

ASSESSMENT OF MORPHOFUNCTIONAL CHANGES IN THE UTERINE SCAR AFTER CESAREAN SECTION

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Relevance of the Topic. The increasing rate of cesarean sections worldwide has led to growing concerns regarding the morphofunctional changes in the uterine scar and their impact on reproductive health. The integrity and functional state of the scar are critical factors in determining the feasibility of subsequent vaginal delivery and the risk of severe complications such as uterine rupture, abnormal placentation, and infertility. Traditional diagnostic methods, including standard ultrasound, often fail to provide a comprehensive assessment of the structural and functional changes in the scar. Modern imaging techniques such as 3D ultrasound, elastography, MRI, and Doppler studies offer a more detailed evaluation of scar morphology, elasticity, and vascularization, improving risk prediction and patient management strategies.

Materials and Methods. The study included 130 patients with a history of cesarean section, divided into two groups: 55 women in the pregnancy planning stage and 75 pregnant women in various trimesters. Morphofunctional assessment of the uterine scar was performed using 3D ultrasound in 130 (100%) cases, elastography in 85 (65.4%), MRI in 40 (30.8%), and hysteroscopy in 28 (21.5%). Scar thickness (mean 2.9 ± 0.5 mm), elasticity, and vascularization parameters were analyzed to evaluate structural integrity. Functional assessment included measuring tissue elasticity and perfusion, correlating these findings with clinical outcomes such as uterine rupture risk, placental abnormalities, and reproductive prognosis.

Results and Discussion. The study revealed that the mean scar thickness was 2.9 ± 0.5 mm, with signs of morphofunctional insufficiency detected in 42 (32.3%) cases. Scar thinning below 2.0 mm was identified in 21 (16.2%) patients, and pathological vascularization in 24 (18.5%). Elastography showed decreased elasticity in 31 (36.5%) of 85 patients, aligning with MRI findings, where 14 (35.0%) cases demonstrated fibrotic changes and poor vascularization. Hysteroscopy confirmed structural defects in 11 (39.3%) of 28 patients, indicating its high diagnostic accuracy for direct visualization of scar integrity. A comparative analysis highlighted the advantages of 3D ultrasound combined with elastography and Doppler studies, which identified scar insufficiency in 93% of cases, while MRI was particularly valuable in cases with suspected deep tissue fibrosis or endometrial invasion. These findings emphasize

the importance of a multimodal diagnostic approach to assessing the morphofunctional state of the uterine scar, ensuring accurate risk stratification and optimal patient management.

Conclusion. The study confirms that a comprehensive assessment of morphofunctional changes in the uterine scar after cesarean section using 3D ultrasound, elastography, Doppler imaging, MRI, and hysteroscopy enables precise evaluation of scar integrity and functional viability. 3D ultrasound emerged as the most informative and widely accessible method, while elastography and MRI provided additional insights into tissue properties in complex cases. A personalized approach to patient management based on scar morphofunctional assessment helps minimize the risk of uterine rupture, optimize delivery planning, and improve reproductive outcomes, ensuring the safety of future pregnancies.