Analysis of the Efficacy of Prenatal B-Ultrasound in Diagnosing Fetal Abnormalities

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Abstract: *Objective:* To explore the positive significance of using prenatal B-ultrasound in diagnosing fetal abnormalities. *Methods:* A total of 200 pregnant women who visited Shaanxi Provincial People's Hospital between January 2023 and January 2024 were recruited as the research subjects. All pregnant women received prenatal examinations. A retrospective analysis was carried out to analyze the positive significance of prenatal B-ultrasound examination in the diagnosis of fetal abnormalities. *Results:* Prenatal B-ultrasound examination detected 10 cases of fetal abnormalities, with a detection rate of 5.00%. When compared with the postnatal examination results of 5.50%, the difference was insignificant ($P > 0.05$). Moreover, comparing the fetal limb abnormalities and cardiovascular abnormalities in prenatal B-ultrasound examination and postnatal examination, one case of congenital heart disease was missed in the prenatal B-ultrasound examination, and the others were consistent with the postnatal examination results, with a coincidence rate of 90.91%, indicating a high compliance rate. *Conclusion:* Fetal abnormalities have a great impact on mothers, babies, and families, and it is particularly important to strengthen diagnosis during this process. Prenatal B-ultrasound examination can improve the accuracy of diagnosis of fetal abnormalities and can be promoted in clinical practice as a basis for screening fetal abnormalities.

Keywords: Prenatal B-ultrasound; Fetal abnormalities; Diagnostic value

1. Introduction

Fetal abnormality mainly refers to fetal malformation, which is a developmental abnormality that occurs in the mother's body, showing abnormal morphology of body parts and organs. Judging from the actual development situation in China, the incidence rate of fetal malformations in my country is about 13%, which is relatively high [1-3]. Among the newborns born every year in my country, cardiovascular malformations and limb malformations are the most common. At present, providing fetal examinations before delivery, understanding the healthy development of the fetus, and providing active intervention based on actual conditions will help reduce the rate of neonatal defects and increase the rate of eugenics in my country [4,5]. In actual development, a B-ultrasound examination is an effective method that can dynamically observe fetal development and use

ultrasound beams to diagnose fetal diseases, ensuring diagnostic accuracy and having high application value. To further determine the application value of B-ultrasound diagnostic technology in the diagnosis of prenatal fetal abnormalities. This study examines pregnant women in Shaanxi Provincial People's Hospital by applying B-ultrasound diagnostic technology.

2. Materials and methods

2.1. General information

A total of 200 pregnant women were recruited as the research subjects in this study at Shaanxi Provincial People's Hospital between January 2023–2024. Among pregnant women, the oldest was 45 years old and the youngest was 21 years old. The mean age was 30.56 ± 4.34 years old. Among them, the longest gestational age was 36 weeks, and the shortest gestational age was 11 weeks. The mean gestational age was 30.56 ± 2.34 weeks. Among them, 138 cases were primiparous women and 62 cases were multiparous women. All pregnant women understood the process of this study, gave informed consent, had no contraindications to B-ultrasound examination, and were determined to be singleton pregnancies. The possibility that the patient has other organic diseases or a history of mental illness can be ruled out.

2.2. Method

Prenatal examinations were conducted on 200 pregnant women in this study. Doppler ultrasound diagnostic equipment, model GE E8, was primarily used, with the probe frequency set at 3.5 MHz. Before starting the examination, pregnant women were guided to empty their bladders and assisted in choosing a suitable position, mainly supine, to fully expose the abdomen. During the examination, fetal development was explored from multiple directions through the abdomen, focusing on the fetal head and face, limbs, spine, neck, and cardiovascular system. Additionally, the fetal biparietal diameter and femoral diameter were measured to clarify growth parameters. The condition of the placenta was also assessed, including placental thickness, location, maturity, and amniotic fluid volume [6].

2.3. Observation indicators

(1) The results of prenatal and postnatal examinations as well as overall detection rates.
(2) Diagnostic variability in prenatal and postnatal findings for limb anomalies and cardiovascular abnormalities.

2.4. Statistical analysis

Statistical analysis was performed using SPSS 26.0 software. Data were presented in the form of either [n (%)] or mean ± standard deviation (SD). During data processing, the data between different groups were mainly calculated and compared, and the chi-squared and t-tests were used to verify the difference in the data. If the calculated result shows that the P value is less than 0.05, it is considered that there is a significant difference between the two groups.

3. Results

3.1. Comparison of fetal abnormality rates between prenatal and postnatal examinations

Prenatal B-ultrasound examination detected 10 cases of fetal abnormalities, with a detection rate of 5.00%. Compared with the postnatal examination results of 5.50%, the difference was insignificant ($P > 0.05$). See

Table 1 for details.

Table 1. Comparison of the overall incidence of fetal anomalies in prenatal and postnatal examinations [n(%)]

Group	Number of people detected (n)	The detection rate (%)
Prenatal care ($n = 200$)	10	5.00%
Postpartum checkup ($n = 200$)	11	5.50%
χ^2		0.050
P		0.823

3.2. Diagnosis of fetal limb abnormalities and cardiovascular abnormalities before and after birth

Comparing the fetal limb abnormalities and cardiovascular abnormalities in prenatal B-ultrasound examination and postnatal examination, one case of congenital heart disease was missed in the prenatal B-ultrasound examination, and the others were consistent with the postnatal examination results, with a coincidence rate of 90.91%. The compliance rate is relatively high, as shown in **Table 2**.

Table 2. Comparison of the detection differences of fetal limb abnormalities and cardiovascular abnormalities in prenatal and postnatal examinations (n)

Group	Cleft lip	Polydactyly	Osteogenesis imperfecta	Short limbs	Varus foot	Congenital heart disease	Ventricular septal defect
Prenatal care ($n = 200$)	1	1	2	2	2	1	1
Postpartum checkup ($n = 200$)	1	1	2	2	2	2	1

4. Discussion

Judging from the actual clinical development situation, the incidence of birth defects in my country is relatively high, with up to 900,000 new babies with defects every year, and the incidence of defects is as high as 4%–6%. Abnormalities found in newborns after birth will have an impact on the child's physical and mental health, be detrimental to the child's future growth and development, and will also bring financial burdens to the child's family [7,8].

Judging from the actual situation, fetal abnormalities mainly include fetal limb malformations, cardiovascular malformations, or neurological malformations. The causes of these fetal birth abnormalities are mainly related to the maternal development process, maternal, external factors, and natural genetic factors. When maternal chromosome abnormalities occur, it will lead to structural abnormalities in the fetus in the womb, leading to various malformation problems that seriously affect fetal development [9-12].

In recent years, with the continuous advancement of China's economic construction and the continuous improvement of medical technology, it is clinically believed that this abnormal fetal morphological development structure can be detected and diagnosed through chorionic villus biopsy and fetal imaging to reduce the birth rate of deformed babies. However, in practice, these examination methods are somewhat invasive and cannot be widely used in clinical practice [13,14]. In recent years, B-ultrasound diagnostic methods have emerged. This method is not only simple to operate and has the advantage of non-invasive application, but also can reflect the specific development of fetal organs, help diagnose fetal abnormalities, and meet clinical development needs.

Moreover, B-ultrasound examination is reproducible and easy to use, so it can be used as an important means of prenatal fetal abnormality screening [15]. According to the data structure of clinical research, the best time for prenatal B-ultrasound examination is when the pregnant woman is 24 weeks old, because at this stage pregnant women usually have sufficient amniotic fluid, and the fetal movement is strong, which can clearly show fetal anatomy. Furthermore, the B-ultrasound examination method can dynamically observe the fetal limbs and improve diagnostic accuracy.

After applying prenatal B-ultrasound examination technology in this study, the results showed that the fetal abnormality rate detected by prenatal B-ultrasound examination was 5.00%, and the postnatal examination results were 5.50%. The difference in prenatal and postnatal comparison data was insignificant ($P > 0.05$). Comparing the detection rates of various limb abnormalities and cardiovascular abnormalities, the results showed that only one case of congenital heart disease examination was different, and the others were consistent with the postpartum examination results. The results show that the application of the prenatal B-ultrasound examination method is of significant significance, confirms the theoretical basis of the above research, can clarify fetal abnormalities, and provides a basis for clinical eugenics.

In summary, eugenics is an important part of China's family planning work. To effectively implement this work, it is particularly important to promote prenatal check-ups. The application of B-ultrasound examination methods in this process can achieve effective results, clarify abnormal fetal development, improve the accuracy of clinical diagnosis, and ensure timely intervention. It is of significant significance and can increase clinical attention and strengthen the application and promotion of this technology.

Disclosure statement

The authors declare no conflict of interest.

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