

The Application of Vaginal Color Ultrasound in the Diagnosis and Treatment of Ectopic Pregnancy

Panpan Liu
Yanbin Li
Li'an Yi
Haiping Yan

Panpan Liu, Department of Ultrasonic Medicine, Qingdao West Coast New Area Traditional Chinese Medicine Hospital (Qingdao Huangdao District Traditional Chinese Medicine Hospital), Qingdao, PR China, Yanbin Li, Department of Ultrasonic Medicine, Qingdao West Coast New Area Traditional Chinese Medicine Hospital (Qingdao Huangdao District Traditional Chinese Medicine Hospital), Qingdao, PR China, Li'an Yi, Haiping Yan, Department of Health Management Section, Qingdao West Coast New Area Traditional Chinese Medicine Hospital (Qingdao Huangdao District Traditional Chinese Medicine Hospital), Qingdao, PR China, * Correspondence author: Haiping Yan, Email: 18660206788@163.com

Objective: To explore the application of vaginal color ultrasound in the diagnosis and treatment of ectopic pregnancy. **Methods:** From August 2018 to May 2019, 90 patients with suspected ectopic pregnancy who were treated in our hospital were selected as the study objects. Abdominal color ultrasound and vaginal ultrasound were performed respectively to compare the diagnosis results of the two methods. **Result:** The detection rate of transvaginal ultrasound was higher than that of abdominal ultrasound ($P < 0.05$); the accuracy rate of transvaginal ultrasound was significantly higher than that of abdominal ultrasound ($P < 0.05$); the main parts of ectopic pregnancy were ampulla, isthmus and umbrella, and the main types were ruptured, unruptured and obsolete. **Conclusion:** The application of transvaginal ultrasound in the diagnosis of ectopic pregnancy has the advantages of high accuracy and detection rate, fast examination speed, simple operation, etc. it is of great significance to retain the fertility of patients and is worth popularizing.

Key words: Ectopic pregnancy; Vaginal ultrasonography; Diagnosis; Treatment
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Ectopic pregnancy, also known as ectopic pregnancy, is a common and multiple acute abdomen in clinical gynecology¹. It is mainly caused by the implantation of the fertilized egg in other parts of the uterus, resulting in anemia, sudden abdominal pain, short-term amenorrhea and a small amount of vaginal bleeding, which is similar to the tumor invasion and planting performance². Ectopic pregnancy often occurs in the endometrium, myometrium, fallopian tube, blood vessels and other parts. If the diagnosis and treatment are not timely or the diagnosis and treatment errors are not correct, it is easy to cause massive hemorrhage, even shock, and threaten the life safety of patients³. A large number of clinical data confirmed that the earlier the diagnosis of ectopic pregnancy, the better the treatment effect. For some patients with fertility, early diagnosis

and treatment is of great significance to retain their fertility⁴. At present, the common methods of clinical diagnosis of ectopic pregnancy are abdominal ultrasound and vaginal ultrasound, which have high application value. In recent years, some scholars have pointed out that the accuracy of abdominal ultrasound in the diagnosis of early ectopic pregnancy is not high, it is easy to miss diagnosis or misdiagnosis, and delay the time of treatment. Based on this, this study aimed at suspected ectopic pregnancy patients to carry out vaginal color Doppler ultrasound, analysis of the value of this method in the diagnosis of ectopic pregnancy, the report is as follows.

MATERIALS AND METHODS

General information

90 cases of suspected ectopic pregnancy treated in our hospital from August 2018 to May

2019 were selected as the study objects, all of them had different degrees of vaginal bleeding, amenorrhea, abdominal pain and other symptoms. Among them, the average age was (30.74 ± 10.23) years, the time of menopause was 30-90 days, the average time of menopause was (49.60 ± 10.80) days, 63 cases of primipara, 27 cases of parturient, 22 cases of abortion, 11 cases of cesarean section and 8 cases of ectopic pregnancy.

Inclusion and exclusion criteria

Inclusion criteria: ①Patients and their families understand the basic situation and sign the informed agreement; ②Liver, kidney, heart, lung and other organ functions are normal. Exclusion criteria: ①Vaginal bleeding due to trauma; ②Other infectious and malignant tumor diseases; ③Mental and mental disorders, poor coordination and compliance

Method

All the instruments were Siemens 3000 type Doppler ultrasound diagnostic instrument. Abdominal color ultrasound examination: adjust the frequency of abdominal ultrasound probe to 3.5MHz, drink water properly before examination, place the abdominal ultrasound probe in the abdomen of the patient after the bladder is moderately filled, adjust the frequency of the probe for routine inspection, scan the uterus, pelvic cavity and surrounding mass, record the pelvic effusion, the original beating of cardiac tube and whether there is a pseudogestational sac.

Vaginal ultrasound: guide patients emptying bladder, after entering the room adjusted to lithotomy position, with high buttocks. The frequency of transvaginal ultrasound probe is adjusted to 5MHz. Before the examination, a proper amount of couplant is applied to the top of the probe, and the sterile condom is put on, and then the probe is inserted into the vagina slowly. The visiting method is adjusted appropriately according to the examination position. The blood flow, size, gestational sac condition and endometrial change are checked by rotating, pushing and pulling, tilting and other operations. Check whether there is fluid in pelvis,

liver and kidney, bilateral spleen and kidney, and iliac fossa. If there is fluid, measure the range of fluid and sound transmission. Check whether there is mass in bilateral iliac fossa and rectum fossa, measure its diameter, shape and boundary after detecting mass, observe the relationship with surrounding organs, and check the blood flow status of accessories around mass. Patients with a history of cesarean section should pay attention to the scar of the uterine wall to avoid scar pregnancy.

Observation indicators

①The detection rates of the two methods were compared, including pelvic effusion, pseudogestational sac, adnexal mass, embryo and cardiovascular pulsation. ②The accuracy of abdominal ultrasound and vaginal ultrasound in the diagnosis of ectopic pregnancy was compared. ③Observe the site and type of ectopic pregnancy.

Statistical methods

Using SPSS 21.0 statistical software, "mean \pm standard deviation" means measurement data, with t-test; counting data is made up of%, with χ^2 test, $P < 0.05$ is statistically significant.

RESULTS

Comparison of detection rates of two methods

The detection rate of pelvic effusion, adnexal mass, embryo, cardiovascular pulsation and pseudogestational sac detected by transvaginal ultrasound was higher than that detected by abdominal ultrasound ($P < 0.05$), as shown in Table 1.

Diagnosis method	Number of cases	Pelvic effusion	Germ	Adnexal block	Pseudogestational sac	Cardiovascular pulsation
Abdominal color ultrasound	90	57 (63.33%)	13 (14.44%)	74 (82.22%)	6 (6.67%)	7 (7.78%)
Vaginal color ultrasound	90	69 (76.67%)	28 (31.11%)	86 (95.56%)	14 (15.56%)	21 (23.33%)
χ^2	-	4.237	7.900	9.009	3.999	9.204
P	-	0.039	0.004	0.002	0.045	0.002

Comparison of diagnostic accuracy between the two methods

According to the pathological diagnosis, the

Method	Number of cases	Positive detection rate	Negative detection rate	Accuracy rate
Vaginal ultrasound	90	85 (96.70)	5 (3.30)	96.70
Abdominal color ultrasound	90	71 (82.45)	19 (17.55)	82.45
X ²	-	10.872	10.872	10.872
P	-	0.000	0.000	0.000

Analysis of location and type of ectopic pregnancy

According to the diagnosis, the main ectopic pregnancy sites were the ampulla, isthmus and fimbria. The types of ectopic pregnancy are mainly rupture type, unruptured type and old type, as shown in Table 3.

Ectopic pregnancy site and type	Number of cases (n = 85)	Composition ratio (%)	
Ectopic pregnancy	Fallopian tube ampulla	28	32.94
	Fallopian tube umbrella	27	31.76
	Fallopian tube isthmus	25	29.41
	Other parts	5	5.88
Ectopic pregnancy type	Rupture type	36	42.35
	Old type	32	37.65
	Unruptured	17	20.00

DISCUSSION

Ectopic pregnancy refers to the fertilization of the egg in the fallopian tube. The fertilized egg is blocked in the fallopian tube and cannot be implanted in the uterus normally, but is implanted and developed in a certain part of the fallopian tube⁵. Tubal pregnancy is the most common ectopic pregnancy. The most common pregnancy is in the ampulla of fallopian tube, accounting for 60% of tubal pregnancy, followed by isthmus, accounting for about 25%⁶. According to the survey, with the change of living environment and life style in recent years, 2.0% - 6.0% of pregnant women in

accuracy of transvaginal ultrasonography was significantly higher than that of abdominal ultrasonography ($P < 0.05$), as shown in Table 2.

China are patients with ectopic pregnancy every year, and about 8% of them die because of untimely diagnosis and treatment. It is of great significance to make early diagnosis and treatment plan to ensure the life safety and prognosis quality of patients⁷. The incidence of ectopic pregnancy is increasing year by year. At the same time, affected by the two-child policy, the expectation of young women to retain fertility is increasing. While paying attention to the therapeutic effect of ectopic pregnancy, the impact on ovarian function is also emphasized. How to improve the detection rate of ectopic pregnancy has become the focus of many clinical scholars.

In this study, a total of 90 suspected ectopic pregnancy patients were selected for the study. The results showed that the detection rate and accuracy rate of the diagnosis of ectopic pregnancy by vaginal ultrasound were better than those by abdominal ultrasound ($P < 0.05$). In recent years, color Doppler ultrasound has been widely used in the diagnosis of heart, limb blood vessels, maternity and so on because of its advantages of no radiation, simple operation and no pain⁸. Color Doppler ultrasound can evaluate whether there is abnormal blood vessel through blood flow signal, and the changes of blood flow direction and blood flow velocity in blood vessel can also be clearly displayed, especially in the diagnosis of uterine diameter, uterine lesions and changes in abdominal cavity, which has high sensitivity and discrimination ability, good reproducibility, and can be used as a reference index for later treatment effect evaluation, which is an ideal screen Check the diagnosis method⁹. Color Doppler ultrasound has two methods of abdominal and vaginal ultrasound, which can be used for different types of examination. Abdominal ultrasound has a good acoustic interface for intrauterine accessories, which can be used in the diagnosis of various gynecological diseases. However, in recent years, some scholars have found that the diagnosis of ectopic pregnancy with abdominal ultrasound

alone cannot meet the current clinical needs, especially in the diagnosis of early ectopic pregnancy, it is easy to suffer from gastrointestinal flatulence, abdominal muscles, obesity, bladder filling Poor and other factors increase the difficulty of diagnosis and reduce the accuracy of examination results^{10,18}.

Compared with abdominal ultrasound, transvaginal ultrasound can be performed without filling the bladder of the patient. It is easier to operate without interference of abdominal air and fat layer¹¹. In recent years, it has been widely used in gynecology and is suitable for the diagnosis of various types of gynecology diseases. During the examination, the operator put the vaginal ultrasound probe into the vagina as close as possible to the pelvic cavity, the posterior vault and cervix of the vagina, as well as the fallopian tube, bilateral ovaries and uterus. The position where the patient may have endometrial lesions is in the exploration area of the vaginal ultrasound probe. Because the probe is close to the exploration site, the image obtained is clearer¹². Vaginal ultrasound mainly uses high frequency probe, and the probe position is closer to the pelvic tissues and organs, so the image obtained is clearer than hysteroscopy, more conducive to the detection of small lesions, improve the accuracy of diagnosis, and provide the basis for formulating the corresponding treatment plan. Vaginal ultrasound can also effectively show the uterus, uterine appendages and their relationship with surrounding tissues, and the subtle changes between tissues can also be clearly displayed in the ultrasound image, with a high resolution¹³. Through this examination, it is found that the patients with ectopic pregnancy have poor intrauterine sound transmission, full of thin and narrow weak echo layer, most of which are double wall sign, some of which are accompanied with weak echo stripe sign, and the endometrial thickening is more serious. According to the different types of ectopic pregnancy, they can be divided into rupture type, unruptured type and old type¹⁴. Vaginal ultrasound has the advantages of no radiation, simple operation, no pain and suffering, but it has some limitations. Its qualitative diagnosis accuracy is relatively low, and it is easily affected by

the detection angle, depth and blood flow speed, resulting in the reduction of image clarity, especially the mass lesions and small endometrial polyps, which are difficult to accurately and truly reflect the internal situation of the lesions¹⁵. It may be that transvaginal ultrasound is easily interfered by intraperitoneal gas, and the detected image is mainly manifested as lamellar echo free artifact, which has a certain misdiagnosis rate for such lesions. Therefore, in order to improve the diagnostic accuracy of the disease, abdominal ultrasonography should be combined in the actual examination. In addition, serum β - hCG and PAPP-A can be used together to further reduce missed diagnosis and misdiagnosis.

Qiao Jinfeng, Liu Jianghua, et al.¹⁶ studied 120 patients with suspected endometrial diseases, and examined them respectively by transvaginal ultrasound, hysteroscopy and transvaginal ultrasound combined with hysteroscopy. According to the comparative diagnosis results, compared with the single use of hysteroscopy or transvaginal ultrasound, the combined diagnosis has higher coincidence rate, sensitivity and specificity, and more accurate display of the degree of intrauterine lesions The breaking effect is ideal. At the same time, it is proposed that in hysteroscopic surgery, with a clearer operative field of vision, the position of myoma can be accurately found, and it can be completely removed. Assisted by vaginal ultrasound, it can monitor and observe whether there is any residual foreign body in the uterus, the thickness of the uterine wall, the degree of incision and the amount of residual fluid between the walls of myoma, which is conducive to improving the surgical treatment effect. Zhang Xiuzhen, yuan Linghuan, et al.¹⁷ studied 32 cases of ectopic pregnancy rupture. According to the pathological diagnosis, they were given vaginal ultrasound and abdominal ultrasound respectively, and compared the detection of different types and characteristics of ectopic pregnancy by the two methods. The results showed that the diagnostic accuracy of transvaginal ultrasound was significantly higher than that of abdominal ultrasound, and the diagnostic detection rate of transvaginal ultrasound for different parts of ectopic pregnancy was also

significantly higher than that of abdominal color ultrasound. Transvaginal ultrasound also had a higher accuracy in the detection of ectopic pregnancy in rare parts such as scar pregnancy, abdominal pregnancy, rupture of corpus luteum, etc. it was considered that transvaginal ultrasound was used in the diagnosis of ectopic pregnancy rupture. The effect is significant. Although there are differences in research methods, the above scholars and the results of this study confirm the value of transvaginal ultrasound in the diagnosis of ectopic pregnancy.

CONCLUSION

In conclusion, the application of transvaginal ultrasound in the diagnosis of ectopic pregnancy has a high accuracy rate and detection rate, which can be used as a method of screening and disease assessment of ectopic pregnancy, with the advantages of rapid examination, simple operation, etc., and is worth promoting.

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