Primary care screening for ocular hypertension and primary open-angle glaucoma: evidence synthesis

Fleming C, Whitlock E, Beil T, Snit B

CRD summary
This review was severely limited by a paucity of data. No studies of screening were identified. Treatment studies indicated that interventions to lower intraocular pressure may delay progression in some individuals, but also carry an increased risk of cataract development. The authors appropriately concluded that large, population-based screening studies are needed to assess the effectiveness of early detection and treatment.

Authors' objectives
To assess the effectiveness of screening for and treating early asymptomatic primary open-angle glaucoma (POAG).

Searching
MEDLINE was searched from 1994 to January 2004; the search strategies were reported in full. In addition, the Cochrane Library was searched, field experts were contacted, and the bibliographies of retrieved articles were examined. The electronic search was restricted to studies reported in the English language.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) of 'good' or 'fair' quality were eligible for inclusion. Where no RCTs of treatment were identified, observational and case-control studies were eligible for inclusion. Studies evaluating treatment effects had to have a follow-up greater than 2 years.

Specific interventions included in the review
Studies evaluating the effectiveness of screening, performance of screening tests, or effectiveness of treatments for early POAG were eligible. Studies included both surgical and medical treatment options. No studies of the effectiveness or diagnostic performance of screening were identified.

Reference standard test against which the new test was compared
Studies assessing the diagnostic accuracy of screening tests had to use the 'gold' standard as control to be eligible for inclusion in the review. However, none were identified.

Participants included in the review
Studies of people with early POAG or raised intraocular pressure (IOP) (at risk of POAG) were eligible for inclusion in the review of the effectiveness of treatment. Studies of unselected populations relevant to primary care were eligible for inclusion in the review of the effectiveness and diagnostic performance of screening. The mean age of the participants in treatment studies, where reported, ranged from 55 to 68 years (the remaining study reported a median age of 67 years).

Outcomes assessed in the review
Studies reporting mass screening or a health outcome, including adverse events, were eligible for inclusion. A variety of outcome measures quantifying the progression of POAG were used in the included studies: e.g. visual field loss, changes to the optic disc, changes in visual acuity, and changes in IOP or the medication used to control IOP. Development of POAG was also used as an outcome measure.

How were decisions on the relevance of primary studies made?
Two reviewers reviewed titles and abstracts of all potentially relevant articles for inclusion.
Assessment of study quality
Two reviewers assessed and graded the methodological quality of the included studies using U.S. Preventive Services Task Force criteria. These criteria assess adequacy of randomisation, baseline comparability of the treatment and control groups, loss to follow-up, objectivity of outcome assessment or blinding of assessors, appropriateness of analytical methods, and use of intention-to-treat analysis.

Data extraction
Two reviewers extracted relevant information from the included studies. For studies of treatment, event rates (including adverse effects of treatment) in the treatment and control groups were extracted.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
Differences between the studies were discussed in the text.

Results of the review
One RCT (n=1,636) of the treatment of IOP to prevent POAG was included. Two RCTs (n=400) of the treatment of early POAG to prevent progression were included. Three further RCTs (n=1,469) comparing different treatment options to prevent the progression of POAG were included. No studies of the effectiveness or diagnostic accuracy of screening were included.

No RCTs of population screening for POAG were identified. No studies of the diagnostic performance of screening tests for POAG were identified either.

Prevention of POAG (one 'good quality' study; n=1,636).
Treatment of patients with raised IOP, using topical medications, reduced the occurrence of POAG at the 5-year follow-up in comparison with no treatment (hazard ratio 0.40, 95% confidence interval, CI: 0.27, 0.59, p<0.0001; number-needed-to-treat, NNT 19.6).

Treatment of early POAG (5 studies).
One 'good quality' trial (n=255) showed that treatment with argon laser trabeculoplasty and topical medication reduced POAG progression (based on new visual field loss and/or optic disc deterioration) after a median follow-up of 6 years compared with no treatment (absolute risk reduction 17%, p=0.007; NNT 5.9, 95% CI: 4.3, 14.3). A second 'fair-quality' trial (n=145), comparing surgery and topical medication with no treatment, found no significant difference (based upon worsening or development of visual field defects) at the 5-year follow-up. This second trial also found a higher rate of visual acuity loss due to cataracts in treated patients (p=0.0011).

Three further studies comparing different treatment options found no significant differences in visual field loss or visual acuity.

Authors' conclusions
Treatment to lower IOP may delay progression of visual field defects in some patients with asymptomatic, early POAG. Further studies of population screening are needed to determine whether early detection and treatment of POAG is effective in improving vision outcomes and health-related quality of life.

CRD commentary
This review attempted to address a number of clearly stated research questions driven by the analytical framework;
however, its ability to reach conclusions was severely limited by the available data. The inclusion criteria specified for the review were somewhat broad. The literature search was of limited scope and was restricted to English language reports; relevant data might therefore have been missed, which is of particular concern given the paucity of data in this area. The review process included measures to minimise the introduction of error and bias, and the methodological quality of the included studies was assessed using relevant criteria.

Details of the included studies, including the quality assessment, were clearly presented in the report, thus aiding interpretation of the results. Given the available data, the decision to use a narrative synthesis was appropriate and its presentation was reasonable. Overall, the review appears to be well-conducted and the authors' conclusions are appropriately cautious.

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

Practice: The potential benefits of treating early POAG or raised IOP should be weighed against the potential harms, particularly the increased risk of cataract.

Research: Population-based trials of screening for and treatment of early POAG, using visual and quality-of-life outcomes, are needed to determine whether early detection and treatment is beneficial. Because of their increased risk of glaucoma, trials should include sufficient black participants to detect potential subgroup specific effects.

**Funding**

Agency for Healthcare Research and Quality, contract number 290-02-0024.

**Bibliographic details**


**Original Paper URL**

http://www.ahrq.gov/clinic/uspstf05/glaucoma/glaucsyn.pdf

**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by CRD

**MeSH**

Diagnostic Techniques, Ophthalmological; Glaucoma, Open-Angle /diagnosis; Intraocular Pressure; Mass Screening /methods; Ocular Hypertension /diagnosis /methods; Primary Health Care /methods; Tonometry, Ocular /methods; Vision Screening /methods

**AccessionNumber**

12005008546

**Date bibliographic record published**

30/04/2008

**Date abstract record published**

16/05/2008
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.