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Department of Neurosurgery, Liaocheng People's Hospital, Liaocheng 252000, Shangdong, China. Effect of very early (<24 hours) pharmacological thromboprophylaxis on clinical outcome in patients with traumatic intracranial haemorrhage: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - Nothing.

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 4 May 2025 and was last updated on 4 May 2025.

INTRODUCTION

eview question / Objective Patients with traumatic intracranial haemorrhage (TICH) have been shown to be at high risk of developing venous thromboembolism (VTE), yet the safety and optimal timing of early pharmacologic thromboprophylaxis (PTP) remains a subject of debate. The objective of this study was to evaluate and summarise the impact of PTP initiation time point on patient-related clinical outcomes.

Condition being studied Intracranial haemorrhage (ICH) due to traumatic brain injury (TBI) is a major cause of mortality and disability in young adults worldwide, representing a significant public health concern. A study conducted in the United States reported that approximately 2.8 million TBI occur annually in the United States, with approximately 56,000 deaths due to TBI each year. The study identified one of the etiologic factors contributing to the significant increase in patient morbidity and mortality as subsequent venous thromboembolism

(VTE). Advances in emergency medicine have led to significant improvements in the early survival of patients with traumatic intracranial haemorrhage (TICH). However, these advances have also resulted in a substantial increase in the risk of venous thromboembolism (VTE), due to prolonged bed rest, activation of the inflammatory response, and coagulation disorders. The data demonstrate a substantial increase in the incidence of future complications and a concomitant increase in mortality among TICH patients who do not receive prophylactic anticoagulation.

METHODS

Participant or population We considered studies eligible for inclusion if (1) patients with TBI with intracranial haemorrhage, (2) received PTP treatment during hospitalisation, (3) were divided into early (less than 24 h) and late (more than 24 h) groups according to the time of PTP administration in the study, and (4) had a result in the clinical condition report that was consistent with the current study. We excluded patients with the

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following conditions: (1) combination of injuries at other sites such as the spine, (2) hospitalisation without PTP treatment, (3) unclear timing of PTP administration, (4) patients with previous hypercoagulability or coagulation disorders, and (5) patients with severe arterial or venous injuries.

Intervention (1) patients with TBI with intracranial haemorrhage, (2) received PTP treatment during hospitalisation, (3) were divided into early (less than 24 h) groups according to the time of PTP administration in the study.

Comparator (1) patients with TBI with intracranial haemorrhage, (2) received PTP treatment during hospitalisation, (3) were divided into late (more than 24 h) groups according to the time of PTP administration in the study.

Study designs to be included Cohort study.

Eligibility criteria We considered studies eligible for inclusion if (1) patients with TBI with intracranial haemorrhage, (2) received PTP treatment during hospitalisation, (3) were divided into early (less than 24 h) and late (more than 24 h) groups according to the time of PTP administration in the study, and (4) had a result in the clinical condition report that was consistent with the current study. We excluded patients with the following conditions: (1) combination of injuries at other sites such as the spine, (2) hospitalisation without PTP treatment, (3) unclear timing of PTP administration, (4) patients with previous hypercoagulability or coagulation disorders, and (5) patients with severe arterial or venous injuries.

Information sources PubMed, Embase, and Cochranedatabases.

Main outcome(s) hemorrhagic progression, overall venous thromboembolism, deep vein thrombosis, pulmonary embolism and mortality.

Quality assessment / Risk of bias analysis ROBINS-I tool.

Strategy of data synthesis The extraction of data and the subsequent meta-analysis were conducted utilising the R statistical language (R Version 4.2.3). P-values were bivariate, and the 0.05a level was considered significant.

Subgroup analysis Nothing.

Sensitivity analysis Completed.

Country(ies) involved China.

Contributions of each author

Author 1 - Longshan Zhou. Author 2 - Xiujie Xue. Author 3 - Qingshan Chen. Author 4 - Yexin Xin. Author 5 - Yilei Xiao.