INPLASY

Ciprofol versus propofol in the general anesthesia of gynecologic surgery

INPLASY202560116

doi: 10.37766/inplasy2025.6.0116

Received: 29 June 2025

Published: 29 June 2025

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ADMINISTRATIVE INFORMATION

Support - This work was partially supported by the Young Taishan Scholars Program of Shandong Province (Grant number tsqn201909183), National Natural Science Foundation of China (Grant numbers 82302682), and the Jinan Clinical Medical Science and Technology Innovation Program (Grant number 202328067).

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202560116

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 29 June 2025 and was last updated on 29 June 2025.

INTRODUCTION

Review question / Objective To compare and evaluate the safety and effectiveness of ciprofol and propofol for gynecological surgery by meta-analysis.

Condition being studied The daytime surgery guide stipulates that anesthesiologists should perform their duties with the least possible pressure and the utmost comfort. Physiological changes during pregnancy including congestion, edema, and excessive secretion, may make gynecological patients be a little more vulnerable than most patients and arise issues during obstetric anesthesia. Most anesthesiologists will choose general anesthesia during gynecological surgery, which will make the patients more comfortable.1 Some gynecological patients often have concurrent pulmonary embolism, postoperative nausea and vomiting (PONV), postoperative anxiety and depression and stress response abilities. Therefore, the safety of anesthetics used in gynecological surgery should be considered with greater caution.

Propofol is a super fast acting intravenous anesthetic. It is rapidly metabolized into inactive compounds in the liver and then excreted through urine. The incidence of adverse hemodynamic changes is relatively low. Propofol can reduce cerebral blood flow, brain metabolism, and lower intracranial pressure. Compared with other common anesthetics, propofol also has antiemetic effects, which is very effective for PONV that often occurs in pregnant women.8 Due to the rapid onset, short duration of action, and quick patient recovery, propofol was widely used for the induction and maintenance of general anesthesia in the past. It is unavoidable that propofol has an inhibitory effect on the respiratory system. Not only

that, it has been reported that during induction or recovery, especially in epilepsy patients, involuntary movements and epileptic seizures may occur. There have been reports that long-term use of propofol in acute intensive care could lead to metabolic acidosis, hyperlipidemia, liver enlargement, and other adverse reactions.8 These negative information limits the clinical effect of propofol.

Ciprofol is a novel compound that was independently developed in China in recent years. This drug can maximize the safety and comfort of patients without compromising the efficacy of anesthesia induction. Both ciprofol and propofol exert anesthetic effect by bind with γ-aminobutyric acid type A receptor (GABAA receptor), making chloride ions flow in, activating GABAergic neurons, and thereby inhibiting the central nervous system. However, due to the introduction of cyclopropyl on the basis of the chemical structure of cyclopropane, a chiral structure is formed, which increases the stereo effect, thus enhancing the affinity with the GABAA receptor.10 The affinity of ciprofol with the GABAA receptor is about four times that of propofol. Not only that, ciprofol has high efficacy, good selectivity, and fewer adverse reactions, indicating good clinical application potential. The research of Chen et al.14 showed that ciprofol and propofol had the same anesthetic effect in gynecological surgery with fewer adverse events. During the operation, the incidence of injection pain, as well as blood pressure and heart rate increase of ciprofol were lower than that of propofol.17 This indicates that ciprofol may provide a better ideal sedation level after induction under the administration scheme equivalent to propofol.

However, at present, there are few relevant studies on ciprofol and insufficient clinical application experience, and there is no evidence-based medical evidence for its safety and effectiveness in gynecological general anesthesia. In this study, meta-analysis was used to evaluate the safety and effectiveness of ciprofol in gynecological general anesthesia, and to integrate and analyze some existing studies on the comparison between propofol and ciprofol.

METHODS

Participant or population All participants underwent gynecological general anesthesia surgery.

Intervention Ciprofol group used ciprofol compound analgesic.

Comparator Propofol group accepted propofol compound analgesic.

Study designs to be included Randomized controlled trials.

Eligibility criteria Inclusion criteria of studies for this meta-analysis were listed as below: 1) study design, RCT; 2) participants, all participants underwent gynecological general anesthesia surgery; 3) intervention, ciprofol group used ciprofol compound analgesic, and propofol group accepted propofol compound analgesic.

Exclusion criteria of this meta-analysis included: 1) secondary research reports such as reviews, conference abstracts, and meta-analyses; 2) repeatedly published literature; 3) literature without reported outcome measures; and 4) literature unable to obtain full-text.

Information sources Pubmed, Cochrane Libarary and Embasee.

Main outcome(s) Changes in vital signs (mean arterial pressure/MAP, heart rate/HR, systolic blood pressure/SBP, diastolic blood pressure/DBP, bispectrum index/BIS, etc) before and after anesthesia.

Quality assessment / Risk of bias analysis Quality of included studies was evaluated using Revman 5.4 software and Cochrane's bias risk assessment tool, which includes 6 items (selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias). Low bias, unclear bias, or high bias was determined for each indicator.

Strategy of data synthesis If the Cochran Q test yields P>0.1 or I2<50%, indicating no statistical heterogeneity among the included studies, a fixed effects model is applied. Conversely, if these conditions are not met, a random effects model is utilized.

Subgroup analysis Subgroup analysis was used to identify the source of heterogeneity in outcome measures with high heterogeneity.

Sensitivity analysis Sensitivity analysis was used to identify the source of heterogeneity in outcome measures with high heterogeneity.

Country(ies) involved China.

Keywords Ciprofol; propofol; gynecologic surgery; general anesthesia; meta-analysis.

Contributions of each author

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