

Fourteen-year outcome of angle-closure prevention using laser iridotomy in the randomized controlled Zhongshan angle-closure prevention study

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Primary angle-closure glaucoma (PACG) is one of the most blinding forms of glaucoma. Eyes considered to have primary angle-closure suspect (PACS) may benefit from laser peripheral iridotomy (LPI), which will prevent future primary angle closure (PAC). The Zhongshan angle-closure prevention study was a single-center clinical trial in which eyes with PACS were randomized alternately into an LPI group and a control group. The study results demonstrated a 50% reduction in the 6-year risk of PAC progression in the LPI group.

In this study, all participants were followed for 14 years to evaluate the level of risk reduction following LPI and determine the natural course of PACS as well as the risk factors for its progression.

Initially, 11,991 subjects aged 50-70 years were screened for PACS. The inclusion criteria were pigmented trabecular meshwork visible for $<180^\circ$ on gonioscopy, no peripheral angle synechiae, intraocular pressure (IOP) of ≤ 21 mmHg, no corneal opacity, visual acuity $>20/40$, and no previous intraocular surgeries, penetrating ocular trauma, or acute angle closure. Patients with a positive darkroom provocative test (IOP elevation >15 mmHg) were excluded.

The association between LPI intervention and PAC occurrence was evaluated using univariate and multivariate Cox proportional hazards regression models considering both time and events between LPI-treated and control eyes. Univariate and multivariate logistic

models were built to predict the risk factors for PAC in both the LPI-treated and control eyes during the 14-year follow-up.

In the LPI-treated group, the risk of progression to PAC reduced by 69% (hazard ratio: 0.31; 95% CI: 0.21-0.46). At the 14-year follow-up, these eyes exhibited a larger angle width, and deeper limbal anterior chamber depth (LACD) than the control eyes. However, they had higher IOP and more advanced cataract than controls. A higher baseline IOP and shallower LACD significantly increased the risk of PAC in all the eyes. In addition, limbal anterior chamber depth and lesser IOP elevation after provocative tests were associated with the risk of developing PAC in the control and LPI groups, respectively.

Although limited by the exclusion of high-risk patients, drop-outs, lack of analysis of other potential risk factors and limited to a specific population, this controlled clinical trial had the longest follow-up of patients with LPI-treated PACS. The study results demonstrated that LPI reduced the long-term risk of PAC by approximately two-thirds. Furthermore, it determined that a high baseline IOP, minimal IOP elevation after darkroom provocative test, and anterior chamber depth were risk factors for progression to PAC. Nevertheless, future studies that include prediction models with other potential risk factors and different populations are required to guide clinical practice.

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Article reference of the review

Yuan Y, Wang W, Xiong R, Zhang J, Li C, Yang S, et al. Fourteen-Year Outcome of Angle-Closure Prevention with Laser Iridotomy in the Zhongshan Angle-Closure Prevention Study: Extended Follow-Up of a Randomized Controlled Trial. *Ophthalmology*. 2023 Apr 6;S0161-6420(23)00201-4.

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