Meta analysis of non-penetrating trabecular surgery versus trabeculectomy for the treatment of open angle glaucoma

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CRD summary
This review found that traditional trabeculectomy reduced the intra-ocular pressure and had a higher success rate than non-penetrating trabeculectomy, but non-penetrating trabecular surgery had fewer postoperative complications. Given the small samples, the unclear quality of the trials, and limitations in the conduct and reporting of the review, the authors' conclusions may not be reliable.

Authors' objectives
To compare the effectiveness of non-penetrating trabecular surgery and trabeculectomy, for the treatment of open-angle glaucoma.

Searching
The Cochrane Library, PubMed (1966 to 2009), EMBASE (1980 to 2009), and CBM (1979 to 2009) were searched for studies published in English or Chinese. Some search terms were presented. Reference lists of retrieved articles were examined.

Study selection
Randomised controlled trials (RCTs) that compared non-penetrating trabecular surgery with trabeculectomy, for patients who were clinically diagnosed with open-angle glaucoma and who had not responded to medical treatment, were eligible for inclusion. Trials were excluded if they included patients with recurrent disease. The main outcomes were intra-ocular pressure reduction, rate of success (defined as well-controlled intra-ocular pressure without antihypertensive treatment, and intra-ocular pressure of 21mmHg or less), and postoperative complications.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality
Trial quality was assessed using the Cochrane Risk of Bias tool. The included trials were graded as A (low risk of bias), B (moderate risk of bias), or C (high risk of bias).

Two reviewers independently assessed trial quality. Any disagreements were resolved by consensus.

Data extraction
The data were extracted to calculate mean differences, and their 95% confidence intervals.

The authors did not state how many reviewers were extracted the data.

Methods of synthesis
Pooled mean differences, were calculated using a fixed-effect model, where there was no evidence of heterogeneity, or otherwise, a random-effects model. Heterogeneity was assessed using $X^2$ and $I^2$. Where there was heterogeneity and its source could not be identified, a narrative summary was provided. Publication bias was assessed using funnel plots.

Results of the review
Nine RCTs were included in the review (216 patients, 432 eyes; range 10 to 39 eyes per group). All trials were graded B for bias; most could not be blinded. Evidence of publication bias was not observed. Follow-up for the assessment intra-ocular pressure, after operation, ranged from three months to 36 months.

Compared with non-penetrating trabecular surgery, traditional trabeculectomy was more effective in reducing intra-ocular pressure 12 months after operation (MD 2.83, 95% CI 1.91 to 3.74; $I^2$=0; 316 eyes; six RCTs), and at the end of follow-up (MD 2.12, 95% CI 1.28 to 2.97; $I^2$=0; 362 eyes; seven RCTs).
The results for the rate of success were presented, but there appear to be errors in the analysis, so they are not reported here. The data from eight trials suggested that non-penetrating trabecular surgery had fewer postoperative complications, than trabeculectomy; no meta-analysis was performed due to substantial heterogeneity.

Authors' conclusions
Compared with non-penetrating trabeculectomy, traditional trabeculectomy reduced the intra-ocular pressure, and had a higher success rate. Non-penetrating trabecular surgery was associated with fewer postoperative complications.

CRD commentary
The review question and inclusion criteria were clear. Relevant sources were searched, but unpublished trials, and those in languages other than English or Chinese, were not sought so relevant trials may have been missed. Appropriate methods to reduce reviewer error and bias were used for quality assessment, but it was unclear whether similar methods were used for study selection and data extraction.

The included trials were quality assessed, but only the overall grade and a few details were reported, making it difficult to fully assess the quality of the trials. Most trials were not blinded, so had some risk of bias. The trial data were combined in meta-analyses, but there appear to have been some errors in their reporting.

Given the small samples, the unclear quality of the included trials, and limitations in the conduct and reporting of the review, the authors' conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that trials with longer follow-up were needed to investigate the effects of non-penetrating trabecular surgery on the progression of visual field defect, and to investigate the cost-effectiveness of surgery.

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