

The Role of Pharmacist-Led Rational Drug Use Management of Antibiotics During the Perioperative Period in Gynecology

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Abstract: *Objective:* To analyze the effect of pharmacist-led rational drug use management of antibiotics during the perioperative period in gynecology. *Methods:* Two hundred patients who underwent gynecological surgery between March 2023 and December 2023 were selected and randomly divided into two groups. In the experimental group, the pharmacist led the medication management during the perioperative use of antibiotics, while the control group received routine antibiotic management. The management effects were compared between the two groups. *Results:* The irrational drug use rate, the incidence of adverse drug reactions, the cost of antibiotics, and the incidence of postoperative infection were all lower in the experimental group compared to the control group ($P < 0.05$). *Conclusion:* Implementing pharmacist-led medication management during the perioperative period of gynecological surgery can prevent irrational drug use, reduce adverse drug reactions, control drug costs, and lower the risk of postoperative infection.

Keywords: Gynecological perioperative period; Pharmacist-led; Antibiotics; Rational drug use management

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1. Introduction

Gynecological surgeries involve various types and complex procedures. Surgical site infection (SSI) is a major complication that increases the risk of postoperative infection, prolongs hospital stay, and may even endanger the patient's life. Therefore, preventing infection is a key focus during the perioperative period in gynecology. Preventive use of antibiotics is a commonly used SSI prevention measure at this stage. Reasonable selection of antibiotic types based on patient information such as surgery type, age, and physical condition can ensure perioperative safety. However, there are cases of irrational antibiotic use in clinical practice, which can lead to bacterial resistance. Pharmacists have a high level of knowledge about antibiotics and understand the principles of rational drug use. They can strictly control perioperative medication regimens, so it is necessary to leverage their professional advantages. Based on this, the study selected 200 gynecological surgery patients to evaluate the

positive significance of pharmacist-led medication management for the rational use of antibiotics.

2. Materials and methods

2.1. General information

A total of 200 patients undergoing gynecologic surgery in our hospital from March 2023 to December 2023 were selected and randomly divided into two groups using a random number table. The experimental group consisted of 100 patients, aged between 21 and 40 years, with a mean age of (29.21 ± 3.40) years. Their body mass index (BMI) ranged from 18 to 26 kg/m², with a mean of (23.51 ± 2.74) kg/m². The surgical procedures included 51 cases of ovarian tumor resection, 37 cases of uterine fibroid resection, and 12 other cases. The incision types were 55 Class I and 45 Class II. The control group also consisted of 100 patients, aged between 20 and 40 years, with a mean age of (29.16 ± 3.35) years. Their BMI ranged from 19 to 25 kg/m², with a mean of (23.32 ± 2.63) kg/m². The surgical procedures included 50 cases of ovarian tumor resection, 38 cases of uterine fibroid resection, and 12 other cases. The incision types were 57 Class I and 43 Class II. There were no significant differences in basic information between the two groups ($P > 0.05$).

Inclusion criteria were as follows: patients meeting the relevant indications for gynecologic surgery, receiving prophylactic antibiotics during the perioperative period, aged ≤ 40 years, with normal cognitive and communication abilities, complete basic information, and informed consent for the study. Exclusion criteria included preoperative severe infection, positive blood routine test results before surgery, comorbidities affecting other organs, mental disorders, and withdrawal from the study.

2.2. Methods

The control group received routine antibiotic management, which included organizing frequently used antibiotics in gynecology, reviewing past case records, summarizing types of irrational antibiotic use, and developing targeted medication management strategies.

The experimental group was managed by pharmacists who led the antibiotic management, which included the following steps:

- (1) Setting management objectives based on the hospital's antibiotic management indicators. Pharmacists in the pharmacy department summarized key information such as administration time, usage and dosage, combination regimens, indications, and contraindications of antibiotics. This information was compiled into a brochure and distributed to every doctor. The pharmacists screened for irrational antibiotic use in the gynecological department, analyzed the reasons for irrationality, and set management objectives to reduce irrational drug use, decrease the intensity of antibiotic use, and lower the utilization rate.
- (2) Developing a management plan for prophylactic antibiotic use based on guidelines such as the "Guiding Principles" and treatment guidelines, integrating specific situations of antibiotic use in gynecology. The plan included medical order reviews and medication regimens, detailing review methods and processes, medication principles, and precautions. A self-made medical order review registration form was developed through consultation between pharmacists and clinicians. It included basic patient information such as name, gender, age, hospital medical record number, disease type, and surgery name. Detailed records of antibiotic types, names, administration times, usage and dosage, additional medications, and other information were required to comprehensively evaluate the rationality of medication use.
- (3) Implementing the pharmacist-led medication management process, which involved setting up a

consultation window for doctors and nurses to seek professional help from pharmacists regarding pharmaceutical knowledge. Patients with doubts about their antibiotic treatment plans could also seek assistance at this window. Pharmacists participated in the entire process of developing antibiotic regimens during the perioperative period, controlling specific dosages, frequencies, and overall treatment durations. Once the risk of infection was eliminated, pharmacists urged doctors to stop using antibiotics to prevent overuse. Pharmacists were responsible for manually reviewing antibiotic prescriptions issued by doctors, commenting on drug types, frequencies, dosages, and usage methods. Any irrational prescriptions were discussed with doctors, and adjustments were made accordingly. Unqualified prescriptions required re-issuance with the pharmacist's involvement to ensure qualification rates. Pharmacists also conducted random spot checks on antibiotic use during the perioperative period in gynecology, evaluating the rationality of drug combinations, dosages, and administration timing. Any irrational prescriptions were discussed with the responsible doctors to provide effective prescribing suggestions. During postoperative antibiotic use, pharmacists actively participated in patient rounds, evaluating incision status and observing early signs of postoperative infection. Antibiotics were selected based on patients' specific manifestations and drug sensitivity test results, along with determining dosages and administration times.

2.3. Observation indicators

- (1) Irrational drug use rate: Observe the rate of irrational drug use, including inappropriate drug types, inappropriate usage and dosage, inappropriate duration of drug use, and inappropriate combination use.
- (2) Incidence of adverse drug reactions: Observe the incidence of nausea, vomiting, loss of appetite, diarrhea, and other adverse reactions.
- (3) Antimicrobial drug costs and postoperative infection rates: Collect data on perioperative antimicrobial drug costs and the incidence of postoperative infections.

2.4. Statistical analysis

Data was processed using SPSS 28.0 software. Measurement values were compared/tested using t-values, and count values were compared/tested using chi-square values. Statistical significance was set at a P-value less than 0.05.

3. Results

3.1. Comparison of irrational drug use rates between the two groups

The irrational drug use rate in the experimental group was lower than that in the reference group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of irrational drug use rates between the two groups [n/%]

Group	Cases	Inappropriate drug type	Inappropriate dosage/Usage	Inappropriate treatment duration	Inappropriate combination	Incidence rate (%)
Experimental group	100	2 (2.0)	2 (2.0)	1 (1.0)	1 (1.0)	6.0 (6/100)
Reference group	100	4 (4.0)	6 (6.0)	3 (3.0)	4 (4.0)	17.0 (17/100)
χ^2	-	-	-	-	-	5.945
P-value	-	-	-	-	-	0.015

3.2. Comparison of adverse drug reaction rates between the two groups

The incidence of adverse drug reactions in the experimental group was lower than that in the reference group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of adverse drug reaction rates between the two groups [n/%]

Group	Cases	Nausea and vomiting	Loss of appetite	Diarrhea	Incidence rate (%)
Experimental group	100	1 (1.0)	2 (2.0)	1 (1.0)	4.0 (4/100)
Reference group	100	4 (4.0)	6 (6.0)	2 (2.0)	12.0 (12/100)
χ^2	-	-	-	-	4.348
<i>P</i> -value	-	-	-	-	0.037

3.3. Comparison of antimicrobial drug costs and postoperative infection rates between the two groups

The antimicrobial drug costs in the experimental group were lower than those in the reference group, and the postoperative infection rate was also lower ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of antimicrobial drug costs and postoperative infection rates between the two groups [$\bar{x} \pm s$, n/%]

Group	Cases	Antibiotic cost (¥)	Postoperative infection rate (%)
Experimental Group	100	58.73 \pm 20.55	2 (2.0)
Reference Group	100	107.46 \pm 25.77	9 (9.0)
t/c^2	-	14.784	4.714
<i>P</i> -value	-	< 0.001	0.030

4. Discussion

Treatment plans for gynecological surgery patients are diverse and complex, with long surgical times and relatively large incisions. These factors can cause significant damage to the body and may lead to adverse events such as postoperative incision infections, which can delay incision healing time and reduce surgical efficacy^[2]. To improve surgical safety and reduce the treatment burden on patients, antimicrobial drugs are often used prophylactically during the perioperative period in gynecology. However, practice has shown that some gynecologists have a general understanding of antimicrobial drug knowledge, which may lead to situations such as inappropriate drug selection or extended drug use during the treatment process. These situations can affect drug efficacy and even induce severe adverse reactions^[3].

Pharmacists in the pharmacy department have a high level of understanding of medication knowledge, are familiar with basic pharmacological knowledge of antibacterial drugs, medication rules and principles, optimal timing and treatment courses, and can play a leading role during perioperative drug therapy in gynecology^[4]. Pharmacist-led medication management can establish management goals, scientifically develop medication plans based on patient conditions, and strengthen pharmaceutical intervention with doctors through real-time medical order review and management, which can continuously improve the management mode of antibacterial drugs and

reduce irrational drug use ^[5, 6].

The results showed that the irrational drug use rate, the incidence of adverse drug reactions, the cost of antimicrobial drugs, and the incidence of postoperative infections were all lower in the experimental group than in the control group ($P < 0.05$). The reasons for these findings are analyzed as follows: Pharmacist-led medication management can establish a dedicated consultation window open to doctors and patients, providing a convenient platform for medication advice. This enables doctors or patients to obtain professional medication guidance at any time, increasing communication frequency and raising awareness of adverse drug reaction prevention among doctors and patients ^[7]. Pharmacist-led medication management allows pharmacists to participate in the entire perioperative antimicrobial treatment process. In the preoperative stage, they comprehensively evaluate the patient's physical condition and surgical tolerance, and pre-screen for infection risks ^[8]. In the postoperative stage, they continue to provide professional medication guidance, which can improve patients' compliance with medical advice.

In this model, the patient's antimicrobial regimen is jointly developed by the doctor and pharmacist, enabling timely identification and correction of any inadequacies in the medication plan, thereby reducing the number of unreasonable prescriptions. Additionally, controlling specific indicators such as the dose of antimicrobial drugs, the optimal time of administration, and the duration of treatment can prevent high-dose medication, early or late administration, and over-extended treatment courses, thus improving medication compliance ^[9, 10]. After a drug prescription is issued, the pharmacist is responsible for a comprehensive review. If an unreasonable prescription is found, they must immediately contact the doctor, point out the problem, and oversee adjustments to the prescription content ^[11]. Unqualified prescriptions are directly returned and require the doctor to re-issue them. The pharmacist also monitors the re-issuance process to ensure prescription accuracy. Pharmacist-led medication management can reduce the frequency of drug use and improve the economic efficiency of medication regimens while ensuring the rational use of antimicrobial drugs ^[12].

5. Conclusion

In summary, implementing pharmacist-led medication management during perioperative prophylactic use of antibacterial drugs in gynecology can prevent irrational drug use, reduce adverse reactions after medication, effectively control drug treatment costs, and maximize the prevention of complications such as postoperative infections. However, it should be noted that this mode is difficult to fully cover the medical order content of gynecological wards, and some medical orders are only reviewed through centralized feedback, which has a lag. Future research should aim to achieve informatized medication management, utilizing information systems to conduct real-time reviews of medical orders and dynamically monitor medication processes to enhance medication safety.

Disclosure statement

The authors declare no conflict of interest.

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