

Advances in Obstetrics and Gynecology Research

Editors-in-Chief

K. Matsuo

University of Southern California, USA

Qionghua Chen

The First Affiliated Hospital of Xiamen University, China

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD

(619 649 400)

Level 10

50 Clarence Street

SYDNEY NSW 2000

Copyright © 2025. Bio-Byword Scientific Publishing Pty Ltd.

Complimentary Copy



Advances in Obstetrics and Gynecology Research

Focus and Scope

Advances in Obstetrics and Gynecology Research is a peer-reviewed, open access journal that aims to provide a forum for scientists and clinical professionals working in obstetrics and gynecology. Then as is now, the goal of the journal is to promote excellence in the

The journal publishes original research articles and review articles related to the latest progress in obstetrics and gynecology domestic and foreign. Academic papers at all levels such as clinical, scientific research, surgical innovation, experience exchange, and difficult case discussion are published.

About Publisher

Bio-Byword Scientific Publishing is a fast-growing, peer-reviewed and open access journal publisher, which is located in Sydney, Australia. As a dependable and credible corporation, it promotes and serves a broad range of subject areas for the benefit of humanity. By informing and educating a global community of scholars, practitioners, researchers and students, it endeavors to be the world's leading independent academic and professional publisher. To realize it, it keeps creative and innovative to meet the range of the authors' needs and publish the best of their work.

By cooperating with University of Sydney, University of New South Wales and other world-famous universities, Bio-Byword Scientific Publishing has established a huge publishing system based on hundreds of academic programs, and with a variety of journals in the subjects of medicine, construction, education and electronics.

Publisher Headquarter

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD

Level 10

50 Clarence Street

Sydney NSW 2000

Website: www.bbwpublisher.com

Email: info@bbwpublisher.com

Table of Contents

- 1 Application of Intracavitary Three-Dimensional Ultrasound Volume Contrast Imaging Combined with Free Anatomy Section in the Diagnosis of Intrauterine Adhesions and Classification**
Jingping Wang, Jing Song, Hui Zhang, Li Liu, Jun Wang
- 9 Clinical Observation of the Effect of Sodium Ion Concentration on the Test Dose of Lidocaine in Patients Undergoing Epidural Block Cesarean Section**
Yanan Guo
- 15 Effects of Duloxetine Combined with Cognitive Behavioral Therapy on Patients with Postpartum Depression**
Youshan Wu, Qilin Zhang, Lili Zhang, Juan Wang
- 21 Summary of the Relationship between Postpartum Depression Symptoms, Perceived Social Support, Sleep Quality, and Postpartum Stress in Elderly Parturient Women**
Juan Wang, Qilin Zhang, Lili Zhang, Youshan Wu

Application of Intracavitary Three-Dimensional Ultrasound Volume Contrast Imaging Combined with Free Anatomy Section in the Diagnosis of Intrauterine Adhesions and Classification

Jingping Wang, Jing Song, Hui Zhang, Li Liu, Jun Wang

Department of Ultrasound, Suzhou New District People's Hospital, Suzhou 215129, Jiangsu, China

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Objective: To study the clinical value of three-dimensional ultrasound volume contrast imaging combined with free anatomy section in the diagnosis of intrauterine adhesions. Methods: 321 patients with suspected intrauterine adhesions admitted to Suzhou High-tech Zone People's Hospital from July 2024 to July 2025 were selected. 94 cases were confirmed by hysteroscopy gold standard. All patients underwent separate examination of three-dimensional ultrasound volume contrast imaging (single examination) and a combined diagnosis scheme with free anatomy section (hereinafter referred to as combined diagnosis). The detection situation was analyzed, the diagnostic efficacy was calculated, and the results were compared with the gold standard to evaluate the advantages of combined diagnosis in disease classification. Results: The sensitivity and accuracy of the combined diagnosis were better than those of the single examination ($P < 0.05$). However, there was no significant difference in the detection rate of disease types between the two schemes ($P > 0.05$). Conclusion: The combination of three-dimensional ultrasound volume contrast imaging and free anatomy section can play a significant role in the diagnosis and classification of intrauterine adhesions, greatly improving the clinical detection rate.

Keywords: Intrauterine adhesion; Three-dimensional ultrasound volume imaging; Free anatomy section

Online publication: September 12, 2025

1. Introduction

Intrauterine adhesion, also known as Asherman's syndrome, refers to the formation of fibrous adhesions in the uterine cavity after damage to the endometrial basal layer, which may lead to partial or complete obstruction of the uterine cavity^[1]. The occurrence of this condition can have significant negative impacts on women, such as menstrual abnormalities. Adhesion tissue covers the endometrium, preventing it from proliferating and shedding normally, leading to reduced menstrual flow or amenorrhea. It can even cause infertility, as adhesions reduce the normal endometrial area and affect the implantation of the fertilized egg. Severe adhesions may block the cervical canal or uterine cavity, preventing sperm from entering the fallopian tubes^[2]. The main treatment at this stage is hysteroscopic

separation, combined with postoperative estrogen therapy or placement of a balloon stent to prevent re-adhesion^[3]. However, studies have found that most patients are already in moderate to severe stages when seeking medical attention due to the absence of typical symptoms in the early stages of the disease. Therefore, early diagnosis through ultrasound, hysteroscopy, and intervention can significantly improve prognosis, especially for women with fertility needs^[4]. Volume contrast imaging and free anatomical sectioning in three-dimensional ultrasound are two different three-dimensional image processing techniques^[5]. Next, this article will explore the combined application value of these two methods in the diagnosis of patients with intrauterine adhesions. The full report is summarized below.

2. Materials and methods

2.1. General information

The hospital examined the study cases from July 2024 to July 2025. A total of 321 suspected intrauterine adhesion patients were admitted to the hospital, with the oldest being 44 years old and the youngest being 21 years old. The average age range was (33.25 ± 3.21) years old. Through hysteroscopic diagnosis, 94 cases were confirmed as intrauterine adhesions, including 26 peripheral type, 32 central type, and 36 mixed type. All patients could provide complete clinical data, voluntarily participated in the study, and signed relevant informed consent documents. Additionally, as the three-dimensional volume probe needs to be placed into the vagina for inspection, it is prohibited for virgins, should be used with caution during menstruation, after abortion surgery, and in cases of acute vaginitis or pelvic inflammatory disease. It is not suitable for patients with vaginal deformities, and pregnant or breastfeeding female patients are not accepted. Since the control method adopted in this study involves the same group of patients undergoing different examination schemes, the above data meet clinical consistency and can be used for data research and analysis.

2.2. Methods

2.2.1. Two-dimensional ultrasonography

The Samsung WS80A color Doppler ultrasound diagnostic instrument was used. The examination was performed during the mid-to-late menstrual cycle when the pre-menstrual endometrium was thicker. For those with amenorrhea, the examination was conducted before hysteroscopy. Patients were examined without the need to hold urine, in a supine lithotomy position. The ultrasound probe frequency was adjusted, disinfected, and coated with a coupling agent. A condom was worn, and the probe was slowly inserted into the patient's vagina (posterior fornix). During the examination, the probe could be rotated to explore the specific state of the pelvic cavity from multiple angles, focusing on observing the position, size, endometrial continuity, and morphology of the uterus. The echo intensity of the endometrium, presence of three-line signs, continuity of uterine cavity echoes, and clarity of the endometrial-myometrial junction were evaluated. Specific parameters of endometrial thickness (ED for short) were also obtained.

2.2.2. Three-dimensional ultrasound volume contrast imaging combined with free anatomic cuts

Based on the premise of the clearest two-dimensional ultrasound endometrial images of the patient, fix the probe, reconstruct the three-dimensional program, sample, acquire data, instruct the patient to hold their breath, collect at least 3 times, and select the best one; distinguish between single and combined inspections from the next processing method. Single inspection obtains planar images of A, B, and C, adjusts the X, Y, and Z axes to obtain the best three-dimensional image, and uses 3D contrast volume imaging to evaluate the specific condition of the endometrium. The combined inspection sets ROI, with plane A as the main reference plane, and sets the

Polyline program in the automatic anatomical section system, so that it can automatically reach the uterine bottom serosa layer from the outer opening of the cervix, and draw a reconstructed line segment along the curvature of the uterine cavity, thereby presenting a coronal image of the uterine cavity. At the same time, 3D volume imaging is used to evaluate parameters such as the coronal plane of the endometrium, endometrium, echo intensity, and defects. Sampling is done on plane A, adjusting the X, Y, and Z axes so that the coronal plane of the uterine cavity and the lesion site can be displayed completely and clearly.

2.3. Criteria for diagnosis

Hysteroscopy is considered the gold standard for diagnosing intrauterine adhesions. Direct observation reveals partial or complete adhesions in the uterine cavity, fibrotic and pale endometrium, and membranous, fibrous cord-like, or muscular adhesions, which are indicative of intrauterine adhesions (positive). Diagnostic efficacy is calculated using the following formulas: Sensitivity = True Positive / (True Positive + False Negative) × 100%, Specificity = True Negative / (True Negative + False Positive) × 100%, and Accuracy = (True Positive + True Negative) / Total Number of Cases × 100%. Additionally, detected intrauterine adhesions are classified into peripheral, central, and mixed types.

2.4. Statistical methods

Data were processed using SPSS 23.0 statistical software. Measurement data were expressed as mean ± standard deviation (SD), and the *t*-value was used for numerical testing. Count indicators (%) were tested using the chi-square value, with *P* < 0.05 considered statistically significant.

3. Results

3.1. Analysis of detection results

As shown in **Table 1**, the combined diagnosis identified 92 positive cases and 224 negative cases. In contrast, 3D ultrasound volume imaging alone detected 85 positive cases and 221 negative cases, indicating that the combined approach provided more accurate detection.

Table 1. Disease detection using different diagnostic methods

Test method		Gold Standard		Total
		Positive	Negative	
Combined diagnosis	Positive	92	3	95
	Negative	2	224	226
Single test	Positive	85	6	91
	Negative	9	221	230
Total	94	227	321	

3.2. Evaluation of diagnostic efficiency

As shown in **Table 2**, the sensitivity and accuracy of the combined diagnosis are relatively high. Compared with the separate application of three-dimensional ultrasound volume imaging, the difference is statistically significant (*P* < 0.05); however, there is no significant difference in specificity (*P* > 0.05).

Table 2. Comparison of diagnostic efficiency of different examination methods [*n*(%)]

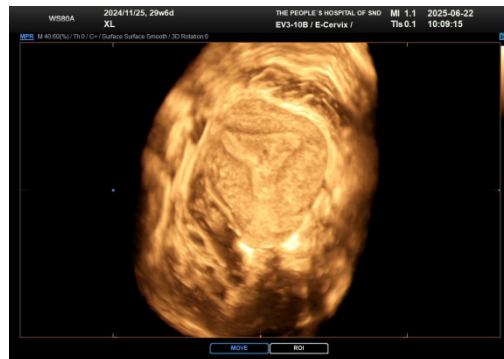
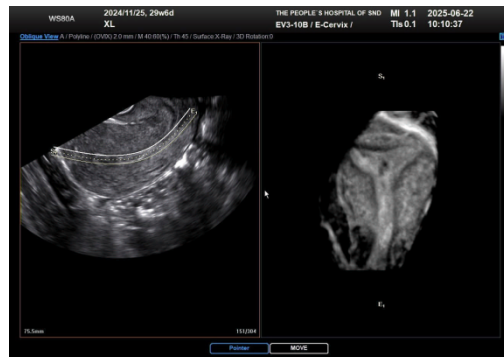
Method	Sensitivity	Specificity	Accuracy
Combined diagnosis	97.87 (92/94)	98.68 (224/227)	98.44 (316/321)
Single test	90.43 (85/94)	97.36 (221/227)	95.33 (306/321)
χ^2	4.7314	1.0202	5.1608
<i>P</i> -value	0.0296	0.3124	0.0231

3.3. Detection and analysis of disease classification

As shown in **Table 3**, the detection rates of the two imaging methods for intrauterine adhesion classification are similar, with no significant difference ($P > 0.05$). Different types of imaging pictures are also provided, as shown in **Figure 1** and **Figure 2** for the central type; **Figure 3** and **Figure 4** for the peripheral type.

Table 3. Comparison of disease classification detection rates between the two examination schemes [*n*(%)]

Method	Total cases	Peripheral type (<i>n</i> = 26)	Central type (<i>n</i> = 32)	Mixed type (<i>n</i> = 36)
Combined diagnosis	92	26 (100.00%)	31 (96.88%)	35 (97.22%)
Single test	85	24 (92.31%)	28 (87.50%)	33 (91.67%)
χ^2 value	-	2.0800	1.9525	1.0588
<i>P</i> -value	-	0.1492	0.1623	0.3034

**Figure 1.** Volume contrast imaging of central intrauterine adhesions (Asherman's syndrome).**Figure 2.** Freehand section of intrauterine adhesions (central type)

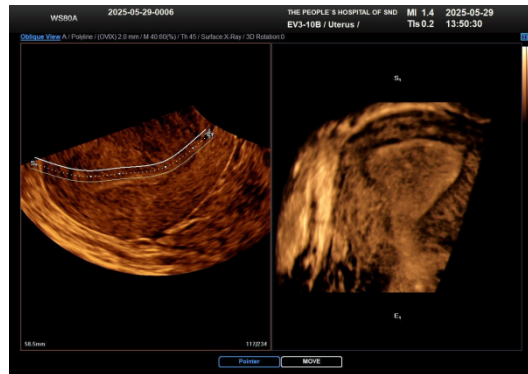


Figure 3. Freehand dissection section showing marginal intrauterine adhesions (IUA).



Figure 4. Volume Contrast Imaging (VCI) of Marginal Intrauterine Adhesions (IUA).

4. Discussion

The occurrence of intrauterine adhesions is often associated with damage to the basal layer of the endometrium. The most common causes include uterine cavity surgical procedures, such as induced abortion or uterine curettage. Repeated curettage or improper operation may damage the basal layer of the endometrium. Other causes include improper management of postpartum placental residues ^[6]. On the other hand, endometritis caused by various pathogens, including tuberculous endometritis, which is a typical infectious factor, and failure to timely administer anti-infective treatment after uterine cavity surgery, can also lead to intrauterine adhesions. Simply put, when the basal layer of the endometrium is damaged, excessive fibrous tissue proliferation occurs during wound healing, forming adhesive bands. In severe cases, it may lead to partial or complete closure of the uterine cavity ^[7]. In the early stage of intrauterine adhesions, they are mostly composed of loose fibrous tissue, which can be reversed through timely intervention. However, if left untreated, they may develop into dense scar tissue or even completely block the uterine cavity, resulting in permanent infertility or significantly increased treatment difficulty ^[8]. Therefore, early detection and prompt treatment are crucial to prevent serious consequences. To ensure the effectiveness of patient treatment, accurate diagnostic plans are essential. For those with a history of abortion, curettage, uterine cavity infection, or tuberculosis, immediate investigation should be conducted if menstrual flow decreases or amenorrhea occurs ^[9]. Currently, hysteroscopy is the gold standard clinical examination method, which can directly evaluate the scope and type of adhesions. However, hysteroscopy is an invasive procedure that requires inserting a scope

through the vagina and cervix into the uterine cavity. This process may cause discomfort such as pain and a feeling of heaviness, especially for women with tight cervical openings or high pain sensitivity. Even with preoperative measures such as cervical softening drugs, some women may still experience significant discomfort, and some patients may require anesthesia due to intolerance, which involves additional risk assessment related to anesthesia^[10]. Although it is generally a safe examination method, there are still risks such as uterine perforation, bleeding, and infection. Although the incidence is relatively low, these situations can bring unnecessary physical harm and a subsequent treatment burden to patients. Therefore, the clinical field is constantly exploring more effective and relatively “gold standard” examination methods or protocols^[11].

3D ultrasound volume contrast imaging is an imaging technique that enhances tissue contrast and resolution through 3D volume data reconstruction [12]. By scanning the same area from multiple angles and stacking data, it reduces noise and highlights the boundaries of structures of interest. It can display tiny structures that are difficult to capture with traditional 2D ultrasound, resulting in clearer images with stronger layering, reduced operator dependence, and more stable imaging [13]. Free anatomical sectioning allows the operator to arbitrarily select the cutting plane in the 3D volume data, generating non-standard sections that cannot be directly obtained by traditional ultrasound. For example, when examining a fetus with an abnormal disease, the coronal or oblique section of the spine can be observed by adjusting the section [14]. Based on 3D data, manual or automatic definition of arbitrary planes for reconstruction breaks through the limitations of traditional ultrasound probe angles, providing multi-perspective analysis and increasing diagnostic flexibility, especially suitable for difficult cases. In recent years, there have been continuous studies combining the two techniques. Firstly, high-contrast data is obtained through 3D ultrasound volume contrast imaging, and then free anatomical sectioning is used to analyze the morphological structure of the uterine cavity from any angle, thereby improving diagnostic efficiency [15].

As seen in the results section of this study, the sensitivity and accuracy of the combined diagnosis were significantly higher than those of the single examination ($P < 0.05$); however, there was no difference in specificity between the two methods ($P > 0.05$). Fundamentally, 3D ultrasound volumetric imaging technology reduces noise and enhances the contrast of tissue boundaries through multi-plane reconstruction and volumetric data stacking, especially when diagnosing low-contrast structures. When combined with free anatomical sections, it allows arbitrary cutting of 3D data to obtain non-standard sections that are difficult to achieve with traditional 2D ultrasound, resulting in clearer and more three-dimensional anatomical details. In terms of specific intrauterine adhesion subtypes, both examination methods demonstrated considerable detection advantages, and there was no significant difference in actual data between the two methods ($P > 0.05$). Upon analysis, 3D reconstruction can present the three-dimensional shape of the uterine cavity, visually displaying the location, scope, and relationship with surrounding structures of adhesions, which is crucial for classification. When the two methods are combined, 3D imaging provides a global view and clarifies the overall classification of adhesions, while free anatomical sections focus on local details to determine specific subtypes.

5. Conclusion

In summary, the combined application of free anatomical sections and 3D ultrasound volumetric contrast imaging achieves a multi-angle, high-resolution three-dimensional representation of intrauterine adhesion structures. This combination not only overcomes the dependence on traditional probe angles but also ensures image clarity under

arbitrary sections, providing an ultrasonic basis for accurate identification and detailed classification of intrauterine adhesions. Its high flexibility and diagnostic efficiency make it have prominent application value and promotion prospects in the clinical diagnosis and subtype evaluation of intrauterine adhesions.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Bu D, Lai G, Chen M, et al., 2025, Diagnostic Value of Three-Dimensional Power Doppler Combined With Tomographic Ultrasound Imaging for Intrauterine Adhesions. *Chinese Medical Innovation*, 22(8): 151–155.
- [2] Jin Y, Liu Q, Li H, et al., 2024, Diagnostic Value of Transvaginal Three-Dimensional Ultrasonography for Different Types of Uterine Cavity Lesions in Infertile Patients. *Big Doctor*, 9(24): 115–118.
- [3] Liu S, Fang Y, 2024, Evaluation of the Severity of Intrauterine Adhesions Using Color Doppler Flow Imaging Combined With Transvaginal Three-Dimensional Ultrasound. *Journal of Medical Imaging*, 34(9): 92–95.
- [4] Zhu D, Chen Y, Qin L, et al., 2024, Application Value and Clinical Significance of Transvaginal Three-Dimensional Ultrasound Imaging in Evaluating the Degree of Intrauterine Adhesions and Endometrial Receptivity. *Journal of Hebei Medical University*, 45(6): 716–723.
- [5] Qin Q, Tang Y, 2024, Application Value of Ultrasonography in the Diagnosis and Treatment of Intrauterine Adhesions. *Journal of Practical Obstetrics and Gynecology*, 40(4): 243–246.
- [6] Wang Z, Zhang Y, Yang H, et al., 2024, Diagnostic Value and Detection Rate Analysis of Transvaginal Three-Dimensional Ultrasonography for Intrauterine Adhesions. *Imaging Technology*, 36(2): 66–69 + 74.
- [7] Li L, Wu C, Liu X, et al., 2024, Evaluation of Transvaginal Three-Dimensional Ultrasound Flow Parameters on the Effect of Hysteroscopic Adhesion Lysis in Patients With Intrauterine Adhesions. *Shanxi Medical Journal*, 53(4): 258–261.
- [8] Huang Y, Dai X, Lai Y, 2023, Diagnostic Analysis of Intrauterine Adhesions Using Transvaginal Two-Dimensional Combined With Three-Dimensional Ultrasound Volume Imaging. *Tibet Medicine*, 44(6): 60–62.
- [9] Liu S, Liang Q, Yuan S, 2023, Evaluation of Endometrial Receptivity and Prediction of Pregnancy Outcome in Patients With Intrauterine Adhesions by Transvaginal Three-Dimensional Ultrasound. *Clinical Medical Engineering*, 30(10): 1333–1334.
- [10] Wei J, Zhang J, Lei T, 2023, Diagnostic Value of Three-Dimensional Transvaginal Ultrasound for Patients With Intrauterine Adhesions and Evaluation of Uterine Cavity Volume. *Clinical Medical Research and Practice*, 8(23): 93–96.
- [11] Tang R, Yu Q, Li X, et al., 2023, Diagnostic Value of Transvaginal Two-Dimensional Ultrasound Combined With Three-Dimensional Ultrasound Volume Imaging for Intrauterine Adhesions and Classification. *Chinese Journal of Modern Medicine*, 33(6): 65–70.
- [12] Nan F, Lu C, Zhang H, et al., 2022, Diagnosis of Peripheral Intrauterine Adhesions Using Intracavitary Three-Dimensional Ultrasound Free Anatomic Sections Combined With Volume Contrast Imaging. *Chinese Journal of Interventional Imaging and Therapy*, 19(6): 348–351.
- [13] Li X, Gao H, 2021, Diagnosis of Intrauterine Adhesions and Prediction of Severity by Transvaginal Three-Dimensional Ultrasound and Power Doppler. *Chinese Journal of Family Planning*, 29(3): 516–519 + 635.

- [14] Wei A, Peng J, Nan S, et al., 2020, Application Value of Transvaginal Three-Dimensional Ultrasound Volume Imaging in the Diagnosis of Uterine Malformations. West China Medical Journal, 32(8): 1234–1237.
- [15] Song L, Wang Y, Lin C, et al., 2019, Combined Application of Transvaginal Two-Dimensional Ultrasound, Three-Dimensional Ultrasound Volume Imaging, and Power Doppler Ultrasound in the Diagnosis of Intrauterine Adhesions. Chinese Journal of Clinical Medical Imaging, 30(5): 342–345 + 367.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Clinical Observation of the Effect of Sodium Ion Concentration on the Test Dose of Lidocaine in Patients Undergoing Epidural Block Cesarean Section

Yanan Guo*

Tianjin United Family Hospital, Tianjin 300222, China

**Author to whom correspondence should be addressed.*

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Objective: To investigate the effect of changes in sodium ion concentration on the onset time of lidocaine in obstetric epidural block test doses. Methods: Eighty pregnant women scheduled for elective cesarean section, with no age or weight restrictions and ASA grade I or II, were selected. Lidocaine was diluted to two concentrations of 1% and 1.5% using normal saline (NS) and sterile water for injection (SW). The patients were randomly divided into four groups (n = 20): Group A (1% SW), Group B (1% NS), Group C (1.5% SW), and Group D (1.5% NS). A 3 mL test dose of epidural block was administered. The onset time, sensory and motor block levels, and adverse reactions were observed in each group. Results: The onset time was slowest in Group A (mean onset time 4.79 ± 0.65 minutes) and fastest in Group D (mean onset time 3.59 ± 0.61 minutes). Comparison between groups showed that the onset time was significantly shorter in Group B compared to Group A ($P < 0.05$), but there was no significant difference compared to Group C ($P > 0.05$). Group C had a faster onset time compared to Group A ($P < 0.05$), but a slower onset time compared to Group D, with a statistically significant difference. Group D had the fastest onset time, which was statistically significant compared to the other three groups. There were no significant differences in sensory and motor block levels or adverse reaction rates between the four groups ($P > 0.05$). Conclusion: Compared to sterile water for injection, diluting lidocaine with normal saline can shorten the onset time of the test dose. The 1.5% normal saline group had the shortest onset time, which is related to the increased sodium ion concentration in the solution, thereby reducing the onset time of lidocaine.

Keywords: Lidocaine; Normal saline; Sterile water for injection; Test dose

Online publication: September 12, 2025

1. Introduction

Epidural block is widely used in obstetric surgical anesthesia, and lidocaine is commonly used as a test dose

medication. Its role is to verify the success rate of epidural space block and reduce the serious consequences of total spinal anesthesia caused by a large amount of liquid entering the subarachnoid space. Although increasing the drug dose will obviously accelerate the onset time, the toxicity will also increase accordingly. Therefore, it is particularly important to adjust its physicochemical properties without increasing the drug dose, so as to change its onset time. In this study, lidocaine was diluted to different concentrations with normal saline and sterile water for injection, respectively, to find the most suitable combination and concentration of test dose for obstetric epidural anesthesia.

2. Materials and methods

2.1. Patient selection and grouping

The study protocol has been reviewed and approved by the hospital's medical ethics committee for compliance, and all subjects participating in the study have signed informed consent documents by themselves or their families. A total of 80 parturients who planned to undergo elective cesarean section were included in this study. The inclusion criteria were set as ASA anesthesia grade I to II, and there were no serious systemic diseases, pregnancy comorbidities, fetal abnormalities, or contraindications to intrathecal anesthesia. There were no restrictive requirements for the age, height, and weight of the parturients. They were randomly divided into 4 groups ($n = 20$) using a random number table method: 1% lidocaine SW group (Group A), 1% lidocaine NS group (Group B), 1.5% lidocaine SW group (Group C), and 1.5% lidocaine NS group (Group D). Anesthesia Method: Patients were fasting for 6–8 hours before surgery without premedication. After entering the operating room, routine monitoring of ECG, BP, HR, and SpO₂ was performed. A venous access was opened, and 500 mL of hydroxyethyl starch 130/0.4 sodium chloride injection was infused. Mask oxygen inhalation was administered at a flow rate of 3 L/min. In the left lateral position, a puncture was performed at the L1-2 intervertebral space. After successful puncture and aspiration to confirm no blood or cerebrospinal fluid, a 3.5 cm^[1] epidural catheter was placed cephalad and secured. A test dose of 3 mL was administered, and the patient was instructed to lie in the supine position. After observing for 10 minutes without adverse reactions and recording all data, additional doses were administered by the anesthesiologist until the anesthesia level reached T6^[2].

2.2. Preparation of medicinal solution

A designated person used 2% lidocaine hydrochloride (Shanghai Hefeng Pharmaceutical Co., Ltd.) mixed with normal saline (NS) and sterile water for injection (SW) to prepare two concentrations of 1% and 1.5%. 3ml was taken as the test dose.

2.3. Observation indicators

After administering the test dose, the patient's block effect was evaluated every 1.5 minutes until anesthesia took effect. The sign of anesthesia taking effect is the weakening of the patient's pain or cold sensation (the order of nerve block: pain sensation → cold sensation → warmth sensation → touch and deep pressure sensation → loss of motor function). Record the time when anesthesia starts to take effect for each group of patients, as well as the level of sensory block and motor block, 10 minutes after administration. Also, record the incidence of adverse reactions (hypotension, excessively high anesthesia level, local anesthetic poisoning, nausea, and vomiting) in patients. The evaluation time was 10 minutes.

2.3.1. Evaluation method of sensory block

The patient's subjective feelings: feeling of heat, heaviness, or numbness in the lower limbs; Objective evidence: skin sensitivity to pain and cold is reduced. Either situation can be regarded as the anesthesia taking effect. The Von Frey Filaments were used to test pain sensation before and after drug administration by selecting the appropriate strength based on actual conditions. Changes in cold sensation were tested with alcohol cotton balls of the same size.

2.3.2. Evaluation method of motor block

The modified Bromage grading method was used for evaluation, including 0, I, 2, and 3 points, representing complete movement ability of both lower limbs, inability to lift lower limbs but able to bend knees, inability to bend knees but able to bend ankles, and complete inability to move both lower limbs, respectively.

2.4. Statistical processing

In the study, mean \pm standard deviation (SD) and (n , %) were used to represent measurement data and counting data, respectively. Both t and χ^2 tests were performed using statistical software (SPSS 19.0) for analysis. $P < 0.05$ was considered statistically significant.

3. Results

There were no statistically significant differences in age, height, and weight among the four groups of pregnant women ($P > 0.05$), as shown in **Table 1**.

Table 1. Comparison of general indicators among the four groups of pregnant women. ($n = 20$, mean \pm SD)

Group	Height (cm)	Weight (kg)	Age (years)	<i>P</i> -value
Group A	164 \pm 5	76 \pm 8	28 \pm 6	> 0.05
Group B	162 \pm 6	74 \pm 7	27 \pm 5	> 0.05
Group C	163 \pm 7	73 \pm 7	28 \pm 4	> 0.05
Group D	162 \pm 4	74 \pm 5	26 \pm 4	> 0.05

The onset time of block in Group A was slower than that in the other groups ($P < 0.05$). Group D had the fastest onset time among all groups ($P < 0.05$). Compared with Group C, Group B had a slightly faster onset time, but the difference was not statistically significant ($P > 0.05$). When comparing groups with the same concentration of test dose, the onset time in the normal saline group was faster than that in the sterile water for injection group ($P < 0.05$). There was no statistically significant difference in the highest sensory block level at 10 minutes among all groups, which was T10. None of the patients in the four groups experienced motor block, high epidural block, subarachnoid block, or severe local anesthetic poisoning after receiving the test dose. No adverse reactions such as nausea, vomiting, or blood pressure reduction were observed. The observation indicators recorded within 10 minutes for each group are shown in **Table 2**.

Table 2. Observation indicators recorded within 10 minutes for each group. ($n = 20$, mean \pm SD)

Group	n	Onset time (min)	Sensory block level	Bromage score	Adverse reaction rate
Group A	20	4.79 \pm 0.65	T10	0	0
Group B	20	4.19 \pm 0.48 ^a	T10	0	0
Group C	20	4.20 \pm 0.63 ^a	T10	0	0
Group D	20	3.59 \pm 0.61 ^{abc}	T10	0	0

Note: Compared with Group A, ^a $P < 0.05$; Compared with Group B, ^b $P < 0.05$; Compared with Group C, ^c $P < 0.05$.

4. Discussion

Lidocaine has been reported in the literature to have a UV/M ratio close to 0.4–0.6 [3]. Due to its relatively low toxicity and fast onset time, it is commonly used as a test dose medication. The significance of the test dose includes improving the detection rate of epidural catheters misplaced into the sheath or blood vessels [4] and guiding the initial dose of epidural medication. The incidence of local anesthetics accidentally entering the blood vessels during epidural block is significantly higher than that of other regional blocks, usually at 2% [5]. During full-term pregnancy, due to the obvious enlargement of the uterus compressing the inferior vena cava, compensatory dilation and filling of the epidural vascular plexus may occur. When performing an epidural puncture under this physiological state, the puncture needle or indwelling catheter may directly cause mechanical damage to the epidural blood vessels. Relevant clinical research data show that during epidural catheter placement in patients undergoing cesarean section surgery, the incidence of blood vessel injury or accidental insertion of the catheter into a vein ranges from 1.3% to 15.7%. When sitting for a puncture, the risk of such complications may further increase, making the test dose particularly important [6–9]. The faster the test dose takes effect, the shorter the waiting time for the patient and the surgeon, which is more significant for women with active uterine contractions. Although increasing the drug dose can achieve a faster onset, it also increases the potential risks for patients. It is worth exploring how to shorten the onset time of smaller doses of local anesthetics through reasonable solution compatibility.

The physicochemical properties and onset time of local anesthetics are influenced by the pH value and $[\text{Na}^+]$ concentration of the local anesthetic solution. When the pH value increases, the proportion of non-ionized base components in local anesthetics increases accordingly. This molecular form change can accelerate the diffusion rate of local anesthetics through the nerve sheath and nerve cell membrane, thereby significantly reducing the onset time of local anesthetics [10]. There are certain differences in the pH value and osmotic concentration between normal saline (pH 6.88) and sterile water for injection (pH 5.5) [11]. Diluting local anesthetics with these solutions can also produce changes in the physicochemical properties of the medication, which can have a certain impact on the onset time of local anesthetics. The voltage-gated sodium channels on the nerve cell membrane are the targets of local anesthetics.

Current research indicates that the potential mechanisms of local anesthetics' blocking effect on sodium channels in cell membranes and the resulting inactivation of sodium channels can be summarized into three aspects:

- (1) Local anesthetics can reduce the proportion of activated channels and correspondingly increase the proportion of inactivated channels;
- (2) Local anesthetics may partially or completely block the process of conformational transitions, directly

interfering with the activation process of the channels, which is to inhibit the transition of channels from a resting state to an open state;

- (3) Local anesthetics may reduce the amount of ion flow through each open channel ^[12]. In clinical practice, the onset and recovery speed of the blocking effect are mainly determined by the relatively slow diffusion and clearance processes of local anesthetic molecules within neural tissue, rather than relying on rapid binding and dissociation reactions between the molecules and ion channels ^[13]. The onset time depends on the drug concentration, degree of ionization, hydrophobicity, and physical properties of the surrounding neural tissue. When the pH value of the local anesthetic solution increases, the proportion of uncharged base-form local anesthetic components will increase accordingly. Changes in the composition of such components can accelerate the diffusion rate of the drug through the nerve sheath and nerve cell membrane, thereby significantly reducing the onset time of the local anesthetic.

In this experiment, with the same dose and concentration, the onset time of the normal saline group (C, D) was significantly faster than that of the sterile water for injection group (A, B), suggesting that changes in sodium ion concentration in local anesthetics can affect the onset time of nerve block; motor block and local anesthetic toxicity did not occur, possibly due to the small dose of lidocaine, which would not produce significant symptoms even if this dose entered the bloodstream. However, through careful clinical manipulation, the situation of local anesthetics accidentally entering blood vessels can be avoided to the maximum extent. Great caution is required when administering drugs intrathecally. Currently, only normal saline and sterile water for injection are used to dilute the drug solution in clinical practice, and they have different pH values and significant differences in sodium ion concentration. Through this experiment, we can see that normal saline is more suitable for diluting local anesthetics, providing a certain reference for our future selection of obstetric anesthesia drug combinations.

5. Conclusion

Based on the findings, diluting lidocaine with normal saline, particularly at a 1.5% concentration, significantly reduces the onset time of the test dose compared to using sterile water for injection. This acceleration in onset is attributed to the increased sodium ion concentration in the solution, which enhances the efficacy of lidocaine.

Disclosure statement

The author declares no conflict of interest.

References

- [1] D'Angelo R, Berkebile B, Gerancher J, 1996, Prospective Examination of Epidural Catheter Insertion. *Anesthesiology*, 84(1): 88–93.
- [2] Luo X, Chen S, Zhang B, et al., 2010, Clinical Study of Ropivacaine Subarachnoid Block in Cesarean Section. *Journal of Nanchang University (Medical Edition)*, 50(4): 88–91.
- [3] Brown W, Bell G, Lurie A, et al., 1975, Newborn Blood Levels of Lidocaine and Mepivacaine in the First Postnatal Day Following Maternal Epidural Anesthesia. *Anesthesiology*, 42(6): 698–707.
- [4] Birnbach D, Chestnut D, 1999, The Epidural Test Dose in Obstetric Practice: Has It Outlived Its Usefulness? *Anesthesia and Analgesia*, 88(5): 971–976.

- [5] Griffin R, Scott R, 1984, A Comparison Between the Middle and Paramedian Approaches to the Extradural Space. *Anaesthesia*, 39(6): 584–586.
- [6] Han C, Zhou Q, Qian Y, et al., 2010, Experience in Improving the Safety of Epidural Block. *Shanghai Medical Journal*, 33(10): 967–968.
- [7] Cesur M, Aliei H, Erdem A, et al., 2005, Administration of Local Anesthetic Through the Epidural Needle Before Catheter Insertion Improves the Quality of Anesthesia and Reduces Catheter-Related Complications. *Anesthesia and Analgesia*, 101(5): 1501–1505.
- [8] Mhyre J, Greenfield M, Kz L, et al., 2009, A Systematic Review of Randomized Controlled Trials That Evaluate Strategies to Avoid Epidural Vein Cannulation During Obstetric Epidural Catheter Placement. *Anesthesia and Analgesia*, 108(4): 1232–1242.
- [9] Harney D, Moran C, Whitty R, et al., 2005, Influence of Posture on the Incidence of Vein Cannulation During Epidural Catheter Placement. *European Journal of Anaesthesiology*, 22(2): 103–106.
- [10] Hadzic A, Vloka J, 2004, *Peripheral Nerve Blocks: Principles and Practice*. McGraw-Hill, New York: 1–720. ISBN: 0-07-140918-1.
- [11] Dhir S, Tureanu L, Bouzari A, et al., 2012, Reduction in Sodium Content of Local Anesthetics for Peripheral Nerve Blocks: A Comparative Evaluation of Saline with 5% Dextrose – A Randomized Controlled Double-Blind Study. *Anesthesia and Analgesia*, 114(6): 1359–1364.
- [12] Gambling D, Berkowitz J, Farrell T, et al., 2013, A Randomized Controlled Comparison of Epidural Analgesia and Combined Spinal-Epidural Analgesia in a Private Practice Setting: Pain Scores During First and Second Stages of Labor and at Delivery. *Anesthesia and Analgesia*, 116(3): 636–643.
- [13] Zhuang X, Zeng Y, Chen B, 2003, *Modern Anesthesiology (3rd Edition)*. People’s Medical Publishing House, Beijing: 961–962.

Publisher’s note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Effects of Duloxetine Combined with Cognitive Behavioral Therapy on Patients with Postpartum Depression

Youshan Wu^{1,2}, Qilin Zhang^{1,2}, Lili Zhang³, Juan Wang^{1,2*}

¹Jingzhou Mental Health Center, Jingzhou 434000, Hubei, China

²Institute of Mental Health, Yangtze University, Jingzhou 434000, Hubei, China

³Yingcheng People's Hospital, Jingzhou 432400, Hubei, China

**Author to whom correspondence should be addressed.*

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Objective: To explore the effectiveness of duloxetine combined with cognitive behavioral therapy in the treatment of patients with postpartum depression. Methods: A total of 64 patients with postpartum depression who visited our hospital from July 2024 to July 2025 were included as study subjects. The observation group and the control group were divided using a random number table method, with 32 patients in each group. Relevant treatment indicators were compared between the two groups. Results: The total effective rate in the observation group was higher than that in the control group ($P < 0.05$). After treatment, there were significant differences in HAMD scores, PSQI scores, DAS scores, and serum inflammatory cytokine levels between the observation group and the control group ($P < 0.05$). However, there was no significant difference in the total incidence of adverse reactions between the two groups ($P > 0.05$). Conclusion: The combination of duloxetine and cognitive behavioral therapy is effective in the clinical treatment of patients with postpartum depression. It is beneficial for improving sleep quality, depressive symptoms, and dysfunctional cognition, and significantly regulates inflammatory cytokine levels with higher safety. This treatment approach can be widely promoted.

Keywords: Duloxetine; Cognitive behavior; Postpartum depression; Adverse reactions

Online publication: September 17, 2025

1. Introduction

Postpartum depression belongs to female mental disorders, and its main etiology is the physiological and psychological changes caused by postpartum sex hormones, psychological and social role changes^[1]. This disease most commonly occurs within 6 weeks after childbirth and persists throughout the entire puerperium. If the condition is severe, it may continue until early childhood^[2]. Postpartum depression is not conducive to the physical and mental health of the mother after childbirth, and has a great impact on the growth and development of the baby, and will bring serious effects on the cognitive behavior and emotions of the child^[3]. Therefore, targeted

treatment for such patients is the key to improving the prognosis of mothers and infants. The following takes patients with postpartum depression as the research object, focusing on a comparative analysis of the efficacy differences of different treatment options for reference.

2. Materials and methods

2.1. Clinical data

The study selected 64 patients with postpartum depression. The earliest consultation time was July 2024, and the latest consultation time was July 2025. They were divided into an observation group ($n = 32$) and a control group ($n = 32$) based on a random number table method. In the control group, there were 21 primiparous women and 11 multiparous women, with ages ranging from 22 to 39 years old. The median age was (29.12 ± 3.21) years old. In the observation group, the ratio of primiparous to multiparous women was 20:12, with the oldest being 38 years old and the youngest being 21 years old. The average age was (29.09 ± 3.23) years old. The basic conditions of the two groups were similar, with no statistical significance ($P > 0.05$), indicating significant comparability.

Inclusion criteria: confirmed diagnosis of postpartum depression; normal blood and urine routine tests; active cooperation with the study. Exclusion criteria: allergy to study medications; presence of other mental illnesses; withdrawal from the study.

2.2. Methods

All patients received cognitive behavioral therapy, which included:

- (1) Creation of an intervention team consisting of psychologists and professional nursing workers. Before participating in the study, they received professional training and were qualified through assessment to engage in clinical work.
- (2) Cognitive remodeling. In terms of individual cognition, face-to-face communication was used to understand the reasons for patients' poor cognitive abilities. Video and oral teaching methods were combined to inform patients about key points related to the disease in simple and understandable language, emphasizing the necessity of actively cooperating with treatment and understanding the adverse effects of the disease on the health of both mother and child. Regarding medication cognition, detailed explanations were provided about antidepressant medications, enabling patients to form correct cognitions about medication efficacy, potential adverse reactions, and the positive impact of adherent medication on prognosis. In terms of repeated cognitive intervention, targeted interventions were combined with patients' cognitive deficiencies. Questioning and reasoning techniques were employed to correct patients' incorrect thoughts and promote active cooperation with treatment. Psychological support was provided to understand the causes of patients' depression, and family members were encouraged to actively participate in patients' psychological counseling.
- (3) Behavioral training: Patients are required to participate in relaxation training, mainly including walking, Tai Chi, and meditation. If the degree of depression is relatively severe, a series of training such as meditation and deep breathing can also be adopted. Based on the patient's condition, psychological characteristics, and hobbies, play soothing music of different styles to successfully shift their attention. Help patients develop healthy habits. If patients suffer from insomnia, they can increase exercise intensity during the day, soak their feet, take a hot bath, and drink hot milk, which are all beneficial for relieving physical and mental fatigue and improving sleep quality.

The control group received oral Paroxetine Hydrochloride Tablets based on this, with an initial dose of 20 mg per day. The medication dosage was adjusted later based on the patient's condition, which could be increased by 10 mg per week. After 2 weeks of treatment, the daily medication dosage was not allowed to exceed 40 mg.

The observation group was treated with Duloxetine Hydrochloride Enteric-coated Tablets in combination, with an initial daily dose of 40 mg. After 1 week of treatment, the dose was increased to 60 mg per day. All patients took the medication after breakfast as a single daily dose for 8 weeks.

2.3. Evaluation indicators

- (1) Evaluate the treatment effect and adverse reaction status between groups.
- (2) Compare patients' HAMD scores, PSQI scores, DAS scores, and serum inflammatory cytokine levels before and after treatment.

2.4. Statistical analysis

Statistical software SPSS 21.0 was used to process the data from both groups, with $P < 0.05$ as the basis for statistical significance.

3. Results

3.1. Comparison of treatment effects between the observation group and the control group

The total effective rate of the observation group was compared with that of the control group, $P < 0.05$ (Table 1).

Table 1. Comparison of treatment effects between the two groups (n/%)

Group	n	Markedly effective	Effective	Ineffective	Total effective rate
Observation	32	20 (62.50)	11 (34.38)	1 (3.13)	31 (96.88)
Control	32	17 (53.13)	7 (21.88%)	8 (25.00)	24 (75.00)
χ^2 value					6.3354
P value					0.0118

3.2. Study on HAMD and PSQI scores before and after treatment in both groups

Before treatment, there was no significant difference in indicators between the groups ($P > 0.05$). After treatment, the relevant scores in the observation group were significantly different from those in the control group ($P < 0.05$) (Table 2).

Table 2. Analysis of changes in HAMD and PSQI scores in the observation group and the control group (mean \pm SD)

Group	n	HAMD score (points)		PSQI score (points)	
		Before treatment	After treatment	Before treatment	After treatment
Observation group	32	22.89 \pm 3.09	7.09 \pm 3.03	15.44 \pm 1.75	5.25 \pm 0.68
Control group	32	22.86 \pm 3.05	9.97 \pm 4.21	15.47 \pm 1.79	7.78 \pm 0.99
t -value		0.0391	3.1409	0.0678	11.9162
p -value		0.9689	0.0026	0.9462	0.0000

3.3. Comparison of changes in DAS scores between the observation group and the control group

After treatment, there was a significant difference in the scores of various indicators between the groups ($P < 0.05$) (Table 3).

Table 3. Comparison of DAS scores before and after treatment between the two groups (mean \pm SD)

Group	n	Vulnerability Score (points)		Perfectionism Score (points)		Dependence Score (points)		Autonomy Attitude Score (points)	
		Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment	Before Treatment	After Treatment
Observation Group	32	18.49 \pm 1.43	15.59 \pm 2.22	19.54 \pm 2.24	16.03 \pm 2.24	19.89 \pm 2.58	16.34 \pm 2.00	19.94 \pm 2.33	17.12 \pm 2.11
Control Group	32	18.52 \pm 1.47	18.24 \pm 2.09	19.57 \pm 2.22	18.47 \pm 2.11	19.92 \pm 2.60	18.89 \pm 2.53	19.98 \pm 2.35	18.84 \pm 2.23
<i>t</i> -value		0.0828	4.9166	0.0538	4.4854	0.0463	4.4728	0.0684	3.1693
<i>p</i> -value		0.9343	0.0000	0.9573	0.0000	0.9632	0.0000	0.9457	0.0024

3.4. Analysis of serum inflammatory cytokine levels before and after treatment in both groups

Before treatment, there was no significant difference in serum inflammatory cytokine levels between the groups ($P > 0.05$). After treatment, the relevant indicators in the observation group were significantly different from those in the control group ($P < 0.05$) (Table 4).

Table 4. Study on changes in serum inflammatory cytokine levels in the observation group and the control group (mean \pm SD)

Group	n	TNF- α (pg/mL)		IL-1 (pg/mL)		IL-4 (pg/mL)		IL-6 (pg/mL)		IL-10 (pg/mL)	
		Before	After	Before	After	Before	After	Before	After	Before	After
Observation	32	77.54 \pm 6.43	47.73 \pm 4.47	39.03 \pm 4.47	18.65 \pm 3.24	3.89 \pm 0.85	7.96 \pm 1.14	10.79 \pm 2.12	5.11 \pm 1.24	101.23 \pm 11.13	155.03 \pm 20.65
Control	32	77.56 \pm 6.47	54.02 \pm 5.15	39.05 \pm 4.44	27.13 \pm 3.54	3.86 \pm 0.88	5.09 \pm 1.10	10.83 \pm 2.08	7.47 \pm 1.15	101.21 \pm 11.11	134.32 \pm 17.79
<i>t</i> -value		0.0124	5.2178	0.0180	9.9961	0.1387	10.2484	0.0762	7.8940	0.0072	4.2982
<i>p</i> -value		0.9901	0.0000	0.9857	0.0000	0.8901	0.0000	0.9395	0.0000	0.9943	0.0001

3.5. Comparison of adverse reactions between the observation group and the control group

The total incidence rate in the observation group was not significantly different from that in the control group ($P > 0.05$) (Table 5).

Table 5. Comparison of adverse reactions between the two groups (n/%)

Group	n	Drowsiness n(%)	Nausea n(%)	Dry mouth n(%)	Total incidence n(%)
Observation group	32	1 (3.13)	1 (3.13)	1 (3.13)	3 (9.38)
Control group	32	2 (6.25)	2 (6.25)	1 (3.13)	5 (15.63)
χ^2					0.5714
<i>P</i>					0.4496

4. Discussion

Postpartum depression is mainly caused by a combination of factors that expose the mother to excessive mental stress, leading to a series of adverse psychological symptoms such as depression and fear, which accumulate and lead to illness^[4]. Based on long-term clinical practice, it has been found that the mother's own condition (such as age at childbirth, educational level, etc.) can lead to differences in understanding of childbirth, infant feeding, and role transitions, which can also cause fear and easily increase stress^[5]. Coupled with factors such as the mother's own personality traits, physical condition, and family economic ability, the combined effect of pressure from various sources significantly increases the incidence of postpartum depression^[6]. Therefore, it is necessary to implement necessary therapeutic interventions for such patients to ensure their emotional stability^[7].

Among them, cognitive behavioral therapy (CBT) is a form of psychotherapy that focuses intervention on the irrational cognitive aspects of patients, enabling them to gradually transform existing psychological issues (such as misperceptions about themselves, others, and things) during the intervention process, with the goal of improving anxiety and depression^[8]. Clinically, paroxetine is the most commonly used antidepressant and antianxiety medication. However, depression patients require a longer treatment cycle, and long-term medication use can easily increase adverse gastrointestinal reactions, negatively affecting medication compliance^[9]. Duloxetine can effectively inhibit the reuptake of neuronal 5-HT and NR without affecting dopamine uptake, making it safer in the treatment of depression^[10].

Based on the comparison of the above research data, it was found that the total effective rate of treatment in the observation group was higher than that in the control group, $P < 0.05$. This indicates that the combined use of cognitive behavioral therapy and duloxetine can significantly enhance the treatment effect of postpartum depression^[11]. For patients with postpartum depression, early symptoms are mainly sleep disorders. If insomnia worsens, it indicates an increased risk of recurrence of postpartum depression^[12]. After treatment, the PSQI score of the observation group was lower than that of the control group, $P < 0.05$, confirming that the medication in the observation group significantly improved sleep quality. After treatment, the HAMD and DAS scores of the observation group were better than those of the control group, $P < 0.05$, indicating that the treatment regimen in the observation group had a significant effect on regulating patients' dysfunctional cognitive function and depressive emotions^[13]. After treatment, the levels of various inflammatory cytokines were compared between the two groups, $P < 0.05$. This confirms that cognitive behavioral therapy combined with duloxetine can effectively regulate patients' cytokines and Th1/Th2 imbalance during treatment, achieving the antidepressant treatment goal^[14]. The total incidence of adverse reactions in the observation group was compared with that in the control group, $P > 0.05$, indicating that duloxetine is safe in treating patients with postpartum depression^[15].

5. Conclusion

Overall, in the clinical treatment of patients with postpartum depression, the combined use of cognitive behavioral therapy and duloxetine can improve patients' condition in a short time, which is beneficial to the improvement of their dysfunctional cognition^[16]. It also alleviates the degree of depression and improves sleep quality to a certain extent, making the treatment safer and having high clinical promotion and application value.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Pang Y, Liu S, 2020, The Effect of Cognitive Behavioral Therapy Combined with Duloxetine Hydrochloride on Early Onset and Efficacy Observation in Patients with Depression. *Chongqing Medicine*, 49(22): 4.
- [2] Chen Y, Liang Y, Chen D, et al., 2022, Study on the Clinical Effect of Yangxue Qingnao Pill Combined with Duloxetine in the Treatment of Post-stroke Depression and Its Impact on Neurotransmitter Levels. *Liaoning Journal of Traditional Chinese Medicine*, 49(8): 3.
- [3] Zeng Y, 2020, Comparison of Efficacy of Duloxetine and Paroxetine Combined with Oxycodone Sustained-release Tablets in the Treatment of Advanced Cancer Pain with Depression. *Journal of Third Military Medical University*, 42(19): 8.
- [4] Zhu H, Li D, 2021, Effect of Duloxetine Combined with Psychotherapy on Improving Adverse Reactions, HAMD, and CGI-SI Scores in Patients with Depression. *Chongqing Medicine*, 50(S01): 297–298.
- [5] Zhou Z, Bian S, Li Y, et al., 2023, The Impact of General Practice Diagnosis and Treatment Model Combined with Duloxetine on Psychological Status, Sleep Quality, and Serum Cytokines in Patients with Fibromyalgia Syndrome. *Journal of Practical Medicine*, 39(21): 2822–2826.
- [6] Sun Y, Xue X, 2021, Effect of Duloxetine Combined with CBT on the Incidence of Adverse Reactions and Levels of IL-2 and Hcy in Patients with Depression. *Chongqing Medicine*, 50(S01): 166–168.
- [7] Geng L, Cao H, 2023, Efficacy of Duloxetine Combined with Oxycodone Hydrochloride in the Treatment of Advanced Cancer Pain and Its Impact on Anxiety and Depression. *China Journal of Modern Medicine*, 33(2): 60–65.
- [8] Li N, Xu Y, Liu Y, 2023, Clinical Study on the Treatment of Postpartum Depression with Jieyu Anshen Capsule Combined with Duloxetine. *Drugs & Clinic*, 38(12): 3016–3020.
- [9] Wu L, Han Y, Lv J, et al., 2023, Efficacy of Sertraline Combined with Cognitive Behavioral Therapy in the Treatment of Gestational Diabetes Mellitus with Postpartum Depression. *International Journal of Psychiatry*, 50(05): 1088–1090 + 1098.
- [10] Zhou X, Qian J, Wu M, et al., 2023, Application of Nursing Intervention Based on Cognitive Behavioral Therapy in Women with Fetal Abnormalities Undergoing Induced Labor. *Chinese Journal of Nursing*, 58(14): 1676–1682.
- [11] Yang J, Wang A, 2023, Effects of Cognitive Behavioral Intervention Combined with Interpersonal Psychotherapy Based on WeChat Platform on the Occurrence of Postpartum Depression, Neurotransmitters, and Mood States of Parturients. *Clinical Medical Research and Practice*, 8(15): 189–191.
- [12] Tang J, Hao R, Zhao Y, 2022, The Effect of Duloxetine Combined with Cognitive Behavioral Therapy on Patients with Postpartum Depression. *Psychology Monthly*, 17(13): 98–101.
- [13] Liang W, Wu G, Gao W, 2022, The Impact of Cognitive Behavioral Intervention Under the Collaborative Care Model of Doctors and Nurses on the Activities of Daily Living of Patients with Postpartum Depression. *Primary Medical Forum*, 26(20): 97–99.
- [14] Wu P, Lin F, 2021, Effects of Duloxetine Combined with Cognitive Behavioral Therapy on Postpartum Depression Patients and Their Dysfunctional Cognitions. *Maternal and Child Health Care of China*, 36(20): 4642–4645.
- [15] Zhao Z, 2021, Analysis of the Clinical Efficacy and Safety of Cognitive Behavioral Therapy Combined with Escitalopram in Patients with Postpartum Depression. *International Journal of Psychiatry*, 48(03): 462–465.
- [16] Jin M, Zhao H, Liu J, et al., 2020, Effects of Interpersonal Psychotherapy and Cognitive Behavioral Therapy on the Efficacy and Social Support of Postpartum Depression. *Journal of Clinical Psychiatric Medicine*, 30(04): 273–275.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Summary of the Relationship between Postpartum Depression Symptoms, Perceived Social Support, Sleep Quality, and Postpartum Stress in Elderly Parturient Women

Juan Wang^{1,2}, Qilin Zhang^{1,2}, Lili Zhang³, Youshan Wu^{1,2*}

¹Jingzhou Mental Health Center, Jingzhou 434000, Hubei, China

²Institute of Mental Health, Yangtze University, Jingzhou 434000, Hubei, China

³Yingcheng People's Hospital, Jingzhou 432400, Hubei, China

**Author to whom correspondence should be addressed.*

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Objective: To analyze the relationship between postpartum depression symptoms, perceived social support, sleep quality, and postpartum stress in elderly parturient women. Methods: 76 elderly parturient women who were admitted to the hospital for delivery between January 2023 and January 2025 were selected. Based on the Edinburgh Postnatal Depression Scale (EPDS) score, 21 cases with a score of ≥ 10 were identified as having postpartum depression symptoms, while 55 cases with a score of < 10 were identified as not having postpartum depression symptoms. The Perceived Social Support Scale (PSSS) score, Pittsburgh Sleep Quality Index (PSQI) score, and Maternal Postpartum Stress Scale (MPSS) score were compared between the two groups. The correlation between each score and postpartum depression symptoms was evaluated, and logistic regression analysis was performed to assess the influencing factors of postpartum depression symptoms. Results: The PSSS score of those with postpartum depression symptoms was lower than those without, while the PSQI score and MPSS score were higher ($P < 0.05$). Pearson linear correlation showed a negative correlation between postpartum depression symptoms and PSSS total score and dimension scores, a negative correlation with PSQI score, and a positive correlation with MPSS total score and dimension scores ($P < 0.05$). Logistic regression analysis showed that PSSS score, PSQI score, and MPSS score were all influencing factors of postpartum depression symptoms ($P < 0.05$). Conclusion: Postpartum depression symptoms in elderly parturient women are closely related to perceived social support, sleep quality, and postpartum stress. Targeted intervention for elderly parturient women is necessary to effectively prevent postpartum depression.

Keywords: Elderly parturient women; Postpartum depression symptoms; Perceived social support; Sleep quality; Postpartum stress

Online publication: September 17, 2025

1. Introduction

The age of advanced maternal age women is ≥ 35 years old, and their risk of childbirth is relatively high. They have poor psychological endurance and are prone to postpartum depression symptoms such as emotional fluctuations or sleep disorders, with an incidence rate of 10–30%. This can lead to mental disorders among puerperas, and in severe cases, there may be a tendency for self-harm and suicide, which can affect the physical and mental health of puerperas in the long term ^[1]. Therefore, it is necessary to comprehensively evaluate the negative psychology of puerperas and screen for risk factors of postpartum depression. Perceived social support refers to the ability of puerperas to resist negative psychology. During the postpartum susceptible period, positive social support can reduce the risk of postpartum depression. Insufficient sleep can increase the fatigue of advanced maternal age women, cause emotional fluctuations, and reduce their psychological adjustment ability ^[2]. Additionally, excessive postpartum stress can easily trigger depressive symptoms, keeping advanced maternal age women in a state of psychological stress for a long time, which is not conducive to postpartum recovery. Based on this, this study selected 76 advanced maternal age women to evaluate the correlation between postpartum depression and multiple factors.

2. Materials and methods

2.1. General information

76 advanced maternal age women who were admitted to the hospital for childbirth between January 2023 and January 2025 were selected. The inclusion criteria were: (1) puerperas aged ≥ 35 years old; (2) postpartum 30–42 days; (3) full-term delivery; (4) complete basic information; (5) normal cognitive and communication abilities. Exclusion criteria: (1) combined with neonatal malformations or neonatal complications; (2) puerperas with a history of mental illness; (3) combined with malignant tumors and other diseases; (4) withdrawal from the study midway.

2.2. Methods

Basic information of elderly parturient women was collected, including age, past delivery history, complications during pregnancy, delivery method, number of abortions, feeding method, and mastitis. The EPDS scale consists of 10 items, with each item scored from 0 to 3, where 0 indicates “never” and 3 indicates “always”. The total score is 30, and there is a positive correlation between depressive symptoms and scores. A score of ≥ 10 indicates the presence of depressive symptoms. The PSSS scale contains 12 items, evaluating perceived support from friends, family, and others. Each item is scored from 1 to 7, where 1 indicates “strongly disagree” and 7 indicates “strongly agree.” The total score is 84, and there is a positive correlation between perceived social support and scores. The PSQI scale includes 18 items, covering 7 aspects such as sleep latency, use of sleep medications, and sleep efficiency. Each item is scored from 0 to 3, with a total score of 21. There is a negative correlation between sleep quality and scores. The MPSS scale comprises 22 items, including infant care, personal needs and fatigue, bodily changes, and sexuality. Each item is scored from 0 to 4, where 0 represents “no stress at all” and 4 represents “extreme stress.” The total score is 88, and there is a positive correlation between postpartum stress level and scores.

2.3. Statistical analysis

Data processing was performed using SPSS 28.0 statistical software. Count data were expressed as ($n/\%$) and

compared using χ^2 test. Measurement data were tested for normal distribution using the Kolmogorov-Smirnov method and expressed as mean \pm standard deviation (SD). Independent sample *t*-tests were used for comparisons between groups, and paired *t*-tests were used for comparisons within groups. Pearson linear correlation analysis was employed for correlation analysis, and logistic regression analysis was applied to investigate influencing factors. A *P*-value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of basic information between the two groups

There were no differences in the basic information of elderly parturient women between the two groups (*P* > 0.05) (Table 1).

Table 1. Comparison of basic information between the two groups (mean \pm SD, *n*/%)

Group	n	Age (years)	Previous delivery history (times)		Gestational complications		Mode of delivery		
			0	≥ 1	Yes	No	Vaginal delivery	Episiotomy	Cesarean section
With Postpartum Depression Symptoms	21	38.52 \pm 4.16	3 (14.29%)	18 (85.71%)	3 (14.29%)	18 (85.71%)	7 (33.33%)	5 (23.81%)	9 (42.86%)
Without Postpartum Depression Symptoms	55	38.41 \pm 4.22	10 (18.18%)	45 (81.82%)	9 (16.36%)	46 (83.64%)	19 (34.55%)	18 (32.73%)	18 (32.73%)
<i>t</i> / χ^2		0.102		0.163		0.049		0.845	
<i>P</i>		0.919		0.687		0.824		0.655	

Group	n	Number of abortions (times)		Feeding method			Mastitis	
		0	≥ 1	Breastfeeding	Mixed feeding	Formula feeding	Yes	No
With Postpartum Depression Symptoms	21	16 (76.19)	5 (23.81)	5 (23.81)	10 (47.62)	6 (28.57)	6 (28.57)	15 (71.43)
Without Postpartum Depression Symptoms	55	42 (76.36)	13 (23.64)	18 (32.73)	23 (41.82)	14 (25.45)	16 (29.09)	39 (70.91)
χ^2			0.000		0.573			0.080
<i>P</i>			0.987		0.449			0.961

3.2. Comparison of scores between the two groups

Patients with comorbid postpartum depressive symptoms had lower PSSS scores and higher PSQI and MPSS scores than those without comorbid postpartum depressive symptoms (*P* < 0.05) (Table 2).

Table 2. Comparison of scores between the two groups (mean \pm SD, scores)

Group	n	PSSS score				PSQI score	MPSS score			
		Friend support	Family support	Other support	Total score		Infant care	Personal needs & fatigue	Physical changes & sex	Total score
With PPD	21	22.92 \pm 3.48	23.81 \pm 2.87	22.51 \pm 2.98	69.24 \pm 6.22	7.35 \pm 1.58	6.41 \pm 1.58	6.29 \pm 1.51	3.26 \pm 0.59	15.96 \pm 2.47
Without PPD	55	26.84 \pm 3.74	28.45 \pm 3.15	26.14 \pm 3.06	81.43 \pm 8.15	10.19 \pm 1.61	4.51 \pm 1.42	5.03 \pm 1.43	2.94 \pm 0.46	12.48 \pm 2.15
t-value		4.162	5.879	4.657	6.191	6.911	5.056	3.383	2.503	6.054
P-value		0.000	0.000	0.000	0.000	0.000	00.000	0.000	0.015	0.000

3.3. Pearson correlation analysis

Pearson linear correlation showed a negative correlation between postpartum depressive symptoms and PSSS, PSQI scores, and a positive correlation with MPSS scores ($P < 0.05$) (Table 3).

Table 3. Pearson correlation analysis

EPDS score	PSSS score				PSQI score	MPSS score			
	Friend support	Family support	Other support	Total score		Infant care	Personal needs & fatigue	Physical changes & sexuality	Total score
r	-0.38	-0.45	-0.42	-0.48	0.48	0.36	0.52	0.39	0.48
P	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

3.4. Logistics regression analysis

Using EPDS scores as the dependent variable, and PSSS, PSQI, and MPSS scores as independent variables, a stepwise forward method was implemented using multiple linear regression analysis. Substituting the scores into the regression equation revealed that lower PSSS scores, lower PSQI scores, and higher MPSS scores were associated with more severe postpartum depressive symptoms among older mothers ($P < 0.05$) (Table 4).

Table 4. Logistics regression analysis

Variable	β	SE	OR	95% CI	P
PSSS Score	-0.132	0.024	0.876	0.836 - 0.919	<0.001
PSQI Score	0.445	0.073	1.560	1.352 - 1.801	<0.001
MPSS Score	0.146	0.026	1.157	1.100 - 1.218	<0.001

4. Discussion

After childbirth, multiple hormone levels in the bodies of older mothers decrease, which can easily induce neurological disorders in the brain, leading to excessive emotional excitation. Additionally, the hormone regulation ability and ovarian function of older mothers decline, resulting in a pronounced hormone withdrawal effect ^[3]. Furthermore, due to age limitations, older mothers have a slower postpartum recovery rate and face multiple

pressures, such as their own physical recovery and newborn care, which can lead to pronounced psychological states such as anxiety and depression. Considering these factors, older mothers are at a higher risk of developing postpartum depressive symptoms, requiring a comprehensive assessment of influencing factors to develop targeted intervention strategies ^[4].

The results showed that the PSSS scores of those with comorbid postpartum depressive symptoms were lower than those without, while the PSQI and MPSS scores were higher ($P < 0.05$). Pearson linear correlation analysis revealed a negative correlation between postpartum depressive symptoms and PSSS scores, as well as PSQI scores, and a positive correlation with MPSS scores ($P < 0.05$). Logistic regression analysis indicated that lower PSSS scores, lower PSQI scores, and higher MPSS scores were associated with more severe postpartum depressive symptoms among older mothers ($P < 0.05$). This may be because older mothers face changes in physical function after childbirth, leading to heightened sensitivity to the surrounding environment. Prolonged newborn care can reduce their external contacts, thereby decreasing perceived social support and causing feelings of loss or irritability, which may lead to postpartum depressive symptoms ^[5]. Nighttime newborn care after childbirth can also reduce the sleep quality of older mothers, and continuous decline in sleep quality and chronic sleep deprivation are major contributing factors to postpartum depressive symptoms, directly affecting emotional stability and potentially leading to more severe physical symptoms. Older mothers have a longer postpartum recovery period and face heavy parenting responsibilities and greater economic pressure, which can significantly increase their psychological burden. Additionally, postpartum hormonal changes can easily lead to emotional instability. Under the influence of these multiple factors, older mothers are prone to depressive symptoms ^[6].

Based on the above research findings, it is necessary to establish a coordinated support system for advanced-age mothers. This involves providing health education to the spouses of these mothers, emphasizing the importance of the husband's role in postpartum recovery and newborn care. By encouraging spouses to actively take on parenting responsibilities, listen patiently to the inner feelings of the mothers, and provide timely praise and encouragement, emotional support can be provided. Weekly family meetings should be organized to clearly delineate each member's parenting responsibilities, thereby reducing the intensity of childcare for the mother ^[7]. Community resources should be fully utilized to form support groups for advanced-age mothers, where offline exchange activities can be held irregularly. This encourages mothers to share experiences and express feelings, reducing postpartum loneliness or anxiety. Adjustments to sleep strategies for the mothers are also important. When the newborn sleeps during the day, mothers should be encouraged to take short naps, synchronizing their sleep with the baby. At night, a rotating newborn care schedule can be implemented to ensure that the mother can achieve more than 6 hours of sleep, thereby improving sleep quality. For those who have difficulty falling asleep, mindfulness meditation training, music therapy, or deep breathing exercises can be recommended to fully relax and shorten the time it takes to fall asleep ^[8]. Long-term psychological counseling should be provided for those who experience significant postpartum stress. Healthcare professionals can keep contact information for advanced-age mothers and conduct weekly phone calls or WeChat follow-ups to understand their current psychological state. By utilizing psychological knowledge or successful cases, negative emotions can be addressed and alleviated.

5. Conclusion

In summary, there are many influencing factors contributing to postpartum depressive symptoms among advanced-age mothers. It is essential to provide social support, sleep guidance, and psychological counseling to reduce the

incidence of depressive symptoms and ensure effective postpartum recovery.

Disclosure statement

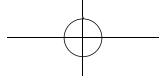
The authors declare no conflict of interest.

References

- [1] Wang Y, Zhang F, Xu X, 2025, Relationship between Postpartum Depressive Symptoms and Perceived Social Support, Sleep Quality, and Postpartum Stress among Advanced-Age Parturient Women. *Chinese Journal of Mental Health*, 39(3): 215–220.
- [2] Xin Y, Ma J, Zhou L, et al., 2025, A Longitudinal Study on Social Support and Postpartum Depression among Postpartum Women from 0 to 6 Months of Breastfeeding. *Chinese Journal of Practical Nursing*, 41(1): 35–40.
- [3] Yuan L, Yang K, Gao B, 2025, Effects of IPT-G Therapy on Depression Level, Social Support, and Interpersonal Function in Patients with Postpartum Depression. *International Journal of Psychiatry*, 52(1): 173–176.
- [4] Wang X, An S, Chen H, 2024, The Influence of Family Care and Personality Traits on Postpartum Depression and the Mediating Role of Social Support. *Chinese Journal of Maternal and Child Health*, 15(2): 46–51.
- [5] Cao Y, Li L, Li Y, et al., 2023, A Study on the Correlation between Postpartum Depression and Family Care and Social Support. *Guide to Women's and Children's Health*, 2(19): 11–14.
- [6] Gao S, Liu F, Li X, et al., 2023, The Mediating Effect of Primiparas' Ruminative Thinking on the Gap between Expected and Actual Social Support and Postpartum Depression. *Chinese Journal of Practical Nursing*, 39(18): 1410–1415.
- [7] Yang H, Nie Y, Ning R, 2020, Relationship between Depressive Attributional Style, Sense of Loss of Control, Social Support, and Postpartum Depression among Older Multiparas. *Chinese Journal of Family Planning*, 28(12): 2025–2029.
- [8] Wang C, Liu R, 2022, Relationship between Postpartum Depression and Adult Attachment and Perceived Social Support. *Journal of Clinical Psychosomatic Diseases*, 28(2): 71–74.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Integrated Services Platform of International Scientific Cooperation

Innoscience Research (Malaysia), which is global market oriented, was founded in 2016. Innoscience Research focuses on services based on scientific research. By cooperating with universities and scientific institutes all over the world, it performs medical researches to benefit human beings and promotes the interdisciplinary and international exchanges among researchers.

Innoscience Research covers biology, chemistry, physics and many other disciplines. It mainly focuses on the improvement of human health. It aims to promote the cooperation, exploration and exchange among researchers from different countries. By establishing platforms, Innoscience integrates the demands from different fields to realize the combination of clinical research and basic research and to accelerate and deepen the international scientific cooperation.

Cooperation Mode



Clinical Workers



In-service Doctors



Foreign Researchers



Hospital



University



Scientific institutions

OUR JOURNALS



The *Journal of Architectural Research and Development* is an international peer-reviewed and open access journal which is devoted to establish a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

Topics covered but not limited to:

- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

Journal of Clinical and Nursing Research (JCNR) is an international, peer reviewed and open access journal that seeks to promote the development and exchange of knowledge which is directly relevant to all clinical and nursing research and practice. Articles which explore the meaning, prevention, treatment, outcome and impact of a high standard clinical and nursing practice and discipline are encouraged to be submitted as original article, review, case report, short communication and letters.

Topics covered by not limited to:

- Development of clinical and nursing research, evaluation, evidence-based practice and scientific enquiry
- Patients and family experiences of health care
- Clinical and nursing research to enhance patient safety and reduce harm to patients
- Ethics
- Clinical and Nursing history
- Medicine



Journal of Electronic Research and Application is an international, peer-reviewed and open access journal which publishes original articles, reviews, short communications, case studies and letters in the field of electronic research and application.

Topics covered but not limited to:

- Automation
- Circuit Analysis and Application
- Electric and Electronic Measurement Systems
- Electrical Engineering
- Electronic Materials
- Electronics and Communications Engineering
- Power Systems and Power Electronics
- Signal Processing
- Telecommunications Engineering
- Wireless and Mobile Communication

