Steroid injection in addition to macular laser grid photocoagulation in diabetic macular oedema: a systematic review

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CRD summary
This review found that steroid injection before macular laser grid photocoagulation did not improve visual acuity in patients with diabetic macular oedema of the eye. The authors’ conclusions reflected the findings of the review, but the small number, size and poor quality of included trials and some limitations of the review methods may limit the reliability of these findings.

Authors' objectives
To evaluate the effects of steroid injection (triamcinolone) in addition to macular laser grid photocoagulation versus photocoagulation alone on visual acuity in patients with diabetic macular oedema.

Searching
PubMed, EMBASE and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched to October 2008. Search terms were described. References of selected studies and other relevant articles were checked. Only articles in English, German or Dutch were included.

Study selection
Studies that compared the effectiveness of ocular steroid (triamcinolone) followed by macular laser grid photocoagulation versus macular laser grid photocoagulation alone in patients with diabetic macular oedema were eligible for inclusion. The time between steroid injection and macular laser grid photocoagulation was required to be sufficient to reduce oedema before the photocoagulation procedure. The outcomes of interest were improvement in visual acuity and reduction of central foveal thickness.

Steroid injection was intravitreal in two trials and in the posterior subtenon in the other. Steroid doses ranged from 4 to 20mg; the time between steroid injection and macular laser grid varied from one week to three months.

Two reviewers independently screened studies for inclusion.

Assessment of study quality
The design and methods of trials were independently appraised by two authors. Specifically, the design was assessed for randomisation and allocation concealment, standardisation of repeat treatments, standardisation and blinding of outcome assessments, and completeness of follow-up at six months.

Data extraction
The means and standard deviations reported for best corrected visual acuity and central foveal thickness at baseline and six months were extracted by two authors. Visual acuity was calculated as logarithm of minimal angle of resolution (logMAR).

Methods of synthesis
The mean and standard deviation of the visual acuity and central foveal thickness for the steroid and control groups at baseline and six months were tabulated by trial. Between-group differences and 95% confidence intervals (CIs) were also reported.

Results of the review
Three clinical trials were included (146 eyes treated, range 31 to 73 eyes). Two of the trials fully met randomisation criteria, but was only met partially by one trial. All three trials reported loss to follow-up. Two trials fully met criteria for standardisation. One trial reported blinded outcome measurement. One trial did not give repeat treatments.

One trial reported a significantly beneficial effect of steroid injection before macular laser grid photocoagulation on
visual acuity (-0.21 logMAR units, 95% CI -0.35 to -0.07). However, two trials reported that there was no significant effect of steroid pre-treatment on visual acuity (-0.02 logMAR units, 95% CI -0.19 to 0.15; -0.02 logMAR units, 95% CI -0.13 to 0.09).

In all three trials, there were significant reductions of central foveal thickness in eyes pre-treated with steroids. The reductions in thickness were -93µm (95% CI -153 to -32, as reported in table 4), -81 µm (95% CI -148 to -14) and -64µm (95% CI -128 to 0).

Authors’ conclusions
Although there was a greater reduction in central foveal thickness in eyes pre-treated with steroids before macular laser grid photocoagulation, this did not consistently result in higher visual acuity. The literature search did not provide sufficiently strong evidence to recommend steroid injection before macular laser grid photocoagulation in diabetic macular oedema.

CRD commentary
The review question was defined but the inclusion criteria with regard to the type of steroid and study design were unclear. The search strategy seemed appropriate, but the limitation to trials published in English, Dutch and German may have resulted in a language bias. As there was no description of methods used to identify unpublished studies (publication bias was not investigated), this may have been an additional bias in the review. Two authors selected studies, assessed validity, and extracted data, although it was not clear how differences were resolved.

The criteria used to assess trial quality seemed appropriate, although the standardisation criteria were not defined. The quality of the included trials may have also resulted in a biased estimate of effect. One of the trials was not fully randomised and outcome assessment was not blind in two trials. Information on the characteristics of included trials was limited. The methods used to synthesise outcome data appeared acceptable. The authors did not report why meta-analysis was not used or how heterogeneity was assessed.

The authors’ conclusions reflected the findings of the review, but the small number and size of included trials, potential for language and publication bias, limited reporting of quality criteria in included trials, and a narrative synthesis of the literature may limit the reliability of these findings.

Implications of the review for practice and research
Practice: The authors stated that there is not sufficiently strong evidence to recommend steroid injection before macular laser grid photocoagulation in diabetic macular oedema.

Research: The authors stated that a large high-quality randomised trial is likely to add to the body of evidence on the adjunctive role of triamcinolone injection prior to macular laser grid photocoagulation in cystoid macular oedema.

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