Updated systematic review and meta-analysis of the comparative data on colposuspensions, pubovaginal slings, and midurethral tapes in the surgical treatment of female stress urinary incontinence


CRD summary
This review compared midurethral tapes with other surgical treatments for stress urinary incontinence in women. It concluded that treatment with retropubic tape had slightly higher continence rates than bladder neck suspension surgery, was similar in effectiveness to pubovaginal slings, and had slightly higher continence rates than transobturator tapes. Due to poor trial quality, these conclusions should be interpreted with caution.

Authors' objectives
To update a previous review and evaluate the effectiveness, complication and reoperation rates of midurethral tapes compared with other surgical treatments for female stress urinary incontinence.

Searching
MEDLINE, SCOPUS, Web of Science, EMBASE and Cochrane Database of Systematic Reviews were searched for relevant studies. Search terms were reported. No language restrictions were applied. The reference list of a relevant Cochrane Review was searched for further studies of relevance.

Study selection
Randomised controlled trials that provided outcome data (including continence rates, satisfaction rates and complication rates) following the use of midurethral slings to treat stress urinary incontinence in women were eligible for inclusion. It appeared that trials comparing midurethral tapes with other types of procedure (such as Burch colposuspension/bladder neck suspension and pubovaginal slings) were included, as were trials that compared different types of midurethral tape.

In included trials, the main outcomes were objective continence and subjective continence (definitions provided for both); the measures to assess outcomes varied widely among the included trials.

Three reviewers assessed papers for inclusion. Disagreements were resolved by discussion.

Assessment of study quality
Trial quality was assessed using the Jadad scale. Trials were assigned a quality score (up to a maximum of 5 points) based the appropriateness of randomisation and blinding procedures, whether randomisation or double-blinding was used, and whether sufficient description of patient drop-outs was provided. Trials that achieved a score of 3 or more points were considered high quality.

The number of reviewers who performed the quality assessment was not reported.

Data extraction
Data required to calculate odds ratios (ORs) with 95% confidence intervals (95% CIs) for dichotomous outcomes, or mean differences with 95% confidence intervals for continuous outcomes, were extracted for a range of outcomes relating to cure rates and complications.

The number of reviewers who performed the data extraction was not reported.

Methods of synthesis
Continuous outcomes and dichotomous outcomes (both with 95% confidence intervals) were pooled using fixed-effect models where no statistically significant heterogeneity was identified using a $\chi^2$ test ($p \geq 0.10$). It appeared that outcomes with statistically significant heterogeneity were pooled using a random-effects model.
Sensitivity analyses were performed to assess the effect of study quality on outcomes by only including studies achieving at least three points out of five using the Jadad scale.

Publication bias was assessed by visual inspection of a funnel plot.

**Results of the review**

Thirty-nine RCTs (number of patients not reported) were included in the review. Jadad scores ranged from 0 to 3; zero was the mode score. Fourteen trials were published as abstracts only. Twelve trials were rated as high quality. Duration of follow-up ranged from three months to 64.8 months (where reported).

**Midurethral tape versus Burch colposuspension RCTs:** There was a statistically significant pooled difference in overall cure rates (OR 0.61, 95% CI 0.46 to 0.82; \(I^2=17.3\%\); 11 RCTs; n=1,195 women) and objective cure rates measured by the negative test (OR 0.38, 95% CI 0.25 to 0.57; \(I^2=36.7\%\); three RCTs; n=528 women) that favoured midurethral tape over colposuspension. However, there were no statistically significant differences for objective cure rates based on negative pad tests (three RCTs; n=310 women; \(I^2=51.6\%\)) or subjective cure rates (four RCTs; n=400 women; \(I^2=0\%\)). There was a pooled statistically significant higher risk of bladder or vaginal perforation with midurethral tapes than with colposuspension (six RCTs), but no statistically significant differences for other complications.

**Midurethral tape versus pubovaginal slings RCTs:** There were no statistically significant pooled differences between treatments for overall cure rates (six RCTs) or subjective cure rates (two RCTs). There were statistically significant differences for complications. The risk of bladder perforation was statistically significant lower for slings than tape (OR 2.32, 95% CI 1.05 to 5.10; six RCTs). However, tape had a statistically significant lower risk of storage lower urinary tract symptoms (OR 0.31, 95% CI 0.10 to 0.94; three RCTs) and reoperation rates (OR 0.31, 95% CI 0.12 to 0.82; five RCTs) than slings. There were no statistically significant differences between the two treatments for haematoma (four RCTs) or voiding lower urinary tract symptoms (three RCTs).

**Retropubic tape versus transobturator tape RCTs:** There were no statistically significant pooled differences between the two types of tape for overall cure rate (nine RCTs) or subjective cure rate (12 RCTs). There was a statistically significant pooled difference that favoured retropubic over transobturator tape for objective cure rate (OR 0.80, 95% CI 0.65 to 0.99; 22 RCTs; n=3,186 women); this difference was more pronounced in the subgroup of trials that compared tension-free vaginal tape with in-out transobturator tape (11 RCTs), but not statistically significant in other subgroups. There were significantly more bladder or vaginal perforations (OR 2.39, 95% CI 1.32 to 4.32; \(I^2=40.5\%\); 27 RCTs), haematoma (OR 2.62, 95% CI 1.35 to 5.08; \(I^2=0\%\); 19 RCTs), and storage lower urinary tract symptoms (OR 1.35, 95% CI 1.05 to 1.72; \(I^2=0\%\); 19 RCTs) after placement of retropubic tape compared with transobturator tape. However, transobturator tape was associated with higher rates of vaginal erosion (OR 0.64, 95% CI 0.41 to 0.97; \(I^2=0\%\); 25 RCTs). No statistically significant differences were identified for urinary tract infection (13 RCTs), voiding lower urinary tract symptoms (eight RCTs), re-catheterisation (16 RCTs) or reoperation rates (16 RCTs).

**Sensitivity analyses:** Sensitivity analyses compared the pooled results of all trials with higher quality trials. The direction and/or statistical significance of results were only affected in a few analyses (results reported in the paper).

**Publication bias:** Funnel plots were symmetrical, giving little evidence of publication bias.

**Authors' conclusions**

Patients treated with retropubic tape had slightly higher continence rates compared with Burch colposuspension, but had a higher risk of intraoperative complications. Midurethral tape and pubovaginal slings were similar in effectiveness, but lower urinary tract infection was more likely following pubovaginal slings. Retropubic tape was associated with slightly higher objective continence rates than transobturator tapes, but had higher risks of bladder and vaginal perforation and storage lower urinary tract symptoms, and a similar subjective cure rate.

**CRD commentary**

This review addressed a clear research question. The study selection criteria were generally clear, although the outcomes of interest could have been specified more precisely. More than one relevant database plus additional sources were searched, with no language restrictions applied, which reduced the risk of publication and language bias. The number of reviewers involved in the study selection was reported, but the number involved at other stages was not, so the risk of reviewer error and bias could not be ruled out.
Trial quality was assessed using a standard instrument; this indicated that most trials were of poor quality, so the risk of bias may be substantial. However, sensitivity analyses that only included higher quality trials did not substantially alter the results. A large number of included trial details were reported in both the paper and associated online appendix, which increased the review transparency. The method of synthesis appeared appropriate and thorough, although the large number of outcomes reported opened up the possibility of producing spuriously statistically significant results. However, due to the poor quality of the included trials, the authors' conclusions should be interpreted with caution.

One author disclosed financial links with Ethicon (manufacturers of suburethral slings).

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further research with standardised outcome measures, better handling of missing data, follow-up durations of at least five years, and consensus of clinical definitions of 'cures' are needed.

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