

Primary angle closure glaucoma - early lens extraction beneficial and likely to be cost-effective

Key findings:

- Compared with standard care for individuals with primary angle closure or primary angle closure glaucoma, early lens extraction resulted in improved health status, lower intraocular pressure, and lower reliance on medication over 36 months.
- Early lens extraction generated an additional cost of £14,284 per extra QALY gained at 36 months.
- Based on extrapolation modelling, early lens extraction may be cost saving to the health service over 10 years.

What was the research addressing?

Glaucoma is an age-related and chronic eye disease typically associated with increased eye pressure and progressive optic nerve damage that may lead to blindness if untreated. According to the World Health Organization glaucoma is the leading cause of irreversible blindness worldwide.¹

There are two major types of glaucoma: open or closed angle glaucoma. Although primary open angle glaucoma (POAG) is more prevalent, primary angle closure glaucoma (PACG) is more severe and more likely to result in irreversible blindness. The global prevalence of angle closure glaucoma is just over 20 million, and is expected to rise to 34 million by 2040.²

For many years, angle-closure glaucoma has been treated primarily with laser iridotomy to open tiny holes in the iris of the eye, and eye drops are often required as an adjunct to further reduce the intraocular pressure (IOP). If treatments do not sufficiently reduce the IOP, then glaucoma surgery (e.g. trabeculectomy) is indicated.

Since the lens of the eye plays an important role in the development of PACG, it has been hypothesised that early lens extraction by phacoemulsification may improve control of IOP and thus reduce the need for medications and subsequent glaucoma surgery. The EAGLE trial was conducted to assess the clinical and cost-effectiveness of early lens extraction compared with standard care in individuals with primary angle closure (PAC) or PACG (ISRCTN 44464607).³ This briefing focusses on the results and implications of the economic evaluation.

What this research adds

The EAGLE trial is the first study to assess the clinical and cost-effectiveness of early clear-lens extraction as a first-line treatment option for primary angle closure glaucoma. The economic analysis is based on randomised data collected prospectively (to 36 months) for 285 participants recruited from 22 healthcare centres

across the UK. The pragmatic nature of the trial combined with adequate randomisation and intention to treat principles add robustness and generalisability to the findings.

Methods

The EAGLE trial recruited 419 individuals with newly diagnosed PAC or PACG from 30 centres across the UK and six other countries. The economic analysis adopted a UK health and social care perspective and was based on data from 285 participants recruited from 22 centres across the UK: 145 randomised to lens extraction and 140 randomised to standard care. At each site, patients in the treatment group underwent phacoemulsification and intraocular lens implant within 60 days of randomisation, and those who were randomised to standard care were managed with laser peripheral iridotomy (standard practice). For patients with both eyes eligible, the worst eye (or the patient's choice if both eyes were equally affected) was designated the index eye and underwent treatment first. It was specified that second eligible eyes should receive the same intervention as the index eye within 60 days. Other subsequent treatments in both eyes (e.g. medical therapy, laser peripheral iridoplasty and glaucoma surgery) were recorded to 36 months post-randomisation. Resource use and health related quality of life data were collected at baseline, 6, 12, 24 and 36 months. The primary economic outcome was the incremental cost per quality-adjusted life year (QALY) gained at three years, with QALYs assessed using participant responses to the EQ-5D (3-level).⁴ A Markov model was developed to extrapolate the cost-effectiveness data over a 5-year and 10-year time horizon.

Research findings

Clear-lens extraction demonstrated greater efficacy compared to standard care and resulted in increased costs to the health service of £981 (95% CI 612–1317) for a corresponding mean QALY gain of 0.069 (–0.017 to 0.159); incremental cost-effectiveness ratios was £14,284 per additional QALY generated at three years follow-up.^{5,6} Accounting for uncertainty in the estimated additional costs and effects, early lens extraction had a 67%–89% chance of being cost-effective at three years assuming decision makers are willing to pay £20,000 to £30,000 per additional QALY gained. Using a decision model to extrapolate longer-term cost-effectiveness. Early lens extraction may be cost-saving over a ten year time horizon if the observed trend for an increased need for glaucoma surgery in the standard care group continues.⁶

Policy relevance of the research findings

Early lens extraction may offer a cost-effective approach to treatment in patients with newly diagnosed PAC or PACG. Further randomised studies would help to confirm these findings, and longer term follow-up of patients enrolled in this study should help to verify the model-based extrapolations.

References

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For further information see the main clinical effectiveness and cost-effectiveness papers:

Azuara-Blanco A, Burr J, Ramsay C, Cooper D, Foster P, Friedman DS, Scotland G, Javanbakht M, Cochrane C, Norrie J. The effectiveness of early lens extraction for the treatment of primary angle-closure glaucoma: a randomised controlled trial (EAGLE). *Lancet* 2016; 388(10052): 1389–1397.

Javanbakht M, Azuara-Blanco A, Burr J, Ramsay C, Cooper D, Cochrane C, Norrie J, Scotland G. Early lens extraction with intraocular lens implantation for the treatment of primary angle closure glaucoma: An economic evaluation based on data from the EAGLE trial. *BMJ Open*;6:e013254.

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