INPLASY

Comparative Efficacy and Safety of High-Dose Versus Low-Dose Tranexamic Acid in Adolescent Idiopathic Scoliosis: A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - CuiYing Science and Technology Innovation plan project of Lanzhou University Second Hospital.

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

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 04 August 2024 and was last updated on 04 August 2024.

INTRODUCTION

Review question / Objective The objective of this meta-analysis was to evaluate the comparative effectiveness and safety of high-dose versus low-dose tranexamic acid (TXA) in adolescents undergoing treatment for idiopathic scoliosis.

Condition being studied Adolescent idiopathic scoliosis (AIS) refers to a lateral and rotational deformity of the spine that occurs during adolescence for unknown reasons. This deformity typically involves multiple vertebrae and may be accompanied by thoracic abnormalities. Spinal fusion surgery is a standard procedure for treating AIS. This surgery involves making an incision in the back to expose the spine, then using metal rods, screws, and other internal fixation devices to correct and stabilize the deformed spine, thereby promoting fusion between the vertebrae. In spinal fusion surgery for AIS patients, perioperative blood management is crucial. Tranexamic acid (TXA) is an antifibrinolytic drug that has been proven effective in reducing blood loss during surgical procedures. Its use in various surgeries, including spinal surgeries, has shown significant effects in reducing intraoperative blood loss and transfusion requirements. However, there is still controversy regarding the optimal dosage of TXA in AIS spinal fusion surgery.

METHODS

Participant or population Patients undergoing corrective surgery for AIS.

Intervention The control group received low-dose TXA, and the experimental group received high-dose TXA.

Comparator Intraoperative blood loss, transfusion rate, operation time, and thromboembolic events.

Study designs to be included Randomized controlled trials and retrospective cohort studies.

Eligibility criteria The inclusion criteria were as follows:
1) Patients undergoing corrective surgery for AIS;
2) The control group received low-dose TXA, and the experimental group received high-dose TXA;
3) Endpoints included IBL, transfusion rate, operation time, and thromboembolic events;
4) Study designs were randomized controlled trials (RCTs) and retrospective cohort studies (RCSs);
The exclusion criteria were as follows:
1) Other types of spinal disorders such as non-adolescent idiopathic scoliosis, lumbar disc herniation, spinal fractures, etc.;
2) Case reports, reviews, comments, or articles lacking extractable data;
3) Duplicate publications.

Information sources PubMed, Web of Science, Embase, Cochrane, and CNKI.

Main outcome(s) Intraoperative blood loss, transfusion rate, operation time, and thromboembolic events.

Quality assessment / Risk of bias analysis The quality of RCTs was assessed based on Review Manager version 5.4 (The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, 2014) to assess the risk of bias. The methodological quality of the RCTs was assessed using the following criteria: generation of random sequences, allocation concealment, blinding, incomplete outcome data, and selective outcome reporting. The included RCSs were evaluated using the Newcastle-Ottawa Scale (NOS).

Strategy of data synthesis Statistical Analysis The weighted mean difference (WMD) and risk ratio (RR) were used to compare continuous and dichotomous variables, respectively. Heterogeneity was assessed using the Chi-squared test and I^2 statistic. A fixed-effect model was employed in the absence of significant heterogeneity (I^2 0.1); otherwise, a random-effects model was chosen. Meta-analyses were conducted using RevMan 5.4 for Windows (Cochrane Collaboration, Oxford, UK) and STATA software version 17.0 (Stata Corporation, College Station, Texas, USA).

Subgroup analysis We did not perform subgroup analyses.

Sensitivity analysis We did not perform subgroup analyses.

Country(ies) involved China.

Keywords Tranexamic acid, Adolescent idiopathic scoliosis, high dose, Spinal surgery.

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