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RISK FACTORS OF UTERINE SCAR DYSPLASIA DEVELOPMENT AFTER CAESAREAN SECTION ASPECTS AND TERMINOLOGY.

Fergana Medical Institute of Public Health.
Department of Obstetrics and Gynaecology assistant **G'ulomova R.I.**

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Abstract:

The aim of the review was to summarise information and terminological analysis of the English- and Russian-language literature devoted to the assessment of uterine scar condition after caesarean section, as well as to identify the terms that are most appropriate for use outside and during pregnancy, in labour and in the postpartum period.

Keywords: Uterine scar failure, scar defect, niche, isthmocele, caesarean section.

INTRODUCTION

In the modern world there is a tendency to increase the frequency of caesarean section (CS), which is connected both with the expansion of indications for operative delivery and with the increase in the number of first-born women of late reproductive age. According to the World Health Organisation recommendations, the incidence of CS should not exceed 10-15%, but analysis of this indicator in 194 countries indicates a globally high prevalence of this obstetric operation, exceeding 20% [1]. According to the literature, the increase in the incidence of CS in the USA from 1996 to 2007 was more than 50 per cent, in Brazil - from 45 to 45 per cent [1]. 50%, in Brazil - from 45 to 81% [2], in the UK - from 12 to 29%. In the Russian Federation there is an annual increase in the incidence of CS by 1%, on average this figure is 27%, reaching 40-50% in large perinatal centres [3]. Recently, interest in the problem of uterine scarring after CS has increased significantly.vafter CS has increased significantly. The number of studies on this topic is rapidly increasing, with more than 90% of all publications made within the last 20 years. However, the problem of terminology to describe the uterine scar has not been solved in either domestic or foreign literature so far The aim of this study was to analyse the terminology of publications on the assessment of the uterine scar after CS and to identify the most appropriate terms to be used outside and during pregnancy and labour.

METHODS

The aim of this study was to analyse the terminology of publications devoted to the assessment of the uterine scar after CS and to identify the terms most appropriate for use outside and during pregnancy, labour and postpartum.

Terminology

Scar failure , incomplete uterine scar , niche , isthmocele , utero-peritoneal fistula , post-CC scar defect , postoperative scar thinning are the most frequent definitions of this condition found in the literature. One of the first to describe postoperative csarean section wound defects through hysterosalpingography was L. Poidevin [4]. Poidevin [4]. The study was carried out in 43 women 6 months after CS.

In 27 of them small morphological defects of the internal contour were revealed, which, in the author's opinion, reflected the process of repair in the scar zone and was not considered as a risk factor in subsequent deliveries. At the same time, the author assumed that hysterosalpingography at an earlier period may be less informative due to the persisting tissue oedema in the scar zone. N. Burger et al. introduced the concept of incomplete healing of the uterine scar incompletely healed uterine scar, based on its ultrasound characteristics in the early postpartum period [5]. Transabdominal ultrasound (TUS) in 15 out of 48 women who underwent CS revealed a special sound-conducting zone of varying echogenicity in the projection of the scar, located along the inner contour of the anterior wall of the uterus, but the functional state of the uterus was not assessed in this study. Chen et al. used transvaginal ultrasound and Dopplerometry to evaluate the scar after CS [6]. They described for the first time a hypoechogenic wedge-shaped zone different from the intact myometrium of the lower uterine segment. The authors showed a relatively weak vascularisation of this zone and noted a tendency to smoothing of the defect over time. Later, A. Monteagudo [7] proposed the term niche to describe triangular-shaped scar defects detected during sonohysterography. Monteagudo [7] proposed the term niche [7] to describe triangular-shaped scar defects of varying depth and extent, orientated with the apex towards the bladder, detected by sonohysterography, which was widely used [8-1]. D. Ofili-Yebovi et al. [12] proposed to introduce the concept of deficient scar based on the measurement of its thickness. In this case,

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the degree of deficiency or the degree of scar thinning was calculated - deficiency ratio - the ratio of residual myometrium thickness to the thickness of intact myometrium according to transvaginal ultrasound. If this indicator is less than 50%, the defect was considered significant, which increased the risk of subsequent uterine rupture. The term deficient scar is used in several publications [12, 27-29], but after the publication of O. Naji [30], it was abandoned. Naji [30], the absolute majority of authors abandoned its use because it is only descriptive and has no relation to function. G. Gubbini et al. [13] introduced the concept of isthmocele, describing a defect of the scar zone in the form of a pocket covered by endometrium with the presence of dilated vessels, localised in the isthmus of the uterus, well visualised at hysteroscopy. The level of location of the isthmocele and its characteristics may vary significantly depending on the level of the incision at the CS [13-15].The term cesarean section scardiverticulum - diverticulum of the scar area after the CS - is also frequently used in the literature, especially by Chinese authors [16-18]. Currently, the term cesarean section scar defect, which can be large/small, is increasingly used in the English-language literature to characterise the post-CC scar outside of pregnancy [19-26]. During pregnancy and labour, the English-language literature defines the state of the uterine scar after a CS (and later, the lower uterine segment) by two terms: uterine scar dehiscence (gaping, divergence, opening) - divergence of the scar with preservation of the peritoneal layer (the chorioamniotic membrane is directly adjacent to the peritoneum) and uterine rupture - uterine rupture - complete divergence of all layers (the cavity of the uterus). the uterus communicates with the abdominal cavity). These terms appear both in ultrasound/magnetic resonance imaging (MRI) reports and in indications for CS, as well as in surgical diagnoses (2, 19, 20, 24, 26, 29, 31, 32). Some authors used the term extremely thin myometrium (extremely thin myometrium) to denote an excessively thin scar zone visualised during another CS as a transparent thin membrane or film, but it was not widely used [19].

RESULTS

In the domestic literature, the vast majority of publications use the term uterine scar failure [3, 33-37, 43, 44, 46]. It is used in a variety of meanings, outside and during pregnancy, in labour and postpartum. It can refer to both morphological and functional abnormalities, and often does not reflect their degree. There are no generally accepted clear criteria for scar failure outside pregnancy, although thinning of the myometrium in the scar projection at ultrasound or MRI of less than 3 mm, discontinuity of the scar contours, the presence of a significant number of hyperechogenic inclusions (connective tissue) in the scar, and the presence of niches - areas of retraction on the perimetrium and uterine cavity side - are noted, uneven contour on the posterior wall of the filled bladder, retraction of echogenic tissue on the serous membrane side with the formation of irregularly shaped hyperechogenic structures without clear boundaries, scanty blood supply of tissues in the uterine scar zone, established by Dopplerometry [33-5,37]. However, no studies assessing the relationship between these scar characteristics and the likelihood of uterine rupture in subsequent pregnancy and labour have been found in the Russian-language literature. In addition to the term scar failure outside pregnancy, a number of Russian-language publications also use the term niche to describe wedge-shaped defects similar to those described by A. Monteagudo [44, 45, 45]. Monteagudo [44, 45].During pregnancy and in labour, the classification proposed by L.S. Persianinov et al. back in 1964 is still used in the Russian medical literature [41]. [41]. The problem we are considering corresponds to histopathic uterine ruptures, which according to the clinical course are divided into threatening rupture, initiated rupture and completed rupture, and according to the nature of the damage - into a fissure (tear), incomplete rupture (not penetrating into the abdominal cavity, capturing only the mucous membrane and muscular layer) and complete rupture (penetrating into the abdominal cavity, capturing all layers). In the classification of M.A. Repina [42], which clarifies the classification of L.S. Persianinov, spontaneous uterine ruptures with morphological changes in the myometrium are divided by clinical course into risk of rupture (anamnestic characteristic), threatened rupture and completed rupture, and by the nature of damage - into incomplete and complete rupture. However, in these classifications, for obvious reasons, there is no reference to ultrasound findings of the scar or lower uterine segment during pregnancy or labour. The term incompletely valuable scar is also quite common, which is mainly used for morphological characterisation of the scar and reflects the histological features and maturity of the excised scar tissue [38-40]. At the same time, some publications do not use this term for morphological characterisation of the excised scar tissue [38-40].

In some publications, the term is used not for morphological characteristics of the excised scar tissue, but to describe the scar area by ultrasound and hysterosalpingography, and often both incompleteness and failure are used at the same time, mutually

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replacing each other [43]. Thus, at present, especially in the domestic literature, there is no clear terminology to describe the state of the uterine scar. First of all, it concerns the conclusions based on ultrasound or MRI. Our own analysis of the medical records of the patients who applied to the FGBU NMIC AHP named after Acad. V.I. Kulakov patients with uterine scar after CS over the last 10 years showed that in more than 80% of cases the term uterine scar failure was used during ultrasound and MRI [45]. This was often an indication for consultation of patients by a gynaecological surgeon at the place of residence and even for performing an unjustified metroplasty. There are also more cases of primary obstetricians and gynaecologists being wary of pregnancy planning by women who have been diagnosed with an untenable uterine scar, even to the point of prohibiting pregnancy. Finally, there is a special group of women who suffer from the following problems Infertility, which because of such a conclusion, another attempt of in vitro fertilisation or embryo transfer may be delayed or cancelled altogether, which leads to irreparable loss of time. All the above-mentioned causes the urgent need to use a single correct terminology when describing the condition of the uterine scar after CS.

DISCUSSION

When describing this or that pathological condition, we always speak about two components: morphological and functional. Disturbances may affect one or both components. Accordingly, the condition

The scar should be evaluated in two aspects. The morphological characteristic of the post-CC scar implies the degree of anatomical integrity of the uterine wall, i.e. the preservation and expression of the mucosal, muscular and serous layers. In fact, two options are possible: violation of the integrity of all layers of the uterine wall (complete uterine scar rupture) and partial violation of the integrity of the uterine wall layers (incomplete uterine scar rupture). Accurate information about the integrity of a particular layer in incomplete rupture can be obtained only by histological examination of the excised scar, in other cases, the assessment of these parameters will be of a probabilistic nature, because it will depend on the subjective perception of the surgeon (in macroscopic examination during surgery), ultrasonographer (in ultrasound), radiologist (in MRI). A type of morphological characterisation of the post-CC scar outside pregnancy according to ultrasound or MRI is the description of the scar shape - the presence/absence of a niche - a wedge-shaped defect in the scar zone of varying extent and depth.The functional state of the uterus with a post-CC scar can be assessed outside pregnancy, during pregnancy, in labour and in the post-pregnancy period. Outside of pregnancy, it refers to menstrual function, which may be normal or disturbed. Therefore, the use of the term failure is absolutely inapplicable to describe the functional state of the uterus with a scar after a CS outside of pregnancy! It is possible to indicate the type of menstrual dysfunction in the form of hypermenorrhoea, dysmenorrhoea, postmenstrual blood discharge from the genital tract, menorrhagia. During pregnancy and labour, the most important functions are the function of the fetal receptacle and the fetal expulsion function of the uterus. Violation of these two functions due to

of the post-CC scar occurs only with complete rupture of the uterine wall. That is why the concept of failure in pregnancy and in labour may reflect the extreme degree of dysfunction - complete rupture of the uterine wall along the scar.

In the postpartum period, the preservation of uterine function against the background of not yet completed involution and an unformed scar is extremely difficult to assess, since the process of rapture (wounding process), as well as the process of recovery of uterine function, is beyond the duration of the postpartum period. Therefore, the use of the term failure in the assessment of uterine function in the postpartum period is questionable. Nevertheless, the obstetrician-gynaecologist in the postoperative period is interested in the area of uterine sutures primarily from the standpoint of the adequacy of the reparative process. In the absence of purulent-inflammatory complications, healing is primary tension. In case of purulent-inflammatory diseases, wound healing by secondary tension is possible, or (in case of complicated forms of purulent-inflammatory diseases and progression of wound infection) there is wound suppuration and suture divergence. The analysis of modern literature shows that the term failure in relation to the state of the uterine sutures (not the scar!) in the postpartum period is used, in fact, only to characterise the adequacy of the course of the wound process, and not to assess the function of the organ [38-0].Thus, summing up even an intermediate result, we are convinced of the low informativeness and acceptability of the term scar failure after CS. Indeed, any, even insignificant, decrease in myometrial thickness detected by ultrasound or MRI is morphological failure. However, even a pronounced thinning of the scar does not always lead to impaired function. It is the discrepancy between the severity of morphological changes and functional disorders that makes the term scar failure inadmissible based on the measurement of its thickness alone. As we

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have already mentioned, functional assessment The term failure can only be used in pregnancy or in labour. In this case, the term failure can reflect only the extreme degree of dysfunction - complete rupture of the uterus, the symptom complex of which is repeatedly described in the literature and is well known to all obstetricians and gynaecologists. The use of the term scar failure outside pregnancy loses all meaning. And, finally, in the postpartum period, it is not so much about the condition of the scar as about the condition of the uterine sutures. Despite the terminological inaccuracies, it is important for clinicians to be able to predict the functional status of the uterus (i.e., the likelihood of uterine scar failure in labour) on the basis of certain morphological characteristics detected by ultrasound or MRI outside and during pregnancy. There is an ongoing debate in the literature about the value of measuring the thickness of the lower uterine segment in the scar area in the third trimester of pregnancy after CS in the third trimester of pregnancy and its role in predicting the risk of incomplete or complete uterine rupture detected at repeat CS [3, 31, 32, 35, 36]. Two modalities are available, measurement of the thickness of the entire lower uterine segment and the thickness of the myometrium in the area of the presumed post-CC scar. Assessment of these parameters can be performed both transvaginally and transabdominally. In this case, many authors suggest threshold values of these parameters varying from 1.7 to 3.5 mm. 3.5 mm. Much is said about the standardisation of ultrasound measurements and the reproducibility of the evaluation method by different specialists. However, there is still no consensus on the possibility of predicting uterine rupture by measuring the thickness of the lower uterine segment! This is confirmed by systematic reviews by N. Jastrow et al. and N. Kok et al., which showed significant heterogeneity of studies with large variations in threshold values, making it impossible to recommend any of them for clinical practice [31, 32]. Outside pregnancy, the situation is even more uncertain. Quite a few studies use the assessment of scar thickness after CS as a criterion for the need for surgical treatment (metroplasty) [15, 18, 21, 23, 26, 33,35]. Various threshold values are also suggested: from 2.5 to 4.0 mm. However, in the absolute majority of cases, these values are proposed as a postulate based on general phrases about the reduction of the probability of subsequent uterine rupture in labour due to an increase in the thickness of the scar zone after metroplasty. And only one prospective study - O. Vikhareva Osser et al. [19], conducted with 59 patients, showed a higher risk of rupture (incomplete or complete) among women with a significant scar defect compared to women with small scar defects or without ultrasound signs of scar defects (odds ratio 12.7; 95% confidence interval 0.9-24.0). At the same time, the authors established threshold values of post-CC scar thickness (differentiating between significant and small post-CC scar defects) for two examination methods: for transvaginal ultrasound: ≤,2 mm after a single CC and ≤,9 mm after two or more CCs, and for sonohysterography: ≤,5 mm after a single CC and ≤,3 mm after two or more CCs. We did not find any studies evaluating the prognostic value of MRI in assessing the relationship between the magnetic resonance characteristics of the post-CC scar and the risk of uterine rupture in subsequent pregnancies, although most researchers acknowledge the high resolution and efficiency of the method, comparable to contrast sonohysterography [25].Thus, based on the analysis, the following conclusions can be drawn:1. The term uterine scar failure after CS

The resolution of modern research methods (ultrasound and MRI) allows a high accuracy assessment of the structural features of the post-CC scar or the lower uterine segment in the scar area, but there are still no reliable criteria for the relationship between the degree of structural changes and the functional state of the uterus during pregnancy and labour. There is a tendency to a higher frequency of uterine rupture against the background of significant scar defects diagnosed outside pregnancy according to ultrasound or sonohysterography. The thickness of the lower uterine segment in the III trimester has an inverse correlation with the risk of uterine rupture in labour. This indicator is auxiliary in assessing the prognosis of uterine rupture in labour (no recommended threshold value) and cannot serve as a criterion for choosing the method of delivery. 3. There is an urgent need to use correct terminology concerning In this regard, we propose to use the following terminology to describe this condition, as the use of inadequate wording in conclusions and diagnoses negatively affects the management of patients: 1. To describe the state of the scar after CS according to ultrasound, Sonohysterography or MRI outside pregnancy, it is reasonable to use the term "post-CC scar defect" instead of the term failure. The conclusion can be supplemented with visual characteristics of the scar - with (or without) the formation of a niche. It is also possible to be guided by the criteria proposed in the literature or our own criteria for distinguishing between significant and small defects depending on the thickness of the residual myometrium. 2. In ultrasound or MRI studies during pregnancy, the use of the term "scar failure" is undesirable, because, as outside pregnancy, there are no clear criteria for correlating the risk of uterine

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dysfunction with the thickness of the scar/lower uterine segment. It is more appropriate to use the term "thinning of the uterine scar area" or "lower uterine segment" with an indication of the thickness of the area under investigation. 3. In clinical diagnoses in labour, due to the greater significance of clinical manifestations, the terms "threatening" and "uterine scar rupture", which, in fact, describe the failure of the uterine scar in the form of an incomplete or complete rupture, should be used, which are familiar and well-established in the Russian language. 4. The terms "incomplete" or "complete uterine rupture" refer to the surgical diagnosis during CS because they require macroscopic verification. 5. In the postpartum period, the term uterine scar failure should be avoided because the scar is not yet formed. The term uterine suture failure does not reflect the true picture of what is going on. When we talk about uterine suture failure, we are essentially talking about the presence or absence of wound infection affecting the reparative process. In uncomplicated cases, the term "postpartum endometritis" should be used, in complicated forms of postpartum purulent-inflammatory diseases - "postpartum endomyometritis", "peritonitis". These diagnoses determine the tactics of patient management, as well as indications for surgical treatment. The presence or absence of divergence of sutures on the uterus, as a rule, is difficult to establish at the preoperative stage (ultrasound has low informativeness). Therefore, the term "uterine suture divergence" refers more to a surgical diagnosis at the time of reoperation. 6. The term "Incomplete scar" should be used only for pathomorphological opinion based on histological examination of the excised scar tissue and should not be used to describe the ultrasound or MRI characteristics of the scar or MRI characteristics of the scar. A careful analysis of the 10th revision of the International Classification of Diseases (ICD) shows that several conditions are suitable for the description of scarring.

CONCLUSION

Several codes are appropriate to describe these conditions, which are fully relevant to the problem at hand in pregnancy, labour and postpartum (incidentally, these codes are repeated in the ICD 11th revision under development): Class O00-O99 - The codes included in this chapter should be used for conditions related to or aggravated by pregnancy, labour or the postpartum period (maternal causes or obstetric causes). Block O34 - Maternal health care for established or suspected pelvic anomaly includes conditions that warrant observation, hospitalisation or other obstetric care for the mother, and caesarean section prior to delivery, item O34.2 - Postoperative uterine scar requiring maternal health care (NB! It is during pregnancy and delivery!).

Block O71 - Other obstetric injuries, items O71.0 Uterine rupture before labour and O71.1 - Uterine rupture during labour. Block O86 - Other postpartum infections, item O86.0 - Surgical obstetric wound infection. Block O90 - Complications in the postpartum period, not classified in other headings, item O90.0 - Dissection of sutures after caesarean section .Outside pregnancy we found only 2 items meeting the query parameters:

Class N00-99 - Diseases of the genitourinary system. Block N99 - Other diseases of the genitourinary system, item N99.8 - Other disorders of the genitourinary system after medical procedures.

Class R00-R99 - Symptoms, signs and abnormalities detected by clinical and laboratory tests, not classified in other headings.Block R93 - Abnormalities detected by diagnostic imaging during examination of other organs and areas of the body, item R.93.5 - Abnormalities detected by diagnostic imaging during examination of other areas of the abdomen, including retroperitoneum .Analysing the ICD codes, we come to the conclusion that to characterise the condition of the scar outside pregnancy p Item R93.5 can also be used, but it is more used by ultrasonographers and radiologists.Item O34.2 can only be used during pregnancy (in the first trimester for the scar, in the second and third trimesters for the lower uterine segment) and can be used to decide whether a CS is necessary. Finally, O86.0 and O90.0 should be used in the postoperative period.

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