INTRODUCTION

Decision regarding mode of delivery after caesarean birth has always been a major topic of debate and controversy. Caesarean section rate increases by 1.5 million every year.\(^1\) Caesarean section rate reported in Agha Khan Hospital Pakistan is 31.26%.\(^2\) The reported rate of caesarean section is higher in USA and Brazil.\(^3\) Increase in caesarean section rate has also been observed in Europe and UK.\(^4\) There are many underlying factors for this increased rate of caesarean section including increased knowledge, availability of facilities and patient’s fear of vaginal birth. Caesarean section increases the risk of complications in subsequent pregnancy with increased maternal and foetal morbidity and mortality. Complications include placenta previa, accreta, increta, percreta, dehiscence or uterine rupture. The risk of uterine rupture with previous one caesarean section without trial of labour is 0.16%, while this risk increases to 0.4–1% in patients who underwent trial of labour after caesarean \(\text{TOLAC}\) during subsequent pregnancy.\(^5\) Uterine rupture is associated with severe neonatal, and maternal morbidity and mortality.\(^6\) As the rate of caesarean section has increased on the other hand the rate of vaginal birth after caesarean has steadily decreased mainly because of the fear of uterine rupture during labour, despite the advantages of decreased neonatal and maternal morbidity and mortality.\(^7\)

Due to increasing number of patients with previous caesarean section, patients and obstetricians are faced with the challenge of choice of delivery between repeat elective caesarean section and trial of labour with previous caesarean birth. Increased risk of uterine rupture with previous caesarean section plays a major role in deciding the mode of delivery in subsequent pregnancy. Therefore, accurate prediction of uterine rupture can be of significant value during management of subsequent pregnancies after previous caesarean delivery. Many prediction score methods were evaluated to predict successful \(\text{VBAC}\) based on clinical characteristics of patients, but none was found to be useful.\(^8\)

Several studies have been conducted using ultrasonographic measurement of lower uterine
MATERIAL AND METHODS

This cross-sectional validation study was conducted in the Department of Obstetrics and Gynaecology, Ayub Teaching Hospital Abbottabad from May to October 2017. Patients with singleton pregnancy (on USG), gestational age 37 completed weeks to 41 weeks-calculated from early scan, with previous 1 caesarean section and not in active labour between the ages of 20–40 years were included in the study. Patients having placenta previa on ultrasound, previous history of myomectomy, previous history of uterine rupture and patients with lower uterine segment fibroid were excluded from the study. Sample size of 117 was completed.

All patients were enrolled in the study from outpatient department of Obstetrics & Gynaecology Unit C, Abbottabad after fulfilling the inclusion/exclusion criteria. Approval from the ethical committee of the hospital was obtained. A written informed consent was taken from each subject. History was taken including age, parity, period of gestation, duration since last delivery, indication of previous caesarean section, place of caesarean section, previous single- or double-layer closure and post-operative history of wound infection (from previous record). Examination including general and systematic examination was carried out with emphasis on looking for the presence or absence of scar tenderness. Ultrasound thickness was evaluated by transabdominal scan before caesarean section. Lower uterine segment was scanned in sagittal section under magnification to localize the thinnest area. Measurement was done with full bladder and the measurement was taken with the cursors at the urinary bladder wall, myometrium interface and the myometrium/chorio-anniotic membrane and amniotic fluid interface. The subjects were followed till caesarean section and intraoperative surgical findings were recorded by the surgeons according to three categories: grade I – well-formed or no thinning of lower uterine segment, grade II- thinning of lower uterine segment with foetal hair not visible and grade III- window defect, dehiscence/rupture of lower uterine segment.

Data was analysed using SPSS version 16.0. Quantitative variables like age, parity, duration of caesarean section, and thickness of scar were described as mean±standard deviation. Thickness of scar was categorized at ultrasound as less than 3mm, less than or equal to 3mm and more than 3mm uterine scar thickness was evaluated by transabdominal scan and during surgery, and was described as frequencies and percentages.

A 2×2 contingency table was constructed to measure sensitivity, specificity, positive and negative predictive values.

Measures of validity was calculated by stratifying for age, parity, duration since last caesarean section, single- or double-layer closure, postoperative wound infection after previous caesarean and scar tenderness. Post stratification chi-square was applied at 5% level of significance.

RESULTS

A total of 117 women were enrolled in the study. Their ages ranged from 19–39 years, with mode at 30 years (33.3%) and mean age of 28.9±4.0 years. The parity ranged from 1–5 with mode at 1 (69.2%) and mean of 1.56. Gestational age ranged from 37–42 weeks, with mode at 38 (12.0%) and mean of 38.4±1.3 weeks.

Duration since last caesarean section ranged from 1 to 9 years, with mode at 2 (61.5%) and mean of 2.12±1.1 years. Out of 117 patients 8 (6.83%) had less than or equal to 3 mm uterine thickness on scan while 109 (93.16%) had scar thickness more than 3mm. At cut-off of 5mm 70 (59.82%) patients had scar thickness of less than or equal to 5 mm while 47 (40.17%) had scar thickness of more than 5mm on scan.
DISCUSSION

In the present study majority of subjects were healthy with no major risk factors for scar thinness or dehiscence at a mean of two years post-previous caesarean. However, scar tenderness was present in about 25% of subjects and about 33% were labelled as having thin or dehiscent scars at caesarean. Many studies have shown that lower uterine segment thickness measured ultrasonographically is directly related to the risk of scar dehiscence/rupture. 

Ultrasound measurements showed scar thickness of ≤5.0 mm in almost 60% of subjects, which decreased to mere 18% at cut-off of ≤4.0 mm and 7% at a cut-off of ≤3.0 mm. Sensitivity increased as the cut-off was increased from ≤3.0 mm to ≤5.0 mm while Specificity decreased as the cut-off was increased from ≤3.0 mm to ≤5.0 mm. Overall accuracy decreased from 68–58% as the cut-off was increased from ≤3.0 mm to ≤5.0 mm. A study conducted in Pakistan in 2018 showed significant association (p-value <0.001) between scar thickness (1–3 mm) and intraoperative findings of scar dehiscence and rupture.14

Sharma et al from India in their study also observed that lower uterine segment thickness was significantly less in patients with previous caesarean scar as compared to those without scar (p=0.000). They also reported that lower uterine segment thickness less than 3.65 mm has 91% sensitivity, 93% specificity, and 91% negative predictive value for prediction of scar rupture.15 Another study from India also reported high sensitivity, specificity, positive and negative predictive value of ultrasonographic lower uterine segment thickness of <5 mm with uterine rupture.10
CONCLUSION

The study did provide some merit to ultrasonographic measurements of uterine scar thickness for predicting the risk of uterine rupture in subsequent pregnancies. No definite ultrasonographic cut-off limit could be established to provide guidance regarding the clinical decision of opting for VBAC or repeat caesarean section; however, scar thicknesses ≤5.0 mm should be judged cautiously.

USG measurements should be used in conjunction with other clinical evidence and risks to foeto-maternal health as final arbiters of mode of delivery.

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AUTHORS’ CONTRIBUTION

REFERENCES