International Journal of Surgery 35 (2016) 104–110

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Review

Open versus endoscopic in situ decompression in cubital tunnel syndrome: A systematic review and meta-analysis

Yi-Ming Ren [a, 1], Xian-Hu Zhou [a, 1], Hu-Yun Qiao [b, 1], Zhi-Jian Wei [a], Bao-You Fan [a], Wei Lin [a], Shi-Qing Feng [a, *]

[a] Department of Orthopedics, Tianjin Medical University General Hospital, Tianjin, PR China
[b] Department of Orthopedics, The Second Hospital of Shanxi Medical University, Taiyuan, PR China

HIGHLIGHTS

- OISD has equal efficacy with EISD.
- With same complication rate, EISD intervention has same safety as OISD.
- EISD with minor intraoperative trauma is recommended as a valuable alternative for CuTS.

ARTICLE INFO

Article history:
Received 5 June 2016
Received in revised form
29 July 2016
Accepted 10 September 2016
Available online 12 September 2016

Keywords:
Open in situ decompression
Endoscopic in situ decompression
Cubital tunnel syndrome
Systematic review
Meta-analysis

ABSTRACT

Objective: We conducted this systematic review and meta-analysis to compare the clinical efficacy and safety between open and endoscopic in situ decompression surgery methods for cubital tunnel syndrome (CuTS).

Methods: PubMed, Medline, Embase, Cochrane Library and CNKI were searched for eligible studies. The data were extracted by two of the coauthors (WL, BYF) independently and were analyzed using RevMan statistical software, version 5.1. Relative risks (RRs) and 95% confidence intervals (CIs) were calculated. Cochrane Collaboration's Risk of Bias Tool and the Newcastle–Ottawa Scale were used to assess the risk of bias.

Results: Seven studies were included for systematic review, and six studies were included for meta-analysis. The CuTS patients received open in situ decompression (OISD) or endoscopic in situ decompression (EISD). A pooled analysis of postoperative Bishop score showed that the difference was not statistically significant between the EISD group and the OISD group (RR = 0.99, 95% CI = 0.88–1.12, P = 0.88). The overall estimate of postoperative satisfaction between the EISD group and the OISD group was not found to be significant (RR = 0.98, 95% CI = 0.89–1.08, P = 0.70). The overall estimate of complications (RR = 0.88, 95% CI = 0.24–3.29, P = 0.85) suggested that the difference was not statistically significant.

Conclusions: EISD and OISD for treating CuTS have equivalent efficacy for postoperative clinical improvement, whereas the incidences of complications of endoscopic surgical procedure were also same as those with the open surgical procedure. In situ decompression (especially EISD, with minor intraoperative trauma) could be treated as a valuable alternative to treat CuTS.

1. Introduction

Cubital tunnel syndrome (CuTS), also known as delayed ulnar neuritis, is a peripheral nerve entrapment disease, the incidence of which ranks second only to carpal tunnel syndrome [1]. Roughly 25 people out of every 100,000 suffer ulnar nerve symptoms each year [2]. The symptoms of CuTS in patients are often related to numbness and tingling sensations in the ring and little finger as well as pain in the elbow and sensory changes after bending the elbow for a long time. When it becomes more severe, intrinsic muscle atrophy of the hand, loss of muscle tone, and claw hand deformity will appear [3]. If conservative treatment fails, many different surgery

* Corresponding author. Anshan Road 154, Tianjin, 300052, PR China.
E-mail address: sqfeng@tmu.edu.cn (S.-Q. Feng).
[1] These authors contributed equally to this work.

http://dx.doi.org/10.1016/j.ijsu.2016.09.012
1743-9191/

methods can be considered, such as in situ decompression, anterior transposition of the ulnar nerve and endoscopic decompression [4]. The best surgical selection for CuTS remains controversial. Although the traditional view strongly recommends anterior transposition of the ulnar nerve, at immediate follow-up there is no obvious difference between in situ decompression alone and in combination with anterior transposition. Even in situ decompression could be treated as a simple and practical method [5].

In 1995, Tsai et al. [6] first reported on endoscopic decompression of the ulnar nerve, which coincided with the updating of endoscopic instruments. The advantages of this method are rapid recovery, less operative trauma, less discomfort, fewer complications and less postoperative scarring for the patient [7]. Has endoscopic decompression performed better than open decompression? Some surgeons see no outcome differences between open and endoscopic in situ decompression [8,9], while other authors strongly recommend the endoscopic technique as the new standard treatment procedure for CuTS [10,11]. Although some studies reported excellent results with the endoscopic decompression technique, it is still unclear whether this technique is really superior to the standard open decompression.

However, there have been no systematic, quantitative evaluations between endoscopic decompression and open decompression. In this article, we included 7 relevant studies to compare the clinical efficacy and safety of open and endoscopic in situ decompression in CuTS to provide some evidence for clinical decision making.

2. Materials and methods

2.1. Search strategy

Five databases (PubMed, Medline, Embase, Cochrane Library and CNKI) were searched using keywords such as “delayed ulnar neuritis”, “ulnar nerve”, “cubital tunnel syndrome”, “endoscopic” and “open decompression” from 1995 to April 2016, to collect relevant studies about clinical comparisons of open and endoscopic in situ decompression in CuTS. The references of published papers were also assessed for supplementation.

2.2. Inclusion and exclusion criteria

The inclusion criteria included the following: (1) patients diagnosed with primary cubital tunnel syndrome (or ulnar neuropathy at the elbow) clinically and electrophysiologically, not caused by surgery or injury; (2) outcomes at least including postoperative scores or other indices of clinical improvement; (3) patients treated by either endoscopic in situ decompression (EISD) or open in situ decompression (OISD); (4) published randomized controlled clinical trials or retrospective controlled studies; and (5) articles in the English language. The exclusion criteria were as follows: (1) insufficient clinical outcome data in studies and (2) reviews, letters or conference articles.

2.3. Data extraction and quality assessment

Two coauthors (WL, BYF) independently reviewed all of the titles and abstracts of the searched papers using the standard protocol. If a paper met the inclusion criteria, we chose the potentially qualified paper and examined the full text to determine whether to include it. The extracted data included the characteristics of the included studies, such as country, study design, sample size, mean age, intervention and relevant outcome. The risk of bias for randomized controlled trials (RCTs) was evaluated with the Cochrane Collaboration's Risk of Bias Tool [12]. This risk of bias tool incorporates the assessment of randomization (sequence generation and allocation concealment), blinding (participants and outcome assessors), incomplete outcome data, selective outcome reporting, and other risk of bias. The items were judged as “low risk” (+), “unclear risk” (?), or “high risk” (−). The Newcastle-Ottawa Scale [13,14], which contains the assessment of selection (exposed cohort, noexposed cohort, ascertainment of exposure, outcome of interest), comparability and outcome (assessment of outcome, length of follow-up, adequacy of follow-up), was used to evaluate the quality of observational studies, including retrospective controlled studies and prospective cohort studies. A higher overall score indicates a lower risk of bias and a score of 5 or less (out of 9) corresponds to a high risk of bias.

2.4. Statistical analysis

RevMan statistical software, version 5.1 (Cochrane Collaboration, http://ims.cochrane.org/revman) was used to analyze the included study data. The Cochrane Handbook's Q test and I^2 statistic were used to determine the heterogeneity among the studies. If there was significant heterogeneity ($P<0.05$, $I^2>50\%$), random-effect models were used. Otherwise, fixed-effect models were applied if there was no significant heterogeneity ($P \geq 0.05$, $I^2 \leq 0\%$). Relative risks (RRs) and 95% confidence intervals (CIs) were calculated for dichotomous variable.

3. Result

3.1. Search results

A total of 1329 records were identified through computerized database searching, and 1215 duplicate records were removed. After reviewing the titles and abstracts of 114 records, 106 obviously irrelevant records were excluded. A total of 8 full-text articles were assessed for eligibility, and 1 full-text article was excluded because it failed to meet the predefined standard protocol. Finally, two RCTs [15,16] and 5 observational studies [9,17–20] that satisfied the inclusion criteria were included in our study. Six of the included studies had sufficient data for meta-analysis [9,12–15,17]. A detailed study flow diagram is shown in Fig. 1.

3.2. Characteristics of included studies

The characteristics of the 7 included studies are presented in Table 1. These studies, including 2 RCTs [15,16] and 5 observational studies (4 retrospective studies [9,17,19,20] and 1 prospective study [18]), were published from 2009 to 2015. The CuTS patients were treated with EISD or OISD. Although in Bolster's study [9], control group patients underwent a minimally invasive technique using an illuminated speculum, we still considered it OISD. The total sample size was 537: 293 patients in the EISD group and 244 patients in the OISD group. The studies were conducted in the Netherlands [9], America [19], France [20], Germany [16,17] and Australia [18]. The last follow-up duration of the trials ranged from 6 to 139.2 months. The clinical outcomes of the studies were evaluated mainly based on Bishop score, satisfaction with results and complications. Bishop's rating scale, which is defined as poor (0–2), fair (3–4), good (5–7) and excellent (8–9), was used to evaluate postoperative outcomes, and it consists of measurements, including patient satisfaction, overall improvement, severity of residual symptoms, work status, strength and sensibility [21].

3.3. Methodological assessment of study quality

Methodological quality assessment of the 7 included studies is presented in Fig. 2, Fig. 3 and Table 2. Because Heikenfeld's and