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Original Article

Diagnostic Accuracy of Transabdominal Ultrasonography for Prediction of Uterine Dehiscence in Females Presenting with a Previous Cesarean Section

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Abstract

Objective: To assess the diagnostic accuracy of trans-abdominal ultrasonography for the prediction of uterine dehiscence in females presenting with a previous one cesarean section

Methods: This Cross-sectional study was undertaken in Department of Obstetrics & Gynaecology, Moula Bakhsh DHQ Teaching Hospital Sargodha; Livestock & Dairy Development Department, Government of Punjab. Informed consent was taken from all the patients and demographic information was obtained. The transabdominal ultrasound was performed by a single senior radiologist having 4 years' residency experience. Scar thickness was measured and patients were labeled as positive or negative. Then during surgery, scar thickness was measured. All the collected data was entered and analyzed on SPSS V. 20.

Results: The mean age of females was 30.45±6.01 years. The mean gestational age was 36.82±1.44 weeks. The sensitivity, specificity and diagnostic accuracy of the TAS was 91.8%, 88.76% and 90% respectively taking intraoperative as gold standard.

Conclusion: The TAS is useful tool with high accuracy for examination of uterus for uterine dehiscence in females having previous one cesarean delivery

Keywords: Cesarean Section, Transabdominal, Ultrasonography, Uterine Dehiscence

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Introduction

Caesarean section is the most performing surgery performed all over the world among all surgeries. The increasing rate of caesarean section and its complications have roused an attention in nature of caesarean section scars and their potential complications.[1] Combination of increasing number of previous caesarean section and reduction in incidence of VBAC, increase the rate of cesarean section more than before.[2]

Thus, correct diagnosis of uterine rupture is very important as it would increase the number of females, who are at low risk, for trial of labor, but in high risk females, unplanned caesarean section can be performed. Numerous trials suggest that uterine rupture can be predicted through ultrasound which shows thinning in lower uterine segment (LUS).[3]

Sonographic measurement of the LUS has been used in forecasting uterine rupture in females with previous caesarean section. However its value in the management of a trial of VBAC is still controversial.[4] Ultrasound allows perfect evaluation of LUS thickness in woman with previous caesarean and thus can possibly be advised to evaluate the chance of uterine rupture during trial of labour.[4] The reported prevalence of scar dehiscence was 20.7% in at-risk patients (with previous one cesarean section).[5]

The overall sensitivity & specificity of ultrasound for prediction of myometrial LUS thickness were 0.94 (95%CI; 0.81–0.98) and 0.64 (95%CI; 0.26–0.90).[6]

According to a study conducted by Rozenberg, the

sensitivity of ultrasound was 88% & specificity as 73.2% for LUS in females with previous one cesarean section.[7] Another study showed that the sensitivity of Ultrasonographic measurement was 90.9%, specificity 84% for LUS in females with previous one cesarean section.[8] But one study showed that the sensitivity of Ultrasonographic measurement was 25%, specificity 100% for LUS in females with previous one cesarean section.[9]

Aim of this study is to find the diagnostic accuracy of transabdominal ultrasonography for prediction of uterine dehiscence in females with previous one cesarean section. Multiple caesarean sections are associated with a greater risk of complications during surgery and abnormal placentation (previa, accreta).

The LUS thickness assessment by using transabdominal ultrasound for the management of women with prior caesarean section may increase safety during labor by selecting women with lowest risk of uterine rupture. This may also help in reducing number of unnecessary cesarean sections, i.e. in cases with normal scar thickness. But there are controversial results of different studies showing that ultrasound may or may not be reliable. So there is need for more research in this context. Also there was no local study found in literature.

So we conducted this study to get the evidence for ultrasound is a reliable tool for prediction of scar thickness and scar dehiscence. This will help to improve our practice and reduce number of patients with complications of scar and scar dehiscence.

Methods

Study Design: Cross sectional study

Setting: Labour room, Department of Obstetrics & Gynecology, Moula Bakhsh DHQ Teaching Hospital Sargodha

Sampling Technique: Non-probability, consecutive sampling

Inclusion Criteria: Booked females of age 20-40years at gestational age>34wks (on LMP) with previous one low transverse caesarean section planned to undergo cesarean section in current pregnancy

Exclusion Criteria: Multiple pregnancies (on USG), Previous h/o hysterotomy, Previous h/o wound infection and Placenta previa confirmed on ultrasound.

All indication which requires elective caesarean section like CPD confirmed on clinical examination.

Pregnancy with oligohydroamnios confirmed on ultrasound. (AFI<5 cm)

Data collection procedure: 150 patients fulfilling inclusion criteria were enrolled in this study from labour room of Department of Obstetrics & Gynecology, Moula Bakhsh DHQ Teaching Hospital Sargodha. Informed consent and demographic details (name, age, parity, BMI, gestational age) was obtained. Then transabdominal ultrasound was performed by a single senior radiologist having 4 years' residency experience. Scar thickness was measured and patients labeled as positive or negative (as per operational definition). Then females underwent cesarean section under spinal anesthesia by researcher herself. During surgery, scar thickness was measured and patients confirmed as positive or negative. All this information was recorded on proforma.

Data analysis: Data was entered and analyzed with SPSS version 20. For gestational age and BMI, Mean± SD was calculated. For parity and scar dehiscence, frequency and percentage were calculated. 2×2 table was formed to calculate sensitivity, specificity, PPV, NPV and diagnostic accuracy of transabdominal ultrasound taking intraoperative findings as gold standard.

Results

Out of 150 patients TAS diagnosed positive uterine dehiscence in 66(44%) patients and it diagnosed negative uterine dehiscence among 84(56%) patients. (Table 1)

Table 1: *Frequency Distribution of Uterine Dehiscence on TAS*

		Frequency	Percent
TAS	Positive	66	44.0
	Negative	84	56.0
	Total	150	100.0

In this study the sensitivity, specificity, PPV, NPV and diagnostic accuracy of TAS for diagnosis of uterine dehiscence was 91.8%, 88.76%, 84.85%, 94.05% and 90% respectively taking intraoperative as gold standard. (Table 2)

Table 2: *Comparison of Uterine Dehiscence on TAS with Intraoperative*

		Intraoperative		Total
		Positive	Negative	
TAS	Positive	56	10	66
	Negative	5	79	84
Total		61	89	150

Sensitivity	91.8%
Specificity	88.76%
PPV	84.85%
NPV	94.05%
Diagnostic Accuracy	90%

The study results showed that in patients with primary parity, the sensitivity, specificity and diagnostic accuracy

of TAS were 94.44%, 82.76% and 87.23% respectively taking intraoperative as gold standard. Similarly in patients with multiple parity patients, the sensitivity, specificity and diagnostic accuracy of TAS was 90.7%, 91.67% and 91.26% respectively taking intraoperative as gold standard. (Table 3)

Table 3a: *Comparison of Uterine Dehiscence on TAS with Intraoperative Stratified by Parity*

Parity	TAS	Intraoperative		Total
		Positive	Negative	
Primary	Positive	17	5	22
	Negative	1	24	25
Multiple	Positive	39	5	44
	Negative	4	55	59

Table 3a: *Comparison Outcomes*

TAS	Parity	
	Primary	Multiple
Sensitivity	94.44%	90.7%
Specificity	82.76%	91.67%
PPV	77.27%	88.64%
NPV	96%	93.22%
Diagnostic accuracy	87.23%	91.26%

Discussion

For next cesarean section, uterine scar due to previous cesarean section, is the main factor. Transvaginal ultrasonography has several advantages over TAS for evaluation of the cervix. Uterine cervix can be clearly visualized on transvaginal ultrasound.[10]

In our study, sensitivity & specificity were 91.8% & 88.8%, PPV & NPV were 84.9% & 94.1% and diagnostic accuracy was 90% for prediction of uterine dehiscence taking intraoperative as gold standard.

One study by Quant HS et al., presented that the TAS is an appropriate method to predict intrauterine conditions. TAS was 93.3% sensitive & 76.7% specific for detection of placental complication. A cutoff of <2.8cm was 86.7% sensitive & 90.5% specific with a 99.6% NPV.[11]

LUS thickness can be examined by TAS during third trimester.[12] Kirkinen et al., proposed that, however, the LUS thickness evaluated with TAS showed a good correspondence with actual thickness, while better it has corresponding with transvaginal ultrasound.[13]

In one study of Rozenberg et al, the number of participants was very high (n = 642) compared to the other studies and quality of the study design was good. All measurements were performed transabdominally. They found that with 88% sensitivity and 73% specificity, the cut-off <3.5mm.[7]

In evaluation of LUS, a strong index of correlation (96%) between transabdominal sonography and transvaginal sonography was also reported.[14]

It has been further suggested that LUS thickness assessment looks favorable to predict uterine complications (dehiscence & rupture). The overall sensitivity & specificity of were 0.94 (95% CI, 0.81–0.98) & 0.64 (95% CI, 0.26–0.90).[6]

But Edgar Hernandez-Andrade et al.,[15] through their study proposed that TAS is inappropriate to detect the uterine dehiscence. But one study showed that the sensitivity of Ultrasonographic measurement was 25%, specificity 100% for LUS in females with previous one cesarean section.[9]

Conclusion

According to our study results the TAS is useful tool with high sensitivity, specificity and diagnostic accuracy for forecasting uterine dehiscence in females presenting with previous 1 cesarean section.

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