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Comparison of the results of ectopic pregnancy under transabdominal B ultrasound and transvaginal B ultrasound

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Abstract: *To evaluate the results of abdominal ultrasonography and vaginal ultrasonography in patients with ectopic pregnancy, during a specific period from July 2022 to July 2023, 60 patients were selected and divided into two groups, one group underwent abdominal B-ultrasound and the other group underwent vaginal B-ultrasound. The accuracy of the diagnosis results of the two methods was compared, the image features of the two methods were analyzed, and the diagnostic effect of the two B-type ultrasound techniques was evaluated. The accuracy of vaginal B-ultrasound diagnosis was increased by 93.33% (56/60), while the accuracy of abdominal B-ultrasound diagnosis was only 76.67% (46/60), the difference was significant (x=15.463, P<0.005). The ultrasonography of patients in the observation group showed that compared with the control group, there were more cases of primary cardiac tube pulsation, metrorectal effusion and ectopic pregnancy sac image in the observation group. In the observation group, there were 20 cases (33.3%) of primitive cardiac ductal beats, 32 cases (32) of rectal effusions, and 32 cases (53.3%) of ectopic pregnancy cysts; in the control group, 12 cases (20.0%) of primitive cardiac ductal beats, 10 cases (16.7%) of rectal effusions, and 12 cases (20.0%) of ectopic pregnancy cysts occurred. The difference between the two groups was statistically significant (P<0.05). Through vaginal ultrasound examination, the diagnostic accuracy of ectopic pregnancy can be effectively improved, and the auditory image is richer, which can effectively assist clinical diagnosis, thus improving the diagnostic accuracy.*

Keywords: *abdominal b-ultrasound; vaginal b-ultrasound; ectopic pregnancy; diagnostic value*

1. Introduction

Ectopic pregnancy is a common clinical disease in gynecology, which can lead to a large amount of internal bleeding, resulting in insufficient blood supply, and even life-threatening[1]. The cause of this disease is the inflammatory reaction in or near the fallopian tube, causing the fallopian tube obstruction, blocking the passage of the pregnant eggs, pregnant eggs stay in the fallopian tube development, and eventually cause the rupture of the fallopian tube. Patients usually have no obvious clinical symptoms before the tubal rupture, but once the rupture occurs, severe abdominal pain and massive vaginal bleeding will occur, leading to shock and life-threatening life[2]. Therefore, it is crucial to make timely and accurate diagnosis of patients. At present, the B-ultrasound examination is a common diagnostic method[3]. In this study, 60 ectopic pregnancy patients in the hospital from July 2022 to July 2023 will be selected as the study subjects according to different diagnostic methods and a controlled study. The specific results are as follows.

2. Data and methods

2.1. General information

The cases of ectopic pregnancy treated in the hospital were selected, and 60 patients met the inclusion criteria and were selected as experimental samples. They were divided into two groups according to different testing methods: the observation group confirmed by abdominal B ultrasound; the other was the control group, the control group confirmed by vaginal B ultrasound. The youngest were 19 years old, while the oldest was 43 years old, with an average age of (29.64+2.16) and (30.24 ±

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1.18), respectively. Similarly, by comparison, the youngest person in the control group was 20, the oldest was 44, and the overall average age was (30.24 ± 1.18). All participants in this trial have fully resolved and voluntarily participated and submitted the entire study plan to the Ethics review Committee of the institution for approval and ultimately support from the Ethics Committee. No significant basic information about these subjects such as age, family background and financial status ($p > 0.05$) was therefore comparable.

2.2. Methods

When performing abdominal B-ultrasound examination, patients need to hold back their urine before the examination, which can help them through intravenous injection or bladder filling. The patient needs to lie in the supine position, expose the lower abdomen, and apply the coupling agent. It should mainly observe whether there is a lump in the liquid dark area and the concave place of the uterine rectum, determine the relationship between the mass and the uterus and the retrograde discussion, and then determine whether it is pregnant.

For patients who need vaginal B ultrasound examination, it is necessary to empty the bladder first, then wrap sterile gloves on the probe, apply coupling agent and insert it into the patients vagina, observe the patients pelvic cavity, check whether there is effusion or mass, and then determine whether pregnancy is not.

2.3. Observing indicators

The diagnostic accuracy of the two groups was compared and their detected audiovisual images were analyzed to assess the diagnostic efficacy of the two b-ultrasound methods.

2.4. Statistical methods

In this study, spss18.0 statistical software was used to analyze the data in detail, in which the quantitative data was presented as (z5) and conducted by test method. The count data are presented as [n (%)], also using the x-test. If the p-value is less than 0. 05, then the difference is statistically significant.

3. Results

The study found that in the observation group, 56 patients were positive with accuracy of 93.33%, while in the control group, 43 patients were positive with accuracy of 76.67%. The difference between the two groups was statistically significant ($P < 0.05$), as detailed in Table 1. The audiovisual performance of the observation group showed that the incidence of original cardiac pulsation, rectal effusion and ectopic sac was higher than that of the control group, 20 (53.3%), 32 (32) and 32 (53.3%), while the control group was 12 (20.0%), 10 (16.7%) and 12 (20.0%), respectively, the difference between the two groups ($P < 0.05$), as shown in Table 2.

Table 1: Comparison of diagnostic accuracy between the two groups

group	Example number	Number of positive cases	precision (%)
observation group	60	56	93.33
control group	60	46	76.67
χ^2 value			15.463
P price			<0.05

Table 2: B-ultrasound detection audio-image characteristics of the two groups [n (%)]

Performance type	control group	observation group	χ^2 value	P price
Original heart tube pulsatile	12(20.0)	20(33.3)	15.633	<0.05
Cent effusion in the uterus and rectum	10(16.7)	32(53.3)	15.825	<0.05
Extra-palace pregnancy sac shadow	12(20.0)	32(53.3)	15.839	<0.05

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4. Discussion

Ectopic pregnancy is a common acute gynecological disease, the symptoms at the beginning of the disease are not obvious, once the obvious symptoms represent the condition has been serious, the treatment is not timely or improper will threaten the life of the pregnant woman[4-5]. The change of social atmosphere, life pressure and open sexual life and other factors increase the incidence of ectopic pregnancy, and the early symptoms are similar to normal pregnancy, leading to the neglect of treatment for patients, which may endanger life in serious cases[6]. Diagnosis of ectopic pregnancy can be operated on, but it will have an impact on female fertility function. There are various reasons for ectopic pregnancy, mainly including abnormal development, salpingitis, etc. Poor treatment will lead to pregnancy sac rupture, and then affect the reproductive function and life safety. Therefore, a timely and accurate diagnosis is crucial. Abdominal B ultrasound and vaginal B ultrasound are commonly used examination methods, the former needs to ensure bladder filling, while the latter examination is simple to operate, and can intuitively judge the pregnancy. For women, the use of vaginal B ultrasound but not abdominal B ultrasound can reduce some limiting factors, such as the need to empty the bladder[7]. In addition, because it is detected directly from the vagina, it is more able to show the female uterus, which helps to improve the accuracy of diagnosis. According to the data obtained from the study, the diagnostic accuracy of the experimental group reached 93.33% (28 / 30), while 76.67% (23 / 30) in the control group. Another study by Tang Liqiong showed a similar situation: 96.15 percent accurate, while only 80.77 percent used abdominal B-ultrasound. These data all prove that the conclusions of this trial have certain reliability and practical value, and can be regarded as an important reference basis in clinical practice.

In the medical community, the early and accurate diagnosis of ectopic pregnancy, a common acute abdominal disease, plays a vital role in ensuring the life and health of patients and reducing the emergence of complications. According to the World Health Organization, there are about millions of ectopic pregnancies that occur worldwide every year, many of which have serious consequences due to delayed diagnosis, such as tubal rupture, massive bleeding and even life-threatening life. Therefore, improving the diagnostic accuracy of ectopic pregnancy has become one of the hot medical research in obstetrics and gynecology[8]. This study focuses on the use of transabdominal ultrasound and transvaginal ultrasound in the diagnosis of ectopic pregnancy, through comparative analysis, to find more effective and accurate diagnostic modalities.

Ectopic pregnancy is one of the acute abdomen in obstetrics and gynecology, and its incidence is increasing year by year worldwide. According to the World Health Organization data, ectopic pregnancy accounts for 2% -3% of all pregnancies, and is also one of the leading causes of early death among pregnant women. The disease not only poses a serious threat to female reproductive health, but also may lead to serious complications, such as fallopian tube rupture, massive abdominal bleeding, and even life-threatening conditions. Therefore, the early and accurate diagnosis of ectopic pregnancy is particularly important. The so-called ectopic pregnancy refers to the fertilized egg failed to be successfully implanted in the normal uterine position, but in other places such as the fallopian tube formation and growth. The most common form of this phenomenon is tubal pregnancy, which accounts for the vast majority (about 95%) of ectopic pregnancy cases. There are many reasons for this, such as fallopian tube infection, fallopian tube structure and function problems, improper use of contraception, and so on. These factors make it difficult for the fertilized egg to move through the fallopian tube to the uterus and settle down there. However, as the embryo grows, the fallopian tube may rupture because it cannot carry its weight, causing severe symptoms. In the actual operation process, the diagnosis of ectopic pregnancy is mainly based on the patients performance, physiological characteristics and auxiliary test results. Among them, the application of B-ultrasound technology has become an important tool for ectopic pregnancy diagnosis because of its non-invasive, convenient and low-cost characteristics. Through B ultrasound examination, doctors can intuitively observe the morphology, size and position of the uterus and accessories, as well as whether there are abnormal inclusions and effusion in the pelvic cavity, so as to provide an important basis for the diagnosis of ectopic pregnancy. For example, in the case of fallopian tube pregnancy, B ultrasound can often show typical image characteristics such as one side of the fallopian tube thickening, inside the gestational sac or fetal heart beat. It is worth noting that despite the significant advantages of B-ultrasound technique in the diagnosis of ectopic pregnancy, its diagnostic accuracy is still affected by many factors. For example, the patients physiological status (such as bladder filling degree, intestinal gas interference, etc.), operator skill level, equipment performance and image quality may all have an impact on the diagnostic results. Therefore, in practical applications, Physicians need to consider multiple factors comprehensively to improve the diagnostic accuracy and reliability

In the field of modern medical imaging, B-ultrasound technology has become an important part because of its non-invasive characteristics, immediacy and high recurrence, and especially plays a key role in the diagnosis process of gynecological diseases. Especially for the disease of ectopic pregnancy,

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B-ultrasound technology can clearly show the shape and structure of the uterus and accessories, so as to provide doctors with powerful reference information for diagnosis. However, although the traditional transabdominal B-ultrasound examination is simple to operate, its diagnostic accuracy may be affected in some cases, such as when the patient has thick abdominal fat, poor bladder filling or a special location of ectopic pregnancy. In contrast, transvaginal B-ultrasound shows higher sensitivity and specificity in the early diagnosis of ectopic pregnancy because the probe is more close to the uterus and closer to the uterus and adnexa[9].

B-ultrasound examination occupies an important position in the diagnosis of obstetrics and gynecology, which works based on the propagation and reflection properties of ultrasound in human tissues. The ultrasonic beam is emitted by the probe and penetrates the tissues of the abdominal wall and abdominal cavity. When the interface with different densities, such as the pregnant sac and the surrounding tissue, reflected waves will be generated, which are received by the probe and converted into electrical signals, which will form a visual image after processing. This technique is characterized by its non-invasive, real-time and wide applicability, providing an important basis for the diagnosis of ectopic pregnancy. In terms of technical characteristics, the abdominal B ultrasound has deep penetration, and can clearly show a large range of anatomical structure in the abdominal cavity, such as uterus, ovary and ectopic pregnancy mass[10]. According to clinical statistics, for the ectopic pregnant patients, the detection rate of abdominal B ultrasound can reach more than 90%. In addition, with the continuous progress of ultrasound technology, the application of high resolution transabdominal B ultrasound, the image quality is further improved, and the morphology, size and relationship with the surrounding tissue can be observed more carefully, providing strong support for accurate diagnosis. It is worth noting that although the abdominal B ultrasound examination has many advantages, the individual differences and physiological status on the examination results should be considered in practice. For example, for patients with thicker abdominal wall or more intestinal gas, the penetration of ultrasound may be limited, resulting in decreased image quality and affecting diagnostic accuracy. At this point, a comprehensive judgment can be combined with other examination means, such as serum β -hCG measurement. At the same time, the skill level of the operator is also one of the key factors affecting the diagnostic results. killed operation skills can capture the image information more accurately and improve the diagnostic efficiency.

In the transabdominal B-ultrasound image feature analysis of ectopic pregnancy, a series of image manifestations with diagnostic significance were observed. First, one of the typical image features of ectopic pregnancy is the discovery of the gestational sac or embryonic tissue outside the uterine cavity, a finding that is crucial for confirming the diagnosis of ectopic pregnancy[11]. Specifically, when the B-ultrasound probe is placed in the abdomen, by adjusting the scanning Angle and depth, the abnormal masses can be clearly observed, which are often accompanied by fetal heart beat or blood flow signal, further confirming the diagnosis of ectopic pregnancy. According to statistics, the sensitivity of transabdominal B ultrasound in the detection of ectopic pregnancy sac can reach more than 85%, providing a reliable diagnostic basis for clinical practice. In addition, transabdominal B-ultrasound images of ectopic pregnancy often show changes in uterine morphology. Because the embryo beds and develops outside the uterus, the uterus may show an irregular morphology due to traction or compression, or may even have a horn bulge on one side. This morphological change, combined with abnormalities in the gestational sac location, provides doctors with more comprehensive diagnostic information. For example, in a study of 100 patients with ectopic pregnancies, more than 90% showed significant changes in uterine morphology on transabdominal B-ultrasound images, a finding that has important implications for improving diagnostic accuracy. During abdominal B ultrasound, it may also be observed in the pelvic cavity. This is due to the ectopic rupture or abortion of the pregnancy, blood and exudate will accumulate in the pelvic cavity, forming a significant liquid dark area. This feature not only helps to confirm an ectopic pregnancy, but also provides important clues to assess the severity of the condition. According to reports in the literature, the detection rate of pelvic blood accumulation caused by ectopic pregnancy rupture under the abdominal B ultrasound can be as high as more than 95%, which wins valuable time for timely treatment measures. In the process of image analysis, advanced image processing technology and analysis models, such as gray scale symbiosis matrix (GLCM) and texture analysis algorithm, are used to further improve the recognition accuracy of image features[12]. These technologies can automatically extract key information in the image, such as the morphology, size, location and distribution of blood flow signals, providing doctors with more objective and accurate diagnostic basis. At the same time, it also draws from the research of domestic and foreign expertsResults and clinical experience, constantly optimize and improve the diagnostic process and prescription

When exploring the characteristics of ectopic pregnancy, the unique imaging advantages have to be mentioned. Transvaginal B ultrasound, because its probe is directly placed in the vagina, significantly shortening the transmission path of sound waves, thus reducing abdominal fat, intestinal gas and other interference factors, making the image quality significantly improved. This feature is particularly

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important in the diagnosis of ectopic pregnancy because it enables more clarity to demonstrate the subtle structure of the uterus and its adnexa.

In detail, when an ectopic pregnancy occurs, the absence of the gestational sac in the uterus is usually observed in the vaginal B ultrasound, while special echo areas are found in areas such as the fallopian tube, ovaries or other areas of the abdomen. These special echo areas often have unique shape characteristics, such as the "anechoic area" surrounded by "annular hyperechoics", which is a salient sign of tubal pregnancy, and it is possible to detect the fetus and the initial heart beating, confirming the presence of ectopic pregnancy. According to reports in the literature, the accuracy of transvaginal B ultrasound in the early diagnosis of fallopian tube pregnancy can be more than 90%, which is much higher than that of transabdominal B ultrasound. In addition, transvaginal B ultrasound can also observe the blood flow in the ectopic pregnancy lesion through Doppler blood flow imaging technology, providing an important basis for clinical decision-making. For example, during tubal pregnancy, numerous surrounding blood flow signals are often visible, which reflects the activity of the embryo and has a key role in assessing disease severity and making treatment planning. At the same time, combined with advanced imaging technologies such as color Doppler energy map (CDE), the blood flow distribution can be displayed more intuitively and improve the accuracy and reliability of diagnosis. The advantages of transvaginal B-ultrasound in the diagnosis of ectopic pregnancy are not only reflected in the image quality, but also reflected in its convenience and patient acceptance. Without a bladder filling, the patient does not have to endure long waits and discomfort, and the examination process is more rapid and comfortable[13]. This feature is particularly true for emergency patients and patient populations that require frequent monitoring of condition changes.

Transabdominal B ultrasound and transvaginal B ultrasound are two commonly used ultrasound examination methods, which each have advantages and limitations in the diagnosis of ectopic pregnancy. Ectopic pregnancy is the implantation of the fertilized egg outside the uterine cavity, most commonly tubal pregnancy. Transabdominal B ultrasound examination was performed by applying an ultrasound coupling agent to the abdomen and then scanning on the abdominal surface using an ultrasound probe. This method is non-invasive and easy to operate, but requires the patient's bladder so that ultrasound can better penetrate the abdominal tissue. Transabdominal B ultrasound may be less sensitive to the diagnosis of early ectopic pregnancy than transvaginal B, because the early gestational sac may be smaller and more disturbed by intestinal gas. Transvaginal B ultrasound examination is directly into the vagina for scanning. This method does not require bladder filling and the probe ion chamber and adnexa area are closer, thus allowing for a clearer picture and being more sensitive to the diagnosis of early ectopic pregnancy. However, transvaginal B ultrasound is an invasive test and may not be applicable to women who have not had sex or in patients with vaginal inflammation. In practice, doctors will choose the appropriate examination method according to the specific situation and clinical needs of patients. For example, in patients with significant abdominal pain and bleeding symptoms, transvaginal B ultrasound may be preferred for a rapid and accurate diagnosis of ectopic pregnancy. However, in poor abdominal conditions or other pelvic structures, transabdominal B ultrasound may be selected. The combination of the two methods can improve the diagnostic accuracy of ectopic pregnancy.

Transvaginal B-ultrasound shows an incomparable value in the early diagnosis of ectopic pregnancy. Its unique examination method, that is, through the vaginal probe directly close to the uterus and the accessory area, significantly improve the resolution and clarity of the image, so that the small changes in the early ectopic pregnancy can be accurately captured. According to clinical data, the accuracy of transvaginal B ultrasound in the early diagnosis of ectopic pregnancy is more than 95%. Compared with transabdominal B ultrasound, the diagnosis time can be about one week earlier, which is a valuable time window for clinical intervention.

The importance of this study lies in the comparative analysis of the accuracy of transabdominal ultrasound and transvaginal ultrasound in the diagnosis of ectopic pregnancy, to provide doctors with a more scientific and rational diagnostic scheme. At the same time, this study will also explore the factors affecting the accuracy of the two examination methods, such as patient physiological status, operator skill level and equipment performance, in order to provide a theoretical basis for optimizing the examination process and improving the diagnosis quality. In addition, this study will also focus on patient acceptance and examination comfort, striving to improve patients medical experience while ensuring the accuracy of diagnosis.

Overall, the diagnosis of ectopic pregnancy by vaginal b-ultrasound does not require complicated surgical procedures or any preparatory work for the patient. This method can improve the diagnostic accuracy, make the examination images clearly visible and convenient for clinicians to observe and treat.

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5. Conclusion

Ectopic pregnancy is a common acute gynecological disease, the initial symptoms are not obvious, once the obvious symptoms on behalf of serious illness, treatment is not timely or improper will threaten the life of pregnant women. B-ultrasound technology can clearly show the morphology and structure of the uterus and accessories, providing powerful reference information for doctors' diagnosis. In practice, the doctor will choose the appropriate examination method according to the specific situation and clinical needs of the patient. In general, diagnosing an ectopic pregnancy via vaginal B-ultrasound does not require complicated surgery or any preparation. This method can improve the accuracy of diagnosis, make the examination image clearly visible, and facilitate the observation and treatment of clinicians.

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