehiscence**		**No dehiscence**		**P value**
		No.	**%**	**No.**	**%**	
ICU admission	**Yes**	54	30.5	160	29.1	0.781
	No	123	69.5	390	70.9	
PPH	**Yes**	11	6.2	33	6.0	0.917
	No	166	93.8	517	94.0	
Blood transfusion	**Yes**	67	37.9	197	35.8	0.624
	No	110	62.1	353	64.2	

Regarding neonatal outcome no difference were found in Apgar score or birthweight between the two groups, as shown in Table

Table 12: Distribution of Apgar score and birthweight

Variables	**Dehiscence**		**No dehiscence**		**P Value**
	Mean	**SD**	**Mean**	**SD**	
Apgar score one minute	5.58	3	5.41	2.87	0.497
Apgar score five minutes	7.06	2.41	6.93	2.38	0.522
Birth weight	2941.15	557.77	2987.27	507.66	0.329

The rate of neonatal intensive care unit(NICU) admission and neonatal death were not different between the two groups, as shown in Table.

Table 13: NICU admission and neonatal death.

Variables		**Dehiscence**		**No Dehiscence**		**P value**
		No.	**%**	**No.**	**%**	
NICU admission	**Yes**	69	39.0	224	40.7	0.681
	No	108	61.0	326	59.3	
neonatal death	**Yes**	9	5.1	40	7.3	0.313
	No	168	94.9	510	92.7	

4. DISCUSSION

Uterine dehiscence is a separation of the uterine musculature with intact uterine serosa. Uterine dehiscence can be encountered at the time of cesarean delivery, be suspected on obstetric ultrasound or be diagnosed in between pregnancies. Management is a challenge for obstetricians, regardless the timing of onset[32].

The current study included all cases of previous one C/S, to estimate the incidence of uterine dehiscence, risk factors and outcome.

The study included 727 women who had a history of previous cesarean section and according to the status of the uterus, they were divided into two groups, first group those with dehiscence is 177 cases and the second group without dehiscence is 550 cases, the incidence of uterine dehiscence in cases of previous one C/S was 24.3%. Comparable results found by Khan et al[33] who found uterine dehiscence after previous one C/S to be 23.75% and stated that the exact incidence of uterine

dehiscence is different from one region to another and had very wide range (6.6%-69%). This variations in the incidence mainly attributed to different methods and criteria for diagnosing and reporting uterine dehiscence.

The mean maternal age was not different between the two groups. Similar result found by Naz et al[34]. The body mass index was also not different between the two groups, Gillespie et al[35] found that obesity associated with many C/S wound complications but without significant increase in the rate of uterine dehiscence.

The parity was not different between the two groups. Similar result found by Akbar et al[36].

The mean gestational age of the current pregnancy was not different between the two groups, on contrary the mean gestational age of previous pregnancy was significantly lower in the first group (35.49)weeks, with (85.3%) of the cases was less than 37 weeks. Similarly found by Naz et al[34], Akbar et al[36] and Morlando et al[37].

The shorter interpregnancy interval also was more common in the first group, (27.7%) of the dehiscent cases within less than 6 months interval, (41.8%) was between 6 and 12 months, (16.9%) was between 12 and 18 months, (9%) was between 18 and 24 months and only (4.5%) was with more than 24 months interpregnancy interval. These result goes in line with the previous studies conducted by Tyagi et al[38] who reported that (65%) of patients with interpregnancy interval less than 18 months and Lewis et al[39] who reported that (65%)of patients with interpregnancyinterval less than 18 months and only (6.66%) of patients with interpregnancy interval more than 24 months.

The indication of current and previous C/S was not different between the two groups, but the commonest indication of previous C/S in the first group was CPD, about the type of CS whether it was elective or emergency, the rate of emergency CS was significantly higher in the first group ,Sultana et al[40] found that cases of emergency C/S had higher rate of dehiscence than control.

Regarding the place of previous surgery whether it was in general or private hospital, private hospital was the most common place of delivery of the previous pregnancy in the first group (79.7%), this could be explained by the poor technique of the surgery, that could affect uterine scar healing leading to the formation of the dehiscence and many cases were operated on before 37weeks of gestaion without scientific indication. To note that many private hospitals still use catgut sutures for uterine closure which per se associated with increased rate of scar dehiscence as suggested by Hosseini et al[41].

The feto-maternal vital signs were not different between the two groups, as majority of cases were incidental finding during second C/S. Similar results found by Naz et al[34], Akbar et al[36] and Morlando et al[37]. On the other hand studies found that frank uterine rupture associated with abnormal vitals as stated by Tarar et al[42].

Scar tenderness was significantly higher in the first group compared to the second group. Similar result found by Tyagi et al[38], and Odeh et al[31]. This tenderness may be attributed to the stretching of the scar during the trial of vaginal delivery after previous one C/S.

Uterine contractions was more prevalent in the first group, similarly found by Seaman et al[43].

Vaginal bleeding was more prevalent in the first group compared to the second group, this result was similar to what Schwinn et al[44] found.

Cases of first group were less likely to start active stage of labor than the second group, similar result found by Donnez et al[45], this attributed to the inefficient uncoordinated uterine contractions, higher rate of vaginal bleeding and scar pain that could be a trigger to the decision of stopping the trial of vaginal delivery and choosing CS delivery.

The previous uterine scars placed in the upper uterine segment were more common in the first group than those with the second group. Similarly found by Whittington et al[32]. This may be attributed to higher intensity of uterine contractions and higher stretching in this area. As this area is mainly thicker than lower segment the closure of uterine incision would be more difficult and prone

to a higher rate of poor closure technic, this could lead to weak area that would be potential area for dehiscence.

Bowel and bladder adhesions to the site of previous surgery was not different statistically. No study had investigated the effect of adhesion on the formation of uterine dehiscence, on the other hand, there is case report suggesting that there is beneficial effect of the adhesion in preventing frank uterine rupture as suggested by Berhan et al[46].

There were no difference in the rate of maternal morbidity and mortality between the two groups, also the neonatal outcome (birthweight, Apgar score, NICU admission rate, and neonatal death) was not different between the two groups. Similarly found by Zhu et al[6].

5. CONCLUSION & RECOMMENDATIONS

5.1. Conclusion:

The incidence of uterine scar dehiscence in pregnants with previous one C/S was 24.3%. Gestational age in previous pregnancy of less than 37 weeks, shorter interpregnancy interval less than 24 months, upper segment uterine scar and delivery in private hospital were the most common risk factors of uterine scar dehiscence. Scar tenderness, vaginal bleeding, uterine contractions, and failure to achieve active labor were the most common presentations of scar dehiscence.

5.2. Recommendations

- Better health education to mothers regarding the importance of spacing between pregnancies, the benefit of using contraception and better antenatal care.
- Timing of planned elective CS at 39 weeks of gestations as recommended by National institute for health and care excellence (NICE) guidelines, unless there is indication for earlier termination.
- Better training regarding the techniques of choosing the site of uterine incision and method of closure.
- This study could help to guide the obstetric team in the decision making in cases of previous one C/S.

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