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The Diagnosis and Treatment of Early Pregnancy in Caesarean Scar (CSP) - a Clinical Description of the Case

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Summary

Early pregnancy, in the lower part of the uterus, in the Caesarean scar (CSP), is a type of ectopic pregnancy. It can cause serious complications if left untreated.

CSP, with a positive embryo/foetal heart function, treated on a waiting list, has been associated with a high, maternal burden, haemorrhaging, early uterine rupture, hysterectomy and severe AIP. Some pregnancies, made the more complicated with CSP, can progress to term, making it difficult to decide whether termination of the pregnancy may be the only treatment option for these women. Expectant management in CSP, without cardiac activity, may be an option because of the low risk of maternal complications requiring immediate

intervention. Nevertheless, close monitoring is recommended, in order to avoid complications in pregnant women. Endovaginal USG is the main method in the diagnosis of this disease, since it is not affected by external factors. Therefore, this type of ultrasound diagnosis has better diagnostic efficacy, in the case of this type of ectopic pregnancy CSP.

Keywords: ultrasound, Caesarean section, ectopic pregnancy in Caesarean section, Doppler examination

Introduction

Early ectopic pregnancy, in the lower, Caesarean scar (CSP) is primarily an embryonic pregnancy in the scar after cutting the lower section of the uterus [1,2]. A significant increase in the number of Caesarean sections, in recent years, has led to an increase in the incidence of both the short- and long-term complications associated with this type of ectopic pregnancy. These include profuse vaginal bleeding in the first trimester of pregnancy, symptoms such as abdominal pain and/or vaginal bleeding requiring surgical intervention, uncomplicated spontaneous abortion, complicated abortion, requiring gynaecological intervention, uterine rupture and associated hysterectomy in the first, second or third trimester of pregnancy, bleeding in the third trimester, maternal death, abnormal implantation of the placenta and the presence of ingrown placenta and live birth [2,3].

Diagnosis of CSP is based on the presence of a gestational sac at the site of a previous, uterine muscle incision, the presence of an empty uterine cavity and cervix along with a thin, uterine muscle adjacent to the bladder [4]. It is not always possible to make a prenatal diagnosis. Many cases are misdiagnosed as threatening or incomplete miscarriages, or intra-uterine pregnancies. Such a diagnosis can led to curettage of the uterine cavity, due to a presumed unsuccessful pregnancy, which results in profuse bleeding and urgent surgical intervention which sometimes ends with a hysterectomy [4]. This type of ectopic pregnancy threatens a woman's physical and mental health and quality of life [3,4]. Therefore, early diagnosis of CSP is a key, diagnostic problem.

Ultrasonography is the standard diagnostic method in early pregnancy. Abdominal USG examination is influenced by external factors such as the thickness of fatty tissue or the defective filling of the bladder, which increases the risk of misdiagnosis. Vaginal ultrasound is not influenced by any external constitutional factors of the patient [7,8]. Vaginal ultrasonography is characterised by higher diagnostic accuracy and useful value in CSP than

is the case with trans-abdominal ultra-sonography. Endovaginal ultrasound reduces the risk of misdiagnosis, thereby preventing delay in treatment.

When using trans-abdominal ultrasound, the Toshiba LOGIQ S7 four-dimensional, Doppler colour, ultrasound scanner and a vaginal probe from the same company, were used. When the patient's bladder was full, the position and size of the appendages of the pregnant uterus were determined and the thickness of the uterine muscle, as also the abnormal structures around the Caesarean section scar, uterine muscle deficiencies and the cutting scar were examined. The equipment and frequency of the vaginal ultrasound probe were the same as for the trans-abdominal ultrasound. After inserting the probe into the vagina, longitudinal and transverse scans of the uterine scar, the place of pregnancy, the cervix, the uterine cavity, appendages, pelvis, implantation of the gestational sac, along with the blood flow in the Caesarean scar, are performed.

There are many known methods of CSP treatment, but the optimal approach, in terms of safety and efficacy, has not yet been established [3]. The most common clinical practice is to offer the woman termination of the pregnancy due to the high rate of morbidity and complications associated with this condition [3]. The proposed relationship between CSP and AIP, namely, the abnormal connection of part of the placenta or the entire chorionic plate with penetration of the chorionic villi, in the myometrium, along with lack of decidua basalis, influences the counselling of women with prenatal CSP and increases the dilemma as to whether termination of pregnancy should be the only form of treatment [5,6]. Although the evolution of changes towards early haemorrhage or rupture of the uterus may seem the most likely scenario, the link with AIP, as presented, raises the question of the percentage of CSPs associated with live birth and how to identify cases where pregnancy is likely to be successful and will be amenable to postpartum treatment. The majority of publications, published on CSP, include symptomatic or emergency cases, which makes it difficult to correctly assess the burden on the mother, of this condition.

Case study

A 32-year-old patient with C III p II 6 HBD was admitted to the ward due to suspected ectopic pregnancy in the Caesarean scar; she had been pregnant twice before. Six years earlier, the patient was hospitalised in pregnancy labour at the 8th week of pregnancy because of *gravid obsolete*, or dead pregnancy. Pharmacological treatment was applied without the need for curettage of the uterine cavity. The course of the miscarriage was complication-free. Two years later, the patient was pregnant again. The pregnancy went well. At 39 weeks of

pregnancy due to threatening intra-uterine foetal malformation, the pregnancy was brought to a close by Caesarean section. A full-term, live son was born, weighing 3470 g and was given 9-9-10 points on the Apgar Scale. The post-operative course of treatment was without complications. On the fourth day, the patient was discharged, along with the child, both in generally good condition. The baby is developing properly.

Two years later, the patient, with no symptoms but with a positive pregnancy test result, attended the Gynaecological Outpatient Clinic. In the USG examination, carried out in the 6th week of pregnancy, diagnostic criteria were applied, according to Ilan E. Timor–Tritsch, during which it was found that the gestational sac was located below the perpendicular line, drawn near the cervix. On this basis, an initial diagnosis of CSP was made. The patient was referred for hospital treatment. The examination revealed there was an empty uterine cavity, a closed cervical canal, the gestational sac was closely adjacent to the scar after the previous Caesarean section, there was rich vascularisation of the Caesarean scar area which was then confirmed by the Doppler examination and a thin layer of uterine muscle between the urinary bladder and the gestational sac was also observed.

Fig. 1. Ultrasound examination I

The patient was informed of the abnormal location of the pregnancy, which could have posed a direct threat to her life. Methods for further proceedings were presented. Basic laboratory tests were performed prior to the planned treatment with methotrexate, i.e.: blood group "A" Rh/+ / positive, concentration of the β – sub-unit of the chorionic gonadotropin -12795.00 mIU/ml, complete morphology with smear and platelet count WBC - 9.06 K/ul, RBC-4.45 M/ul, HGB-14.2 g/dl, HCT-42.5%, PLT-279.0 K/ul, CRP – 1.82 mg/l liver tests - aspat-30u/L,

alat – 28U/L, renal parameters: - urea 20mg/dl, creatinine - 0.71 mg/dl. The patient was offered treatment with a folic acid antagonist - Methotrexate as the first line of treatment. This works by inhibiting the enzyme dihydrofolate reductase thus interfering with DNA synthesis in cells at the site of implantation, especially of the trophoblast. The use of MTX requires repetition of the dose due to its short half-life. The daily dose of the preparation is 1 mg/kg of body weight or 50 mg/m^2 p.c. This applies to the situation when MTX is administered both locally and systemically. Under general anaesthesia and USG, a 16-20G was injected into the gestational sac with a needle and into the trophoblast area, 25 mg of the drug and 100 mg of the drug were administered. After the procedure, antibiotic prophylaxis was administered in the form of intravenous drugs: 1.5 g of Cefuroxime and 500 mg of Metronidazole. The patient endured the procedure well. On days 2 and 6, after drug administration, the concentration of the β sub-unit of chorionic gonadotropin was determined and a USG control examination was performed. The examination showed a collapsed gestational sac. Two days later, the beta HCG level was 3376.00 mIU/ml. After a further four days, the beta HCG was 993 mIU/ml. On day 7, the patient was discharged, in good general condition.

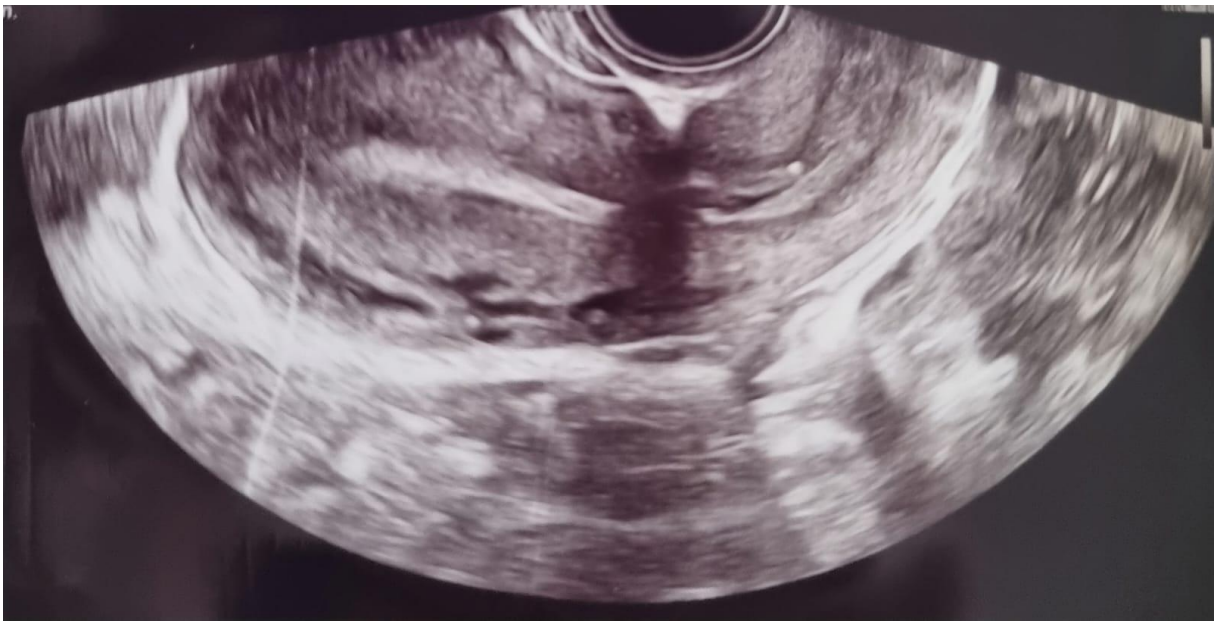

Fig. 2. USG examination

Discussion

CSP is associated with the anatomical condition of the Caesarean scar of the uterus and changes in local biochemical factors [12]. Some authors suggest, in their works, that ectopic pregnancy in the Caesarean scar is associated with temporal vascular defects, abnormal healing of the uterine muscle wound post-Caesarean section and endometrial damage. In the absence of typical clinical symptoms, there is a risk of misdiagnosis, such as, cervical pregnancy, trophoblastic tumour, intra-uterine pregnancy and complications associated with

abortion which results in an increased number of complications. Assessment of the thickness of the muscular tissue and of the implantation of the gestational sac with the use of Doppler ultrasound, is useful for the assessment of blood flow in the Caesarean scar [16]. CSP can progress by starting at the scar and moving towards the uterine cavity, thereby allowing the foetus to grow and survive. The second type is associated with directing the growth from the scar, towards the uterine wall. This type can cause the uterus to rupture. On the basis of the endovaginal, ultrasound examination carried out, in the uterine cavity, a gestational sac, an embryo and an attached placenta, at the site of the Caesarean scar, can be seen [17,18]. Trans-abdominal ultrasound can be used to help in diagnosis. However, it has numerous disadvantages, i.e., susceptibility to scarring, and changes both to bladder capacity and abdominal fat. Endovaginal ultrasonography does not have these drawbacks, as it has high resolution efficiency and a wide scanning range. This type of ultrasound can diagnose CSP by checking the position of the implanted gestational sac with high sensitivity and specificity, by checking its clinical condition, by checking the changes in the cervix, the changes in the isthmus, the condition of the uterine muscle and finally, by checking blood flow, thereby reducing the risk of misdiagnosis and providing a benchmark for further assessments. The Endovaginal, Doppler colour ultrasound examination, shows the status of blood flow in the scar, the position of the gestational sac implantation and the thickness of the scar in the uterine muscle, which is useful in the assessment and diagnosis of CSP [19,20]. Attention should be paid to the diagnosis and differentiation of CSP in cervical pregnancy, local adenomyosis, haematoma after incision of the uterus and the post-abortion state. In diagnostics, the position of the endovaginal probe gets closer to the lesion, which is more convenient for the diagnostician, as it allows the location of the implantation of the gestational sac to be assessed and the examination does not require a full bladder**.**

CSP is defined as a gestational sac or trophoblast, located within, or implanted in, the descent/recess of a previous Caesarean section, that is, implanted in an empty uterine cavity which is visible during ultrasound examination, the absence of a uterine muscle layer between the gestational sac and the bladder, or the thin wall (1-3 mm), a closed cervix, an empty cervical canal, the presence of an embryonic/foetal pole and/or yolk sac*,* with or without a foetal heartbeat and the presence of a clear vascular pattern around the chorion or placenta.

Despite the wide variety of opinions, held in this regard, the most common practice is to offer termination of pregnancy because of the high rates of morbidity and mortality. The link between CSP and AIP makes it difficult to advise women, diagnosed with CSP during the prenatal period and raises the dilemma of whether termination of pregnancy should be the only option offered [5,6]. The question should be asked about the percentage of CSP ending in live births. Most of the works published on CSP mainly cover symptomatic or rescue cases, which makes it difficult to estimate the actual burden of maternal morbidity associated with

this disease. Clinical trials indicate that in women who developed a foetal heartbeat, the risk of bleeding and symptoms requiring urgent gynaecological intervention, in the first trimester of pregnancy, has increased. Statistics show that about 13% of pregnant women may experience an incomplete miscarriage, while 20% require surgical intervention. Uterine rupture occurs in about 10% of cases with perinatal hysterectomy occurring in 15%, in both the first and second trimesters of pregnancy. In the third trimester of pregnancy, about 33% experience bleeding while among the others, pathological AIP is recognised, mainly *placenta percreta*. In the case of pregnant women with CSP, but without cardiac activity of the embryo, an incomplete miscarriage may occur, with surgical intervention affecting some 31%. The risk of uterine rupture and hysterectomy is low, in this case.

The small number of CSP pregnancies in most of the studies described, their retrospective non-randomised nature, the different follow-up time, the lack of stratification of the analysis of β-HCG concentration in the serum and the size and location of the gestational *sac,* are the main factors limiting a review of such medical cases.

Increasing CD rates in recent years along with advances in ultrasound diagnosis have led to an increase in the number of patients with CSP, requiring obstetric treatment. Despite the heavy burden of pregnancy with CSP it is often misdiagnosed. CSP is diagnosed in the presence of a gestational sac and/or placenta, near a previous scar in a patient with a previous CD and a positive pregnancy test result. Before 7 weeks of pregnancy, the gestational sac may take the form of the niche in which it nests. There is usually no layer or only a thin layer of uterine musculature between the gestational sac and the bladder wall. Additionally, an empty uterine cavity is evident and a negative symptom of sliding organs; this means that under the pressure of the vaginal probe, the gestational sac cannot be displaced and remains at the level of the internal opening of the cervix. The Doppler colour test shows the blood flow around the gestational sac. There should be no free fluid in the peritoneal cavity, however, its presence may indicate the complete rupture of the uterus. After 7 weeks, the sac "shifts" towards the uterine cavity, changing its shape and assuming the intracavitary position, which may suggest an intra-uterine pregnancy, giving rise to a misdiagnosis. Pregnancies, in the Caesarean scar, are more common in patients with a history of pathology of the placenta, after curettage of the uterine cavity. It is more common in women who have had IVF or who have had a previous ectopic pregnancy. Ultrasound examination enables a Caesarean Scar Pregnancy to be differentiated, in contrast to a cervical pregnancy or a pending miscarriage. The physiological course of pregnancy, in a Caesarean scar, is not sufficiently understood. If untreated, the uterus may rupture or bleed, requiring a perinatal hysterectomy, with the risk of serious complications for the woman. Untreated CSP may develop into an ingrown placenta.

The prognosis of subsequent pregnancies in CSP is associated with a high risk of

complications and requires intensive obstetric supervision. A pause is recommended between CSP and the next pregnancy. In the next pregnancy, thorough ultrasound diagnosis is required to assess the location of the gestational sac. Termination of the next pregnancy is proposed by means of an elected Caesarean section, in order to minimise the risk of uterine rupture. The abnormal structure of the uterus is believed to be responsible for the risk of developing CSP. According to another hypothesis, during the healing of the wound in the Caesarean section scar, a micro-channel is created, which enables the migration of the blastocyst into the scar. Another theory concerns the operation of a molecular mechanism as a result of which, the trophoblast has a stronger pre-disposition to be implanted within the extra-cellular matrix. Another hypothesis suggests the role of the partial pressure of low oxygen, in stimulating the development of the trophoblast and its deep implantation. CSP is similar to a congenitally ingrown placenta. In both cases, there is an implantation disorder secondary to the endometrial pathology. Therefore, no optimal treatment for CSP has yet been established [21].

Conclusion:

1. Intra-cavitary ultrasound is characterised by a higher diagnostic accuracy and, thus, a greater evaluation of its use in the diagnosis of CSP than is traditional trans-abdominal ultrasound.
2. Intra-cavitary ultrasound reduces the risk of missed diagnoses and misdiagnosis, which is likely to result in prompt treatment and better prognoses for patients.

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