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The worldwide incidence of bladder neck contracture after transurethral surgery of prostate by thulium laser for benign prostatic hyperplasia: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

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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 2 April 2025 and was last updated on 2 April 2025.

INTRODUCTION

Review question / Objective The aim of this study was to perform a systematic literature review and meta-analysis of the worldwide incidence of BNC after transurethral thulium laser surgery for BPH.

Condition being studied Bladder neck contracture (BNC) is a long-term complication of surgery for benign prostatic hyperplasia (BPH), often causing recurrent urinary retention and requiring multiple invasive procedures. However, data on the worldwide incidence of BNC following transurethral prostate surgery with thulium laser are limited.

METHODS

Participant or population Participants were 18 years of age or older.

Intervention Patients received transurethral thulium laser surgery for the treatment of BPH, including thulium laser enucleation of the prostate(ThuLEP), thulium vapoenucleation of the Prostate (ThuVEP), thulium laser vaporization of the prostate(ThuVAP), thulium laser vaporesection of the prostate(ThuVaRP), or thulium laser resection of the prostate(TmLRP).

Comparator None.

Study designs to be included The study design was a RCT, case-control, cohort, or case series.

Eligibility criteria Studies were included if they met the following criteria: (1) participants were 18 years of age or older; (2) the study design was a RCT, case-control, cohort, or case series; (3) patients received transurethral thulium laser surgery for the treatment of BPH, including thulium laser enucleation of the prostate(ThuLEP), thulium vapoenucleation of the Prostate (ThuVEP), thulium laser vaporization of the prostate(ThuVAP), thulium laser vaporesection of the prostate(ThuVaRP), or thulium laser resection of the prostate(TmLRP); and (4) the study provided incidence of BNC or sufficient data to calculate them.

Information sources PubMed, EMBASE, and Web of Science.

Main outcome(s) We summarized the overall incidence of BNC following thulium laser transurethral prostate surgery, including a 95% confidence interval(CI).

Quality assessment / Risk of bias analysis The quality of RCT literature was evaluated using the Jadad scale, which was scored on randomization (0-2 points), blinding (0-2 points), and withdrawal and loss of visits (0-1 points), with a total score of 0-5 points. 1-3 points is considered low quality and 4-5 points is considered high quality. The Newcastle-Ottawa Scale(NOS) scale is used to evaluate the quality of case-control and cohort studies and consists of three modules: selection, comparability, and outcome/exposure, with eight items and a total score of 9 points. The maximum score for “comparability” is 2, and the remaining entries are 1. 7-9 is considered high quality, 4-6 is considered moderate quality, and less than 4 is considered low quality. The Agency for Healthcare Research and Quality (AHRQ) scale was used to assess the quality of the literature of case series studies, which assesses the risk of bias in five domains: selection bias, implementation bias, follow-up bias, measurement bias, and reporting bias, and contains 11 items. 6-7 is considered moderate quality, 7 or more is considered high quality, and 6 or less is considered low quality.

Strategy of data synthesis Statistical analyses were conducted using Stata 16 (StataCorp LLC, College Station, TX, USA). We summarized the overall incidence of BNC following thulium laser transurethral prostate surgery, including a 95% confidence interval(CI). Additionally, we examined the incidence across various subgroups, which were categorized based on factors such as study region, thulium laser energy, patient age, study design (RCT, case series, case-control, cohort), sample size (≤100, ≥100), thulium laser technique (ThuLEP, ThuVEP, TmLRP, ThuVaRP, ThuVP), prostate volume (≥100 ml, 60-100 ml, ≥60 ml), surgery duration (≥70 min, 50% or $P < 0.05$, indicating significant heterogeneity, while a fixed-effects model was used in the absence of such heterogeneity. Meta-regression was conducted to explore potential sources of heterogeneity, adjusting for key moderators, including age, prostate volume, sample size, follow-up duration, surgery time, and thulium laser energy. Sensitivity analysis was performed by systematically excluding each individual study from the meta-analysis. Publication bias was evaluated through both Egger's and Begg's tests, with funnel plot asymmetry used to visually assess the presence of bias.

Subgroup analysis We examined the incidence across various subgroups, which were categorized based on factors such as study region, thulium laser energy, patient age, study design (RCT, case series, case-control, cohort), sample size (≤100, ≥100), thulium laser technique (ThuLEP, ThuVEP, TmLRP, ThuVaRP, ThuVP), prostate volume (≥100 ml, 60-100 ml, ≥60 ml), surgery duration (≥70 min, <70 min), and follow-up period.

Sensitivity analysis Sensitivity analysis was performed by systematically excluding each individual study from the meta-analysis.

Country(ies) involved China.

Keywords Incidence; bladder neck contracture; thulium laser; benign prostatic hyperplasia; meta-analysis.

Contributions of each author
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