EVALUATION OF CAESAREAN SECTION SCAR (SINGLE VERSUS DOUBLE LAYERS CLOSURE) BY SONOHYSTEROGRAPHY

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ABSTRACT:

Background: By applying saline infusion sonohysterography to characterize the "filling defect" of a previous cesarean delivery scar (single versus double layers closure).

Objective: To investigate the role of sonohysterography in evaluating the integrity of c.s scar in non-pregnant women and finding if there is any correlation between the sonohysterographic finding and the type of uterine scar closure.

Setting: Department Of Obstetrics and Gynecology, El-Mineya Teaching Hospital, Faculty of Medicine, Mineya University and El-Mineya hospital for health insurance.

Methods: One hundred patients with history of cesarean deliveries were included. Saline contrast sonohysterography was performed for a variety of gynecologic indications were included. During the procedure, the area below the bladder recess was examined using transvaginal sonography. A filling defect or (niche) was defined as a triangular anechoic structure at the presumed site of a previous cesarean delivery scar. During uterine visualization the following measurements are systematically recorded for evaluation of uterine scar: the thickness of residual myometrium, the thickness of myometrium bordering the scar (anterior myometrium), the depth of the 'niche'(anechoic area at the presumed site of incision). In 50/100(50%) of these patients had uterine scar closure by single layer and in the other 50/100(50%) patients, the uterine scar was closed by double layer.

Results: The number and depth of niches and dehiscence were much higher in women who had single layer closure than those who had double layer closure.

Conclusion: Saline infusion sonohysterography is able to detect a filling defect in women who previously had cesarean deliveries. Considering the widespread use of single layer closure of c.s scar and its apparent impact on later uterine rupture, it is urgent and important for us to evaluate the integrity of uterine scar by using sonohysterography.

KEY WORDS:

Cesarean Section Niche Saline Sonohysterography

INTRODUCTION:

As the caesarean section (C.S) rate has increased at an accelerated pace over the past two decades from 5% to 25% in the United States and some other countries (Cepicky et al., 1991). in Egypt cesarean sections rate increased from a low of 4.6 percent in 1992 to 6.7 percent in 1995 to a high of 10.3 percent in 2000, this represents an overall increase of 130 percent in the cesarean delivery rate between 1987 and 2000 (Marwan Khawaja et al., 2004) with repeat C.S accounting for much as 35% to 50% of the increased abdominal deliveries.

Subsequently, the challenge for clinicians today is to provide women, who desire VBAC-TOL, a more individualized risk assessment of uterine rupture, thereby enhancing success and

optimizing outcome. The rate of uterine rupture varies according to the type and location of the cesarean incision (Cunningham et al., 2005).

The impact of a single or double layer closure on uterine rupture has been measured by many investigators, since the publication of these studies showing comparable short-term maternal morbidity and shorten operative time associated with the single layer closure, this technique has gained wide acceptance. However, there has been little analysis of the effect of this closure technique on the rate of later uterine rupture (Ferrari et al., 2001).

In two published studies, the rates of uterine rupture during a trial of labour after single-layer closure versus a double-layer closure at the site of the previous C.S were reported (Hosmer and Lemshow, 2000).

More recently, Bujold et al (2002) in another study found that a single-layer closure of the previous lower segment was the most influential factor and was associated with a 4 fold increase in the risk of uterine rupture compared with a double layer closure.
Saline infusion sonohysterography (SIS) has been used extensively to assess the uterine cavity in patients with suspected endometrial or intracavitary disease in which transvaginal sonography alone fails to suggest a definite diagnosis (Brown SE et al., 2000).

While performing SIS, it was noticed a triangular anechoic "filling defect" under the bladder recess, in the region between the uterine body and the cervix, in the typical location where low transverse cesarean deliveries are performed. Invariably all of these patients had 1 or more cesarean deliveries. In the literature, it has been well documented that a previous cesarean delivery is an independent risk factor for pathologically adherent placenta (Monteagudo A et al., 2001)

SUBJECTS AND METHODS:

The present study was conducted at the department of obstetrics & gynecology, El- Minia University and El-Minia hospital for health insurance. The study comprised of 100 patients with history of previous one cesarean section. 50/100(50%) of these patients had uterine scar closure by single layer and in the other 50/100(50%) patients, the uterine scar was closed by double layer. it was carried out from the 1st of December 2007 to the 1st of October 2008. this study was explained to all patients & all patients consented to participate in the study. The study protocol has been approved by Research Ethics Committee. Inclusion criteria include patients with previous one C.S, minimum three months following C.S, evidence of closure of uterine incision either by single or double layers, uneventful post-operative course.

Eligible and consenting cases were subjected to: (1) history taking with special attention to age, number and indications(s) of previous CS(s), (2) gynecological examination to evaluate the size and position of the uterus and to exclude pelvic infection and cervical stenosis, ultrasonographic examination (TVUS) & (3) preliminary transvaginal US to identify any pelvic pathology

Ultrasonographic Examination (TVUS): Detection of cesarean section scar by sonography begins with visualization of a hyperaechoic linear density through the stroma near the level of the internal os extending to the

vesicouterine interface in the sagittal plane. Often the hyperechoic density spreads laterally. At times a wedge like defect (hyperaechoic) is seen at the vesicouterine interface pointing toward the endocervical canal. Importantly, a scar defect will display a fluid collection along this line and in continuity with the endocervical canal. Cesarean scar defects were measured in two dimension in the saggital plane (anterior-posterior and cephalad-caudal) and transversally in the coronal plane.

Saline Infusion Sonohysterography (SIS): was performed using Toshiba ECCO CEE SSA-3A equibment, with a 7.5 MHz trans-vaginal probe. The women were scanned in the lithotomy position, with an empty bladder. A sterile vaginal speculum was inserted, and the cervix was cleansed with an antiseptic solution. A thin Foley's (Size CH08) was placed into the cervical os, and the balloon was inflated with 2-5 ml of sterile saline for stabilization and occlusion of the internal cervical os. The speculum was carefully removed and a 20 ml plastic syringe containing sterile saline was attached to the catheter. The US probe was gently introduced into the posterior fornix of the vagina and a saline solution was slowly infused into the uterus while the uterine distension was attached for. Usually 10-15 ml of fluid was required for uterine distension. At this stage the morphology of the uterine cavity can be observed. During uterine visualization the following measurements are systematically recorded for evaluation of uterine scar: the thickness of residual myometrium, the thickness of myometrium bordering the scar (anterior myometrium). The depth of the 'niche' (anechoic area at the presumed site of incision), the endovaginal probe was slowly withdrawn and the catheter was removed, after deflating the balloon.

Patients were instructed to report any symptoms of abdominal pain, vaginal bleeding or fever within one week of the examination. No post procedure antibiotic was given; just NSAID was given after the procedure in the form of declophen 100 mg rectal suppository.

Statistical analysis:

Data were statistically described in terms of mean ± standard deviation (±SD), or frequencies and percentages (%). The x2- test was used to compare categorical variables; *P* - vaue≤0.05 was considered significant. ALL statistical calculations were done using computer programs Microsoft Excel® (Microsoft Corporation, NY, and USA) and SPSS® (Statistical Package for Social Science; SPSS In., Chicago, IL, USA).

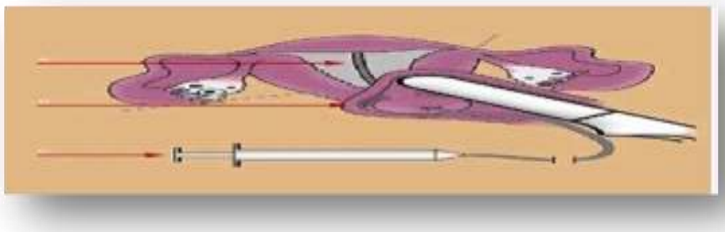

Fig (1):

a: the straight catheter is inserted to the fundus. b: in cases of an anteverted uterus (showen here) the ultrasound probe touches the uterus through the anterior vaginal wall. In case of a retroverted uterus it would be inserted against the posterior vaginal wall (below the catheter)c: a 10-ml syringe of normal saline is attached to the catheter after removal of the speculum Saline Infusion Sonohysterography

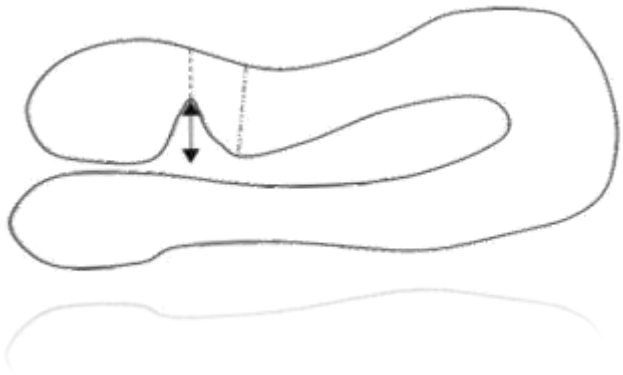

Figure (2): The Thickness Of The Residual Myometrium (- - - -), The Thickness Of The Myometrium Bordering The Scar (Anterior Myometrium) ( ) And The Depth Of The Niche ( ). The Niche Was Defined As A Triangular Anechoic Area At The Presumed Site Of Incision. A 'Dehiscence' Was Arbitrarily Defined As A Niche Whose Depth Was At Least 80% of The Anterior Myometrium.

RESULTS:

A total of 100 women (median, 33.7 years, range, 25-30 years) were enrolled in the study. Table1 presents thickness of myometrium bordering the scar (anterior myometrium) before sonohysterography and position of uterus in all women in relation to type of scar closure, for single layer closure the Mean±SD was 8.6±2.02 vs. 8.8±2.1mm for the double layer closure, the difference was statistically significant.

Table 2 presents thickness of myometrium bordering the scar (anterior myometrium) in cases without niche in relation to type of scar closure before and after sonohysterography, for single layer closure the Mean±SD of the anterior myometrium thickness, residual myometrium was 9.2±2.6 mm, 3.1±1.3 mm respectively vs10±1.9mm, 6.2±14 mm for the double layer closure, the difference was statistically significant.

Table 3 presents Thickness of Myometrium Bordering the Scar and Residual Myometrium in Cases with Niches In Relation To Type of Scar Closure, for single layer closure the Mean±SD of the thickness of the anterior myometrium (mm), was 8.3±1.5 mm, before sonohysterography vs. 8.1±1.5 mm after sonohysterography respectively. For the double layer closure, the Mean±SD of the thickness of the anterior myometrium (mm), was 8.7±2.09 mm, before sonohysterography vs. 8.5±2.09 mm after sonohysterography respectively the difference was statistically significant.

Table 4 presents frequency of niche and dehiscence in relation to type of scar closure., as regards to the number of niche in single layer closure 20(40%) vs. 5(10%) for the double layer closure, the study revealed no dehiscence in double layer closure., this in contrast to 2(4%) dehiscence in single layer closure and the mean±sd of the depth of dehiscence was 11.2±0.14.

Table 5 presents Niche charact-eristic as they relate to type of scar closure.

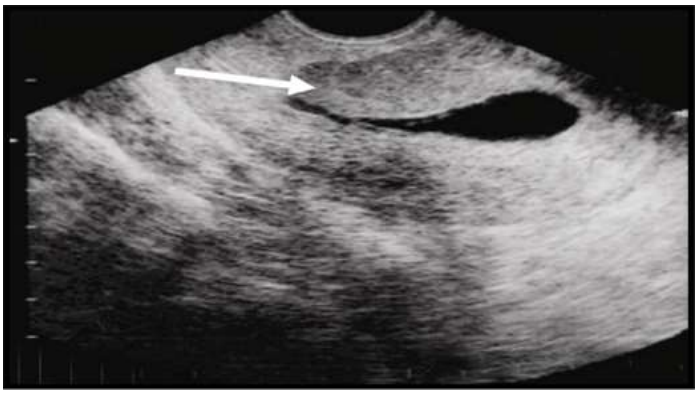

Fig (3): C.S Scar without Niche

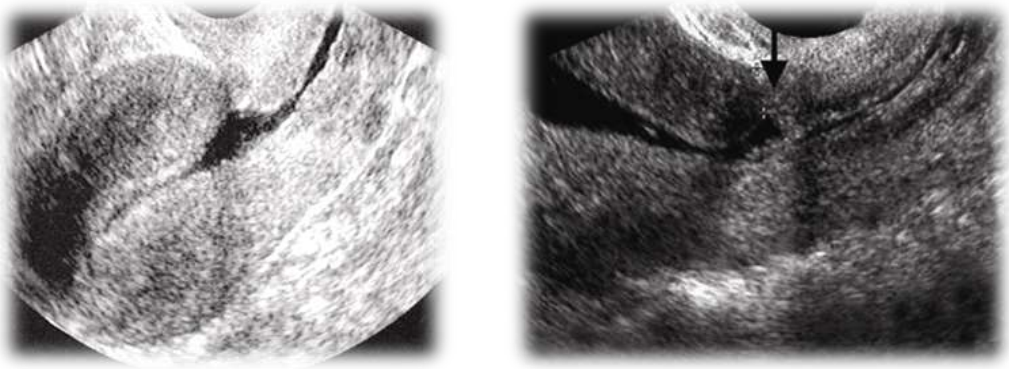

Fig (4): SIS Showing Niche in the Scar

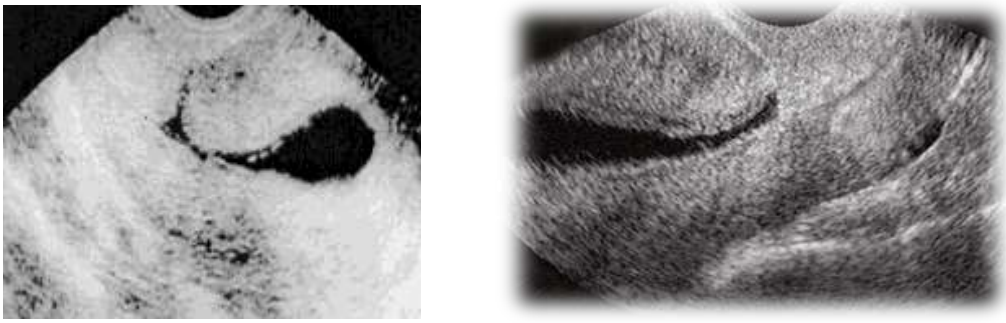

Fig (5): SIS showing dehiscence (niche measuring11.3mm and anterior myometrium measuring 13mm)

Table (1): Thickness of Myometrium Bordering the Scar (Anterior Myometrium) Before Sonohysterography and Position of Uterus In All Women In Relation To Type Of Scar Closure

Type of c.s scar closure	Thickness of anterior myometrium (mm)		Position of uterus	
Single layer closure (n =50)	8.6±2.02	6.7-14.5	AVF	RVF
			43	7
Double layer closure (n =50)	8.8±2.1	6.8-15	47	3
PV	0.6		0.0001**	

Table (2): Thickness of Myometrium Bordering the Scar (Anterior Myometrium) In Cases without Niche In Relation To Type of Scar Closure Before and After Sonohysterography

Thickness of myometrium (mm)	Single layer closure (n =20)		Double layer closure (n =5)		P.V
Anterior myometrium	9.2±2.6	(6.6-14.3)	10±1.9	(8.9-12.5)	0.3
Residual myometrium	3.1±1.3	(1.7-6.2)	6.2±1.4	(4.8-8.3)	0.001**

Table (3): Thickness of myometrium bordering the with niches in relation to type of scar closure.scar and residual myometrium in cases

Thickness of anterior myometrium (mm)	Single layer closure (n =30)		Double layer closure (n =45)		P.V
Before sonohysterography	8.3±1.5	(6.7-12.4)	8.7±2.09	(6.8-15)	0.4
After sonohysterography	8.1±1.5	(6.5-12.2)	8.5±2.09	(6.6-14.8)	0.4

Table (4): Frequency of Niche and Dehiscence In Relation To Type of Scar Closure

Frequency of niche and dehiscence	Single (n=50)	Double (n=50)	P.V
Number of niche	20(40%)	5(10%)	0.04**
Number of dehiscence	2 (4%)	0	0.2
Depth of dehiscence	11.2±0.14	0	-

Table (5): Niche characteristic as they relate to type of scar closure

Type of scar closure	Number of niche	Mean depth of niche	Mean residual myometrium thickness (mm)
Single layer	20(40%)	6.08±2.4	3.1±1.3
Double layer	5(10%)	3.8±0.9	6.2±1.4
PV	0.04**	0.04**	0.001**

DISCUSSION:

Several different approaches have been used to evaluate uterine scar in woman who have delivered by C.S, before they become pregnant again e.g hysterosalpingography and ultrasonography but none of these approaches has been proved useful for assessment of the safety of vaginal delivery or more importantly,the risk of uterine rupture to be predicted (ziberman et al,1986 and thurmond 1999).

Ziberman et al, 1986 and blanco sancho et al, 1969 were among the first to evaluate the cesarean delivery scar using hysterosalpingography. Thurmond et al, 1999, clearly showed a filling defect at the site of the previous cesarean delivery using SIS and hysterosalpingography. They measured the size of the defect from the anterior wall all the way to the posterior wall, including the area of the endocervical canal. It was speculated that the niche represents normal tissue response due to scarring and some retraction due to growth of fibrous tissue. At times the hyperechoic dot of what thought was the suture material or the tissue reaction (scar tissues immediately surrounding the sutures were seen around the niches.

Since a niche appears to be a frequent finding after a cesarean section (52% prevalence), the presence of a niche alone should probably not be considered as a risk factor for uterine rupture during a future pregnancy. Indeed, this feared complication has an incidence which varies from0.3% to 0.7 %. (Monteagudo A et al., 2001). In a meta-analysis the risk was estimated to be about 0.4 % (Mozurkewich El et al., 2000). However, the exact clinical significance that one should attribute to a deep niche is unknown since a link between the thickness of the uterine scar and its strength has not been evaluated.

Based on the results of this study we conclude that saline infusion sonohysterography is able to detect filling defect in women who previously had cesarean deliveries. Considering the widespread use of single layer closure of c.s scar and its apparent impact on later uterine rupture, it is urgent and important for us to evaluate the integrity of uterine scar by using sonohysterography. The number and depth of niches and dehiscence were much higher in women who had single layer closure than those who had double layer closure.

Thus attention must be focused on the transvaginal sonographic appearance of the detectable uterine scar (niche) with or without use of saline infusion sonohysterography in non-pregnant women especially in women who had single layer C.S scar closure as it will train our eyes to look for the scar in the pregnant uterus. in addition another study should be made to follow up these women at subsequent pregnancy to measure the impact of a single layer or double layer closure on uterine rupture and find if there is any correlation between the sonographic finding and the incidence of uterine rupture to evaluate the result of this study.

Considering the widespread use of single layer closure, its apparent impact on latter uterine rupture, comparable short term morbidity with single layer and double layer closure technique and sonohysterographic findings noticed in this study, we advise using double layer closure technique especially for women who may experience a subsequent trial of labour.

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