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Research Article

**FREQUENCY OF POST CESAREAN SECTION
COMPLICATIONS ON ULTRASONOGRAPHY:
A SYSTEMATIC REVIEW**¹Mr. Amjad Ali Khan, ²Dr. Sayeda Khadija-Ul-Sughra Maryam, ³Miss. Irum Raheem¹MSDU(Ultrasound)²PHD*, MSDU(Ultrasound)³MSDU (Ultrasound)¹⁻³: Department of Radiology, University of Lahore, Lahore, Pakistan

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Abstract:

Background: Cesarean delivery – also known as C-section or cesarean section – is the surgical delivery of a baby. It involves one incision in the mother’s abdomen and another in the uterus. 95% of women who underwent C-section have higher chances of miscarriage (report in journal NIHR). Objective: To revise the current literature about the frequency of post C-section complications incidentally found on ultrasound and the accuracy and efficacy of ultrasound in such cases. Methods: An electronic database search was performed (Google Scholar, PubMed, science direct) with the data range 1985- 2020. All studies fully available in English, assessing the complications of Csection sonographically. Results: sixteen articles were found regarding post cesarean section complications on the gray-scale and color Doppler transabdominal and transvaginal ultrasound imaging. It has been estimated that women who delivered through Csection were 80% more likely to have complications than those who delivered vaginally. Conclusion: All the possible complications re-evaluated. Ultrasound is the modality of choice due to its low cost, quick and non-invasive nature. Post Csection complications can be evaluated by using transvaginal ultrasonography due to its higher sensitivity in detecting infections, fluids, hematoma or any other masses. Keyword Ultrasound examination, post C-section, complication

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INTRODUCTION:

Cesarean section also called C-section; is the delivery of a baby through surgery. It involves an open abdominal incision (Laparotomy) and an incision on the uterus (Hysterotomy)[1]. The indications of a C-section are three folds. Fetus related indications include abnormal umbilical cord, mal-presentation, abnormal tracing of the fetal heart and unsuccessful running vaginal delivery. Uterine abnormalities, include abnormal placenta, prior hysterotomy, invasive cervical cancer and genital tract obstructive mass.

Maternal indications include previous history of c section, perineal injury, cardiac or pulmonary disease and cerebral aneurysm [2,3]. Cesarean delivery is related with increased chances of abortions, stillbirth and placental problems in future pregnancies [4]. Transvaginal Ultrasonography is an accurate examination for detecting and measuring the fluids post cesarean section. Images are obtained easily too.

A study including 100 women who had done C-section was performed. A fluid collection was found in 29 women. [5] Measurement of fluid collection by trans-vaginal ultrasonography was considered as an accurate method when compared with direct laparoscopic measurement. [6,7]. A research was performed to assess the role of ultrasound investigation immediately after a Csection. Trans-abdominal ultrasound scan was performed in 124 women, 48 and 96 hours next to C-section. Mean length of the uterus was $156 \pm 14\text{mm}$ and $141 \pm 11\text{mm}$, respectively obtained by keeping the probe in the umbilicus perpendicular to the uterus with a gentle pressure on the fundus. The study summarized that ultrasound examination is safe in all patients with just a little distress. Given sonographic measurements and technique was exact, easy and fast. [8]

DISCUSSION AND RESULTS:

Total 24 articles were selected regarding the complications found on real time ultrasound scan post cesarean section. Out of which three were regarding the ultrasound techniques its importance and accuracy and one colour Doppler study calculating the colour flow for assessing

the invasion in the myometrium of placenta in patients who had C-section. One article found regarding the importance of transvaginal scan for the assessment of the uterine scar and its association with the next delivery in women with the previous history of C-section. Two articles were presenting the summary of the possible complications while rest of the articles were based on describing a specific complication in detail. The number of Csections are increasing rapidly due to fetal and maternal complications. In USA and Italy; one-third of all the births occur through Csection.[9]

The post cesarean complications are divided into two types: The acute complications occur within a month following C-section at the rate of 14.5% and mostly include infections (13.3%) like wound infections (1.6%), abscess and Endometritis (6.6%). The post-surgical early complications include hematomas, uterine rupture and uterine dehiscence. Though uncommon but Uterine rupture is the most severe complication. Planned surgeries had lesser complications (4.7% of cases) than emergency cases (24.2%).

Ultrasound is the modality of choice when specific Symptoms such as fever, falling Hb level, uncommon raised vaginal bleeding, and pain are observed after Csection. Chronic complications may occur after some years and they include abdominal wall endometriosis, ectopic pregnancy due to cesarean scar and abnormally adherent placenta, cesarean scar defect and the cesarean scar RPOCs. Cesarean scar defect is the most common and neglected one.[10] For the evaluation of the late complications; ultrasound is the modality of choice both Trans abdominal and TVS.

Colour Doppler sonography plays a significant role in the assessment of myometrial invasion by measuring the colour flow in women with history of C-section. In a study; Colour Doppler ultrasound was performed to check the blood flow on the placental implants near to scar after hysterotomy.

The least thickness of myometrium was

evaluated below the placenta to assess the level of myometrial reduction of beam and unusual vascular lakes in the said area. Colour Doppler ultrasound of 215 women who had placenta closer to the hysterotomy scar was performed. 15 out of 20 females having placenta Previa had hysterectomy through C-section for bleeding complications. Thickness of the myometrium below 1 mm and large lakes intra-placentally on colour Doppler ultrasound were predictions of the myometrial invasion. sensitivity was 100%.[11] A study was conducted regarding the significance of transvaginal scan for the evaluation of the uterine scar defect and its connection to the next pregnancies and deliveries in non-pregnant women. [12,13]

Transvaginal scans of 162 women 6-9month after cesarean delivery was performed. Large scar defects were used, 6 women did not come for follow up scans due to migration to other areas, 69 of 156 became pregnant, 53 of 69 pregnant women gave birth for one time, 6 women gave birth two times and 10 women faced with miscarriage, ectopic pregnancy or cessation of pregnancy.[14] Bladder-flap hematoma is an uncommon complication of the C-section. Hematoma forms between the bladder and lower uterine segment due to bleeding at the incision site. [15] The bleeding is generally due to trauma to the uterine vessels during surgical procedure, or an occult dehiscence might be the primary reason. [16] Ultrasonography is considered as the prime imaging modality. The ultrasonic features of bladder-flap hematoma are hypo echoic fluid collection having uniform wall and posterior strengthening of the distal echoes in the vesico-uterine space. [17]

Abdominal wall endometriosis post C-section is a highly neglected complication [18]. On ultrasonography; scar endometriomas are identified as heterogenous hypoechoic solid masses, with a hyperechoic fibrotic component, spiculated margins; vascularity seen in most of the cases on colour Doppler ultrasound, while cystic changes have been infrequently reported [19,20,21] Pelvic adhesions are related with the chronic pelvic pain. [22] Transvaginal ultrasound is a beneficial technique for the diagnosis of

pelvic adhesions found in patients with endometriosis [23] Though uncommon (0.1%-0.3%) but injury to the urinary tract can occur in C-section and is associated with significant complications. [24,25] bladder injury can lead to vesico-uterine fistula [26] . Females with a history of earlier C-section had a risk of previa accreta. A study was conducted regarding women with previos history of one section were 4.1% exposed to placenta previa accreta and 13.3% with previous history of two cesarean deliveries.[27]



Figure 1: Longitudinal endovaginal US image of the uterus demonstrates an oval hypoechoic area (arrow) representing defect at the site of the surgical incision in the anterior lower uterine segment. Figure 2: Transverse endovaginal US image shows several punctate and curvilinear hyperechoic foci (arrowheads) representing suture material. [28]

CONCLUSION:

Though C-section plays an important role in its indicated circumstances but it is associated with a lot of complications also. Ultrasound is a reliable, cheap, easily available and noninvasive modality for detecting these complications with their specific sonographic features.

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DECLARATION OF COMPETING INTEREST:

I declare that this was a learning-based study and I have no competing interests. Figure 1: Longitudinal endovaginal US image of the uterus demonstrates an oval hypoechoic area (arrow) representing edema at the site of the surgical incision in the anterior lower uterine segment. Figure 2: Transverse endovaginal US image shows several punctate and curvilinear hyperechoic foci (arrowheads) representing suture material. [28]

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IMAGE REFERENCES:

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