INPLASY

The effectiveness of vitamin D combined with letrozole for polycystic ovary syndrome: a protocol for systematical review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 January 2025 and was last updated on 21 January 2025.

INTRODUCTION

Review question / Objective A systematic evaluation of the effectiveness of vitamin D combined with letrozole in treating polycystic ovary syndrome(PCOS).
P: Clinically diagnosed PCOS patients of childbearing age, with no restrictions on nationality, race, BMI, or duration of illness.
I: Experimental group: vitamin D combined with letrozole as the main intervention.
C: Control group: Treatment with letrozole was used as the main intervention.
O: endometrial thickness(mm); tosterone, T(nmol/L); luteinizing hormone, LH(U/L); estrodiol, E2(pmol/L); number of mature follicles; follicle stimulating hormone, FSH(mIU/ml); fasting serum insulin, FINS(μU/ml); fasting plasma glucose, FPG(mmol/L); HOMA-IR; incidence of adverse reaction; ovulation rate and pregnancy rate.
S: Randomized controlled trials.

Condition being studied Polycystic Ovary Syndrome(PCOS) is the most prevalent endocrine disorder affecting women of childbearing age. It is characterized by hyperandrogenism, anovulation or infrequent ovulation, and a heightened risk of spontaneous abortion.
The global prevalence of PCOS ranges from 5% to 18%, with variations depending on diagnostic criteria and study populations. Research indicates that the prevalence of PCOS among Chinese women of childbearing age reached 7.8% in 2020, marking a 65% increase over the past decade, highlighting its growing public health burden.
Letrozole is currently the first-line drug for treating PCOS. It is typically administered starting on the 5th day of the menstrual cycle for patients experiencing anovulation or infrequent ovulation. Vitamin D is a steroid hormone that is crucial for the body's metabolism. Its main source is synthesized by the skin through exposure to sunlight, and diet and dietary supplements are also important ways to supplement it. Recent studies suggest that vitamin D positively influences follicular development, ovarian reserve maintenance, and steroid hormone production. It also plays a critical role in ovulation induction,

menstrual cycle regulation, and improving insulin resistance and hyperlipidemia in PCOS patients. Increasing evidence indicates that PCOS occurrence and progression are closely associated with vitamin D deficiency. Research highlights the significant role of vitamin D in enhancing insulin sensitivity.
This study aims to systematically evaluate the effects of vitamin D combined with letrozole on hormone levels, blood glucose, insulin levels, and pregnancy outcomes in PCOS patients, providing a scientific basis and reference for clinical treatment.

METHODS

Participant or population Clinically diagnosed PCOS patients of childbearing age, with no restrictions on nationality, race, BMI, or duration of illness.

Intervention Received vitamin D combined with letrozole as the main intervention.

Comparator Treatment with letrozole was used as the main intervention.

Study designs to be included The research design includes all randomized controlled trial of all vitamin D combined with letrozole in the treatment of polycystic ovary syndrome patients.

Eligibility criteria All the RCTs meet the standard of “PICO” mentioned above will be included. Studies were excluded based on the following criteria: (1)Non randomized controlled trials, meta-analyses, systematic reviews, reviews, comments, case reports, and animal experiments (2)duplicate publications (3)literature with incomplete information or inability to obtain the full text.

Information sources The following electronic databases will be searched: The Cochrane Library, Embase, PubMed, Web of Science, Wanfang Database, Weipu Database, Chinese National Knowledge Infrastructure(CNKI) and Chinese Biomedical LiteratureDatabase(CBM).

Main outcome(s) Including endometrial thickness(mm); tosterone, T(nmol/L); luteinizing hormone, LH(U/L); estrodiol, E2(pmol/L); number of mature follicles; follicle stimulating hormone, FSH(mIU/ml); fasting serum insulin, FINS(μU/ml); fasting plasma glucose, FPG(mmol/L); HOMA-IR; incidence of adverse reaction; ovulation rate and pregnancy rate.

Quality assessment / Risk of bias analysis Two researchers independently evaluated the quality of literature using the Cochrane Risk of Bias Assessment Tool. Each evaluation item was classified into three categories based on risk assessment criteria: "high risk", "low risk", and "unclear risk". If there is any disagreement, discuss and resolve it or negotiate based on the opinion of the third researcher. The content of literature quality evaluation includes seven items: random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), selective reporting (reporting bias) and other bias.

Strategy of data synthesis RevMan 5.4 software was used to assess the quality of the four included studies and to generate risk-of-bias plots and forest plots. A risk-of-bias assessment was conducted on the included studies using Stata 18.0, and a funnel plot was generated. Effect measures for outcome indicators were selected based on variable types: relative risk (RR) was used for binary variables, mean difference (MD) for continuous variables, and 95% confidence intervals (CI) were calculated for both. Study heterogeneity was assessed using the I^2 statistic. When $I^2 > 50\%$ and $P < 0.1$, a high degree of heterogeneity among the included studies is indicated, and a random-effects model is applied. Conversely, low heterogeneity is assumed, and a fixed-effects model is used for analysis.

Subgroup analysis If sufficient data are available, subgroup analyses will be conducted based on the different age groups.

Sensitivity analysis Egger’s test will be used to assess the presence of publication bias.

Country(ies) involved China.

Keywords polycystic ovary syndrome; vitamin D; letrozole.

Contributions of each author
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Author 2 - Xiaofeng Jiang.
Author 3 - Jingshu Yao.
Author 4 - Minyan Wang.