

Analysis of the Correlation Between the Mode of Combined Ultrasound Examination and Image effect in Obstetrics and Gynecology

Xiaohong Chen

Hubei Huangshi Yangxin County, Peoples Hospital, 435200, China

287486686@qq.com

Abstract. Objective: To analyze the correlation between ultrasound combined examination in obstetrics and gynecology and image effect. Methods: Five patients who were treated in obstetrics and gynecology department were examined by transvaginal ultrasound and transabdominal ultrasound, and the image effects after examination were analyzed and compared. Results: TAS (transabdominal ultrasound) has a wide visual field, but it needs patients' bladder filling. TVS (transvaginal ultrasound) does not need to fill the bladder of the patient, so that the uterus, appendages, etc. can be located naturally, and more detailed information can be obtained, but the image field of view is relatively small. Conclusion: Vaginal ultrasound probe has the advantages of high frequency and clear image, and transabdominal ultrasound examination has the advantages of economy, simplicity, practicality, strong penetrating power, large scanning area, wide field of vision and no restriction of marital status of patients. Transabdominal ultrasound examination and transvaginal ultrasound examination can complement each other, so it is suggested that gynecology and obstetrics should take joint examination during examination. In the process of examining patients, different examination methods can obtain different image effects, which is of great significance for the diagnosis of patients.

Keyword: Transabdominal ultrasound, transvaginal ultrasound, combined examination, image effect

1. Introduction

Acute abdomen in obstetrics and gynecology is a common and frequently occurring disease in clinic, because acute abdomen in obstetrics and Gynecology includes many types, such as endometriosis, ectopic pregnancy, acute pelvic inflammatory disease and corpus luteum rupture [1]. Acute abdomen in obstetrics and gynecology is a common disease in obstetrics and gynecology. The main clinical symptoms are abdominal tenderness, rebound pain, and even shock in severe cases [2]. Acute abdomen is mostly secondary to gynecological diseases, with acute onset and rapid progress. Timely and effective diagnosis of the disease is the key to ensure the safety of patients' lives and promote the recovery of the disease [3]. Different types of acute abdomen need to take different treatment measures, so it is necessary to carry out accurate and reliable clinical diagnosis for patients with acute abdomen in obstetrics and Gynecology, so as to provide guidance for subsequent treatment [4]. Ultrasound has a very important application value in the diagnosis of Obstetrics and gynecology diseases. At present, there are mainly two kinds of ultrasound examination methods in clinical obstetrics and gynecology diseases, transabdominal ultrasound (TAS) and transvaginal ultrasound (TVS) [5]. Vaginal ultrasound probe has higher frequency and stronger resolution than abdominal probe, and the probe is close to the target organ, which is not affected by abdominal wall thickness, bladder filling degree, intestinal gas and other factors. The image display of posterior uterus, intrauterine lesions and small space occupying in ovary is clearer than transabdominal ultrasound [6]. Therefore, obstetrics and Gynecology ultrasound often take transvaginal ultrasound examination.

With the continuous improvement and maturity of ultrasound imaging technology, it has been widely used in clinical diagnosis of various diseases [7]. Clinically, patients with acute abdomen mainly show fever, nausea, headache, vomiting, abdominal pain, abdominal distension and loss of appetite [8]. The use of transabdominal ultrasound combined with transvaginal ultrasound can

improve the accuracy of detection, identify the cause as soon as possible, and provide a reliable basis for the subsequent treatment plan [9]. At present, ultrasound imaging has become the main technology of gynecological acute abdomen examination, which has the advantages of simple and convenient, high accuracy, strong repeatability, and will not bring additional harm to patients [10]. Obstetrics and gynecology in the process of relevant examination for patients, the main examination method is ultrasound, but the specific examination of ultrasound is also divided into transabdominal ultrasound and transvaginal ultrasound according to different approaches [11]. In the process of patient examination, different examination methods can harvest different image effects, which is of great significance for the diagnosis of patients.

2. Materials And Methods

2.1 Materials

Five patients who were treated in the department of obstetrics and gynecology were selected and examined by transvaginal ultrasound and transabdominal ultrasound. Patient A was 49 years old, with clinical manifestations of menopause and ring removal, no urine test; patient B was 35 years old, with clinical manifestations of lower abdominal pain, vaginal bleeding, a history of menopause, urine test HCG (+); patient C was 42 years old, clinical manifestations of lower abdomen Swelling, no history of menopause, no urine test; patient D is 32 years old, with clinical manifestations of lower abdominal distension and pain, no history of menopause, no urine test; patient E is 36 years old, clinical manifestations of lower abdominal distension and pain, with history of menopause, urine test HCG (+). The 5 patients are listed in Table 1 according to their clinical characteristics.

Table 1. Clinical manifestations of patients

Case	Age	clinical picture	Menopausal history	Urine HCG
Patient A	49	No abnormality (removal of ring after menopause)	Without	Unmeasured
Patient B	35	Lower abdominal pain, vaginal bleeding	Have	(+)
Patient C	42	Swelling of lower abdomen	Without	Unmeasured
Patient D	32	Pain in lower abdomen	Without	Unmeasured
Patient E	36	Pain in lower abdomen	Have	(+)

2.2 Methods

Before transabdominal examination, patients should drink plenty of water to ensure bladder filling. Assist the patient to take the supine position, keep the lower limbs in a natural state, fully expose the abdomen above the pubic symphysis, place the probe on the upper edge of the pubic symphysis of the patient, perform horizontal, vertical and fan-shaped scanning, observe the uterine cavity and pelvic cavity of the patient, and obtain satisfactory images. During the examination, the clinician needs to smear the coupling agent on the top of the abdominal sector probe, so as to reduce the friction between the skin and the probe and help the clinician to check effectively. The scanning position is mainly in the upper abdomen of pubic symphysis, and the scanning directions are longitudinal, transverse and oblique. When examining the uterus, it is necessary to observe the size of the patient's uterus, and then determine whether the gestational sac exists in the uterine cavity. Before the examination, let the patient drink more water to ensure the bladder filling and ensure the image display clarity. The patient adopts supine position, and the lower limbs are in a natural state,

ensuring that the abdomen above the pubic symphysis is fully exposed. The probe is located above the pubic symphysis of the patient, and the patient's abdomen is scanned in horizontal, vertical and fan-shaped ways, observing the condition of the patient's uterine cavity and pelvic cavity, and obtaining a clear and satisfactory image [12]. Instruct all patients to ensure that the bladder is full before examination. If necessary, inject normal saline into the bladder to maintain the bladder full. After adjusting the relevant parameters, the color Doppler ultrasound probe was examined in all directions along the pubic symphysis of the patient's abdomen, and the abdomen was scanned from top to bottom and from left to right, and the lower abdomen was scanned at multiple angles such as transverse and longitudinal.

When performing transvaginal examination for patients, the patients should be informed in advance to discharge urine, or a small amount of urine can be left. Assist the patient to take the lithotomy position. After smearing the couplant and putting on the condom, carefully put the vaginal ultrasonic frequency conversion probe into the patient's vagina to reach the patient's cervix or dome, and then scan horizontally, vertically and hemispherically to observe the patient's uterine body and surrounding tissues and obtain satisfactory images. Transvaginal ultrasound was performed with vaginal probe, and pelvic cavity was scanned and examined from multiple angles, so that the imaging information obtained was more accurate, and the examination results were recorded in detail. Using vaginal ultrasound examination, nursing staff should inform patients to empty urine in bladder before examination, and take lithotomy position during examination. Clinicians need to smear couplant on the probe before examination. In order to avoid cross infection, it is necessary to put a condom on the probe and put it in the vagina of the patient. It is placed at the back dome, and the probe needs to be rotated continuously during scanning. The scanning direction is longitudinal, transverse and oblique, and the order of detection and observation is the same as that of abdominal examination. Before transvaginal examination, let the patient drain urine, apply couplant on the probe and wear condoms to ensure that no harm will be caused to the patient. The patient adopts the way of lithotomy position to completely expose the perineum, and carefully put the vaginal ultrasonic frequency conversion probe into the patient's vagina.

2.3 Statistical methods

After all statistics are correct, they will be summarized and input into the computer, and SPSS 24.0 statistical software will be used for statistical analysis. The counting data are expressed in percentage (%), and the χ^2 test is performed. The measurement data is expressed in mean \pm standard deviation ($\bar{x} \pm s$), and t Test, $P < 0.05$ is considered statistically significant.

3. Result Analysis

See Table 1 for the image display of transabdominal ultrasound, transvaginal ultrasound and transabdominal ultrasound combined with transvaginal ultrasound.

Table 2.Comparison of ultrasound image display

Case	Age	TAS display	TVS display	TAS+TVS display
Patient A	49	Menopause; Intrauterine ring	Uterine fibroids; a little fluid in uterine cavity	Menopause; intrauterine ring; hysterosarcoma; intrauterine effusion
Patient B	35	Echo of heterogeneous mass in the middle abdomen	Uterine leiomyoma, internal structure clear; abdominal mass is not shown	The echo of heterogeneous mass in the middle abdomen, hysterosarcoma with clear internal structure, and mass in the middle abdomen were not shown
Patient C	42	Mixed mass in the right upper part of uterus; effusion in the uterorectal fossa; effusion in the iliac fossa	Hysterosarcoma with clear internal structure; fluid in the fovea of uterus and rectum	Mixed mass in the upper right of uterus; effusion in the fovea of uterus and rectum; effusion in the iliac fossa; hysterosarcoma with clear internal structure; effusion in the fovea of uterus and rectum
Patient D	32	Multiple uterine fibroids with clear location	The internal structure of hysterosarcoma is clear and the anatomical position is not clear	Multiple uterine fibroids, mutual location is clear; uterine fibroids internal structure is clear, anatomical location is not clear
Patient E	36	Internal tissue echo; hysterosarcoma	The internal structure of hysterosarcoma was clear, 4.8cm × 4.2cm × 4.6cm	Multiple uterine fibroids; internal tissue echo; uterine fibroids; uterine fibroids internal structure clear, 4.8cm × 4.2cm × 4.6cm

Case A: 49 years old, after menopause, the ring was taken for medical treatment. Transabdominal ultrasound examination showed only the outline of the reduced uterus (see the sound shadow of the birth control ring) and the sound image of the bilateral appendages. During the examination, the patient showed an original history of uterine fibroids, but the transabdominal ultrasound showed unclear. Use a transvaginal probe for further exploration: there are two hypoechoic masses in the myometrium, and a little fluid in the uterine cavity.

Case B: 35 years old, presented with lower abdominal pain and vaginal bleeding, with a history of menopause, urine HCG (+), through vaginal ultrasound examination, only clear sound image of uterine fibroids and uterine rectal effusion were detected, which is highly suspected in clinical practice The diagnosis of ruptured ectopic pregnancy does not match. Therefore, combined with abdominal ultrasound examination, a 3.0-5.5 MHz convex arc frequency conversion probe was selected, and a mixed mass echo was detected on the upper right side of the uterus.

Case C: 42 years old, patient with multiple uterine fibroids. Although transvaginal ultrasound (TVS) can clearly show the echo of the internal tissues of fibroids, there are many fibroids and their size is large. Transabdominal ultrasonography (TAS) combines a wide fan-shaped deep field of vision and a linear array of superficial large-area displays. Therefore, many large uterine fibroids, especially subserosal fibroids, can form a whole three-dimensional space through transabdominal ultrasound. concept.

Case D: 32 years old, went to the doctor due to lower abdominal distension and pain, vaginal ultrasound examination, only the relatively regular contour of the uterus and bilateral adnexa were detected.

Case E: 36 years old. During the examination, the patient repeatedly emphasized lower abdominal distension and pain, but the vaginal ultrasound impression did not match the patient's main complaint. Taking into account the limitations of vaginal ultrasound, a 3.0-5.5 MHz convex

arc frequency conversion probe was selected for supplementary examination. The internal structure of uterine fibroids is clear, and the maximum volume is about 4.8cm×4.2cm×4.6cm.

4. Discussion

Acute abdomen in obstetrics and gynecology often progresses quickly, threatening the safety of patients, and patients will also suffer long-term pain when it occurs. Therefore, accurate and rapid diagnosis of the patient's condition is carried out in time, and symptomatic treatment is given accordingly. It is of positive significance for the life safety protection of patients and the improvement of prognosis quality. Ultrasound imaging technology has the advantages of convenience, high accuracy, high reproducibility, and no pain for patients. It has been widely used in the diagnosis of acute abdomen. Endometriosis is manifested as an increase in the volume of the uterus on the sonogram, and a cyst-like or nodular structure can be detected in the myometrium and a certain position outside the uterus. It mostly occurs in the ovary, myometrium and uterine rectum. [13]. There are two methods for clinical ultrasound in obstetrics and gynecology: transabdominal ultrasound and transvaginal ultrasound. TAS (transabdominal ultrasound) can provide a larger field of view, but it needs to fill the bladder. TVS (transvaginal ultrasound) does not need to fill the bladder, so that the uterus and appendages can be placed in a natural position, and the most detailed information can be obtained, but it only provides a small image field of view. When TAS and TVS are jointly examined, the information and accuracy of ultrasound images can be significantly improved. Combined application of vaginal ultrasound and abdominal ultrasound, the two have complementary advantages, and play a very important role in the examination of atypical, complex parts and small gestational sacs.

Transabdominal ultrasound only needs common and commonly used probes. It has the advantages of economy, simplicity, practicality, strong penetrating power, large scanning area, wide field of view, and not being restricted by the patient's marital status. In the current clinical diagnosis of ectopic pregnancy, ultrasound is widely used. When choosing ultrasound to diagnose ectopic pregnancy, the key is to find the mass and judge the location of the mass [14]. When exploring special parts such as the cervix and cervix, abdominal ultrasound examination is also difficult, which affects the examination results. Abdominal ultrasound requires the patient's bladder to fill, which brings difficulties to some patients. The degree of bladder filling directly affects the clarity of the image display. If the bladder is not fully filled, the image clarity will be poor, which may lead to misdiagnosis and missed diagnosis. The site of ectopic pregnancy in most patients is the ampulla, and the site of the disease in some patients is in the corners of the uterus, cervix and other places. Abdominal ultrasound is commonly used in clinical diagnosis, mainly to detect the location of the mass. Vaginal ultrasound mostly uses high-frequency probes, which can directly contact the patient's diseased parts or organs, and can obtain highly clear image display, but it is restricted by the patient's marital status. When combined with transabdominal ultrasound and transvaginal ultrasound, they can provide clear images and accurate information.

When applying ultrasound imaging technology to diagnose acute abdomen in obstetrics and gynecology, it should be noted that the cause of acute abdomen in obstetrics and gynecology is more complicated, and some clinical symptoms of acute abdomen have similar imaging characteristics, which can easily cause misdiagnosis. In order to improve the accuracy of the detection results, vaginal ultrasound detection is used on patients. This detection method has high probe frequency and relatively strong resolution. The probe is placed at the posterior fornix of the vagina, which can effectively view the pathological conditions of various organs and improve the detection The accuracy of the results. The ultrasound examiner should have a wealth of clinical knowledge, and will make accurate examination results based on the patient's medical history, clinical symptoms, and other laboratory examination results. Acute abdomen in obstetrics and gynecology includes many types such as endometriosis, ectopic pregnancy, acute pelvic inflammatory disease and rupture of the corpus luteum. It has the characteristics of high incidence,

rapid onset, rapid progress of the disease, and severe pain in patients [15]. If effective treatment measures are not taken in time, the deterioration of the condition can pose a serious threat to the patient's health and life safety. Abdominal ultrasound examination is fast and convenient, and is not restricted by the patient's marital status. Therefore, it is widely used in clinical practice and has the advantages of wide field of view and large display area. It should be noted in clinical diagnosis that some patients with acute abdomen have blood clumps due to more bleeding. At this time, when ultrasound diagnosis is performed, it is found that the imaging image shows a mass, but no capsule is found outside the mass. One of the common causes of misdiagnosis of ectopic pregnancy. Perineal ultrasound is very effective in the diagnosis of the cervix, lower uterus and low placenta, and does not require the patient to fill the bladder. Transrectal ultrasound has a good effect on various gynecological operations, unmarried, and guidance for the operations in the book. When medical staff perform ultrasound imaging diagnosis of patients with acute abdomen in obstetrics and gynecology, they should be proficient in the clinical imaging features of various common acute abdomen and the key points of their differential diagnosis, and communicate with patients and their families and read medical records. Ways to fully understand the patient's past medical history and clinical data, and perform auxiliary diagnosis to avoid misdiagnosis and delay the best treatment time.

5. Conclusions

Ultrasonography is widely used in clinical diagnosis of gynecological diseases, with high detection rate and diagnostic accuracy. Ultrasonic diagnosis of suspected cases can make early diagnosis, strive for the best time for disease treatment and reduce the delay in treatment. Vaginal ultrasound probe has the advantages of high frequency and clear image, and transabdominal ultrasound examination has the advantages of economy, simplicity, practicality, strong penetrating power, large scanning area, wide field of vision and no restriction of marital status of patients. Transabdominal ultrasound examination and transvaginal ultrasound examination can complement each other, so it is suggested that gynecology and obstetrics should take joint examination during examination. We can find out the patient's location successfully by using a variety of ultrasonic examination methods, and through the comprehensive superposition of multi-level and multi-dimensional ultrasonic images. Therefore, combined examination is the preferred imaging examination method in gynecology and obstetrics ultrasound at present.

References

- [1] Li Yalin, Liang Xuhui. The application of ultrasound imaging technology in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Chinese Health Standard Management*, vol. 9, no. 6. pp. 99-100, 2018.
- [2] Chu Aiying. Application analysis of ultrasound imaging technology in clinical diagnosis of acute abdomen in obstetrics and gynecology. *Preventive Medicine Research*, vol. 1, no. 5. pp. 24-24, 2019.
- [3] He Xianghong. Application of ultrasound imaging technology in clinical diagnosis of acute abdomen in obstetrics and gynecology. *Massage and Rehabilitation Medicine*, vol. 9, no. 21. pp. 71-72, 2018.
- [4] Gong Mei. Application value of transvaginal color Doppler ultrasound in the diagnosis of acute abdomen in obstetrics and gynecology. *Frontiers of Medicine*, vol. 7(024). pp. 195-197, 2017.
- [5] Xie Liling, Huang Rilun, Chen Yanling, et al. Application of ultrasound imaging in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Chinese Contemporary Medicine*, vol., no. 24(015). pp. 66-68, 2017.
- [6] Ge Xuxiu. The application value of ultrasound imaging in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Imaging research and medical application*, vol. 4, no. 8. pp. 90-91, 2020.
- [7] Li Qingbo. Investigation of combined ultrasound examination methods and image effects in obstetrics and gynecology. *Psychologist*, vol. 22, no. 27. pp. 101-102, 2016.

- [8] Lu Yanping, Zhao Xiaoyan. Application of ultrasound imaging technology in clinical diagnosis of acute abdomen in obstetrics and gynecology. *Imaging research and medical application*, vol. 2, no. 4. pp. 69-70, 2018.
- [9] Luo Lingjie. Exploration of combined ultrasound examination methods and image effects in obstetrics and gynecology. *Image Vision*, vol. 17, no.4. pp. 23-25, 2016.
- [10] He Ye, Liu Haijun. The diagnosis of acute abdomen in obstetrics and gynecology and the application of ultrasound imaging. *Imaging research and medical application*, vol. 2, no.24. pp. 174-175, 2018.
- [11] Liu Jun, Zhuang Huili. The application value of ultrasound imaging in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Imaging research and medical applications*, vol. 2, no.4. pp. 173-175, 2018.
- [12] Wang Jing, Gong Ning, Wen Ying. The application of contrast-enhanced ultrasound in common obstetrics and gynecology related diseases. *Imaging research and medical application*, vol. 2, no.3. pp. 61-63, 2018.
- [13] Chen Guoxiu, Li Sha. The application of ultrasound imaging technology in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Imaging technology*, vol. 146, no.5. pp. 14-16, 2018.
- [14] Wang Yanjin. Application analysis of ultrasound imaging in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Imaging research and medical application*, vol.3, no.19. pp. 111-112, 2019.
- [15] Zhou Yanli. Analysis of the role of ultrasound imaging technology in the clinical diagnosis of acute abdomen in obstetrics and gynecology. *Chinese and Foreign Medicine*, vol. 37, no.24. pp. 191-193, 2018