Introduction

Uterine rupture is an uncommon but potentially catastrophic complication of a trial of vaginal birth after caesarean section (VBAC)**.** Several studies have reported the perinatal risks of failed trial of labour and uterine rupture in women attempting VBAC ***(Bujold et al., 2002)***.

Partly because of concerns about this complication, the rate of VBAC deliveries continues to fall in developed countries, with an inverse increase in caesarean sections. However, multiple caesarean sections are associated with a greater risk of complications during surgery and abnormal placentation (placenta previa, accrete). Because in the last two decades the choice between elective repeat CS and trial of labor has been largely left to the patient preferences, few tools have been made available to help in decision making ***(Par et al., 2006)***.

To better assess the risk of uterine rupture, some authors have proposed sonographic measurement of lower uterine segment thickness near term, assuming that there is an inverse correlation between lower uterine segment thickness and the risk of uterine scar defect ***(Fukuda et al., 1988; Rozenberg et al., 1996).***

Therefore, this assessment for the management of women with prior caesarean section may increase safety during labour by selecting women with the lowest risk of uterine rupture. However, while a large prospective study demonstrated that a full lower uterine

segment thickness of under 3.5mm had a strong negative predictive values, the best cut-off values and the best measuring technique remain controversial ***(Rozenberg et al., 1996; Cheung, 2005)***.

Aim of the Work

1ry objective to study the association between sonographic measurement of the lower uterine segment thickness in women with prior CS and integrity of uterine scar by 2D ultrasound.

2ry objective to ascertain the best cut-off values for predicting uterine rupture or scar dehiscence.

Vaginal Birth after Caesarean Section (VBAC)

History:

The relative safety of VBAC has been cited in the literature since the early 1900s, and was well summarized in a recent review Despite early experience with VBAC, the practice was not popularized or endorsed in the United States until the early 1980s ***(Enkin et al., 2000; ACOG, 1999)***.

For many years, the scarred uterus was believed to contraindicate labour out of fear of uterine rupture. In 1916, Cragin made his famous and know seemingly excessive pronouncement, "once a caesarean, always a caesarean". It must be remembered, however, that when Cragin made this statement obstetricians routinely used a "classical" vertical incision in the 1921. It should also be pointed out that some of Cragin's contemporaries did not agree with his statement. Writing in the Fourth edition of Williams Obstetrics, Whitridge Williams 1917 termed the statement "an exaggeration" ***(Cunningham et al., 2001)***.

The year 1978 was an important year in the history of prior caesarean delivery reported from the University of Texas at San Antonio that subsequent vaginal delivery was safely attempted in 83% of their patients with prior caesarean deliveries. This report served to rekindle interest in vaginal birth after prior caesarean (VBAC) at a time when only 2 percent of American women who had previously undergone caesarean birth were attempting vaginal

delivery. Use of VBAC increased very significantly in the United States such that there was a 14-fold increase to 28 percent of women with prior caesarean delivering vaginally by 1996 ***(Gibbs, 1991)***,

Before the 1980s in the United States, a trial of vaginal birth after caesarean (VBAC) was not actively promoted. Various studies in the literature in the 1980s concluded that trials of VBAC had success rate ranging between 66% and 85% with minimal neonatal or maternal morbidity ***(Cunningham et al., 2001)***.

In 1999, the ACOG reported that; it has become apparent that VBAC is associated with a small but significant risk of uterine rupture with poor outcomes for both mother and infant. These developments, which have led to a more limited approach to trial of labour, by even the most ardent supporters of VBAC, illustrate the need to reevaluate VBAC recommendations ***(Cunningham et al., 2001)***.

Incidence:

Prior to 1980s all patients with previous CS were advised that the abdominal delivery was the rule. In an-extensive review of the literature from 1950 to 1980 studied 100 patients and reported a successful trial of labour in 60 to 80 (72%) gravidas with one prior CS and vaginal delivery in 10 of 20 (50%) gravidas with two prior C.S. ***(Abd El-Hamed et al., 1982)***.

In other review from 1980-1984, listed that 6252 trials of labour with 5352(86%) vaginal birth after C.S the increasing success

rate in recent studies probably reflects more aggressive management of the trial of labour ***(Flamm et al., 1995)***.

It was listed that in 1994, 76% (N=458) of patients with one prior CS were given a trial of labour, in which 82.3% of those allowed to labour were successfully delivered vaginally, giving an overall vaginal delivery rate of 64.8% ***(Turner Casey, 1996).***

As an active program of permitting patients with prior caesarean births to undergo a trial of labour continues, the caesarean delivery rate declined. One would anticipate that approximately 80% of the patients who elect for a VBAC can expect a vaginal delivery, including those patients with a prior caesarean for breech presentation, one prior vaginal birth, and a fetal weight of less than 4000 g. Oxytocin may be used for the usual indications, and adherence to current guidelines for its administration are essential. Although vaginal birth after caesarean rates in many nations increased dramatically in 1980s and 1990s, many aspects of trial of labour (also known as trial of scar) remain controversial at the dawn of the 21st century ***(Flamm, 2001)***.

Selection of patient:

Selection criteria for trial of labour after previous caesarean delivery according to ***(ACOG, 1999)***.

1. One or two previous low transverse CS with no vertical extension into the fundus or lower segment and no post operative complication. e.g: infection.
2. No other uterine scars or previous rupture.
3. Cephalic vertex presentation.
4. Clinically adequate pelvis.
5. Recurrent indication for abdominal delivery is not present.
6. Physician readily available throughout labour, capable of monitoring labour and performing an emergency caesarean delivery.
7. Availability of anesthesia, blood banking services and personnel to perform immediate CS within 20-30 minutes, as it is found on large study on uterine rupture that no infants had significant perinatal morbidity when delivered within 17 minutes of the onset of prolonged fetal heart rate deceleration ***(Leung et al., 1993)*.**

Factors not favorable for trial of labour:

The criteria used by authors who made vaginal delivery unfavorable are:

1. Classical caesarean section (Society of Obstetricians and Gynaecologists of Canada. Vaginal birth after previous Caesarean birth. Clinical Practice Guideline SOGC; December 1997).
2. Caesarean section with multiple incisions.

3. Inadequate bony pelvic.
4. Unknown type of scar.
5. Previous surgeon advised against vaginal delivery.
6. Contraindication to normal vaginal delivery

Previous uterine rupture (Scott JR. Avoiding labor problems during vaginal birth after Cesarean delivery Clin Obstet Gynecol 1997).

Other factors of concern are postoperative pyrexia or other signs of infection during the previous caesarean section, two or more previous sections and indications that are recurrent in nature.

Factors affecting Success rates of vaginal delivery after caesarean section:

1- Indications of previous caesarean section.

2- Number of prior caesarean section.

3- Prior vaginal delivery.

4- Estimated fetal weight.

5- Degree of cervical dilatation at time of admission.

Table (1): Tablet likelihood of successful trial of labor in patients with previous LSCS

	Points
< 40 years of age	2
Vaginal delivery before and after their C-section	4
Vaginal birth after the first C-section	2

Vaginal birth before their Caesarean birth	1
No vaginal delivery	0
First C-section done for reason other than failure to Progress	1
Cervix > 75% effaced on admission	2
Cervix 25–75% effaced on admission	1
Cervix < 25% effaced on admission	0
Cervix dilated ≥ 4 cm on admission	1

(Leungetal.,1993)

Table (2): VBAC scoring system (Flamm–Geiger)

Points	***Likelihood of successful TOL %***
0–2	49.1
3	59.9
4	66.7
5	77.0
6	88.6
7	92.6
8–10	94.9

Management of Trial of Labour

The patient must be appropriately counseled regarding the risks and benefits and appropriate informed consent must be obtained ***(Penso, 1994; Lau et al., 1996).***

About, 40-50% of women eligible for trial of labour refuse in favor of a repeat CS even after encouragement and counseling this is because of:

A- Negative experiences associated with previous deliveries.

B- Fear of vaginal delivery.

C- Concern about fetal wellbeing.

D- Convenience and known safety of the elective repeat caesarean section ***(Penso, 1994; Lau et al., 1996).***

Pre-requisites before trial of labour:

1. The operative record of previous operation must be available and reviewed by the attending physician to document the type of uterine incision ***(Harold, 2001)***.
2. Admission to hospital: The patient should be admitted to hospital as early as possible. Few authors prefer admission of patients prior to the onset of labour for fear of uterine rupture. But this is unnecessary as dehiscence of scars will not occur except in labour ***(McDonald, 1992)***.
3. Appropriate typed and cross matched blood must be when in labour available ***(Harold, 2001)***.
4. Facilities, nursing, anesthesia and surgical personnel must be available to perform immediate CS if required ***(Harold, 2001)***.
5. The patient must be closely monitored and responsible doctor must be physically present all the time ***(Harold, 2001).***
6. Type of hospital: ***ACOG (1999),*** committee in obstetrics recommended that a trial of labour should be conducted in university or tertiary centers under circumstances in which continual fetal monitoring, obstetric and anesthesia coverage for 24 hours, blood banking and operative start up time of 30 minutes are available.

First stage of labour:

On admission to hospital, patient's blood is cross-matched against two units of compatible blood, which are kept on until after delivery. The patient must be appropriately counseled regarding the risks and the benefits and appropriate informed consent must be obtained ***(Lavin et al., 1994).***

Delivery should be planned and supervised by a senior clinician with adequate experience of the procedure and all those in attendance should be educated their role and points of management particularly cardiograph interpretation plans should be well documented and local guidelines should specify policies for maternal and fetal intrapartum surveillance and augmentation ***(American College of Obstetricians and Gynecologists, 1999).***

The next important step in management is continuous careful monitoring of the progress of labour, especially in early hours, fetal heart rate and mother's pulse and blood pressure ***(Cunningham et al., 2001).***

Progress during the 1st stage is measured exclusively in terms of dilatation of the cervix while descent of the fetal head is certainly not an appropriate measure of progress during 1st stage as there is no constant relationship between cervical dilatation and descent of the head. Careful evaluation of the patient in early labour could help to recognize the dystocic labour-delivery and early indication for CS to avoid unnecessary and prolonged labour ***(Chazotte et al., 1990).***

Augmentation of uterine activity with oxytocin does not appear to be associated with an increased incidence of scar rupture, but extreme care should be exercised**.** Its use should be restricted to those women whose poor progress is especially due to poor rates of uterine contractions (less than 3 in 10 min), and all other possibilities have been excluded ***(Zelop et al., 1999)***.

Electronic fetal monitoring

All patients should be continuously monitored during trials of labour. This is because the most commonly encountered signs of catastrophic uterine rupture are non-reassuring fetal heart rate patterns, including prolonged decelerations, variable decelerations, late decelerations, and undetectable heart rates ***(Wing and Paul, 1999).***

Fetal heart rate abnormality is a sensitive indicator of scar complications but is after the event ***(Gee, 2001).***

McDonald (1992), advised to supervise the intermittent auscultation at 15 minutes intervals for 1 minute between contractions while electronic fetal monitoring must be used specifically in certain indications as meconium stained liquor. He stated also that continuous monitoring of the fetus by scalp electrode supported by intermittent fetal blood sampling may result in early detection of scar dehiscence than depending on maternal signs which are unreliable.

Second stage of labour:

There are no unique characteristics or need to use different strategies in the spontaneous vaginal delivery of an infant after a trial of labour.

There is a steep rise of uterine activity in late first stage of labour and this persists in second stage. Such high activation for long period may not to be advisable, in the presence of the uterine scar and so, it is advised to shorten the second stage of labour ***(Wing et al., 1999).***

The presence of uterine scar is a contraindication to mid-forceps delivery. However, the use of vacuum extraction in a patient with previous section follows the same indications of forceps which is mainly elective outlet application to shorten the second stage ***(Wing et al., 1999)***.

Emergencies repeat caesarean delivery:

Indications:

1. Fetal distress.
2. Intensifying focal uterine or generalized abdominal pain or tenderness between contractions.
3. Deterioration of vital signs.
4. Irregular uterine or cervical dilatation.
5. Hematuria.

6. Protraction or arrested disorder of labour irrespective to conservative measures.
7. Sudden cessation of uterine contraction ***(Cunningham et al., 2001).***

Third stage of labour

Management of third stage of labour which begins just after expulsion of the fetus requires special care in patients with prior caesarean section. Some practitioners do not perform routine evaluation of the previous uterine scar after successful trial of labour after previous caesarean. Thus, approximately 1-2% of uterine dehiscence is missed. Many of these women will undergo a subsequent trial of labour without apparent detriment ***(Wing et al., 1999)***. However that if a patient experiences profuse vaginal bleeding or signs of shock after vaginal delivery, surgical exploration is needed to evaluate the previous scar and entire reproductive tract with correction of a scar dehiscence or rupture. Asymptomatic separation does not require exploratory laparotomy and repair ***(Cunningham et al., 2001).***

Outcome of Trial of Labour after Previous Caesarean Section

Over 120 articles in the literature documenting the outcome of delivery after previous caesarean section in nearly 150 000 cases. Most are retrospective observational studies. These have formed in a variety of clinical settings and populations. Despite this, the findings are nearly consistent: