Complete Summary

GUIDELINE TITLE

Primary angle closure.

BIBLIOGRAPHIC SOURCE(S)

Glaucoma Panel, Preferred Practice Patterns Committee. Primary angle closure. San Francisco (CA): American Academy of Ophthalmology (AAO); 2005. 23 p. [102 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Academy of Ophthalmology (AAO). Primary angle closure. San Francisco (CA): American Academy of Ophthalmology (AAO); 2000. 20 p.

All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant and updated accordingly. To ensure that all Preferred Practice Patterns are current, each is valid for 5 years from the "approved by" date unless superseded by a revision.

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SCOPE

DISEASE/CONDITION(S)

- Anatomic narrow angle (primary angle-closure suspect)
- Primary angle closure and primary angle-closure glaucoma, including acute and chronic

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Treatment

CLINICAL SPECIALTY

Ophthalmology

INTENDED USERS

Health Plans
Physicians

GUIDELINE OBJECTIVE(S)

To preserve visual function and maintain quality of life by preventing or treating primary angle-closure (PAC) by addressing the following goals of therapy:

- Identify those patients who are at risk of developing primary angle-closure or in whom it is present.
- Manage an acute attack of angle closure.
- Determine if a mechanism other than pupillary block (e.g., rubeosis iridis, plateau iris syndrome, aqueous misdirection, choroidal effusion, large and intumescent or anteriorly subluxed lens) is present.
- Reverse or prevent angle closure by using laser iridotomy or, if necessary, incisional iridectomy to alleviate pupillary block.
- After iridotomy, determine by gonioscopy if there is residual angle closure.
- Observe patients for chronic intraocular pressure (IOP) elevation, progression of synechial angle closure, or optic nerve damage, and manage as indicated.
- Minimize the side effects of management and their impact on the patient's vision, general health, and quality of life.
- Evaluate the fellow eye for evidence of angle closure or an anatomic narrow angle.
- Educate and involve the patient in the characteristics and management of the disease.

TARGET POPULATION

Individuals of all ages who have risk factors for pupillary block or clinical findings that suggest pupillary block

INTERVENTIONS AND PRACTICES CONSIDERED

1. Comprehensive ophthalmologic evaluation with the addition of, or special attention to, those factors that particularly bear upon the diagnosis, course, and treatment of primary angle closure

2. Systemic and ocular history, and physical examination, including assessment of refractive status and pupil, external examination, determination of intraocular pressure (IOP), slit-lamp biomicroscopy, gonioscopy, evaluation of the fundus and optic nerve
3. Medical therapy (topical alpha$_2$ -adrenergic agonists, topical beta-adrenergic antagonists, topical or systemic carbonic anhydrase inhibitors, topical miotics, systemic hyperosmotic agents)
4. Surgical treatment (laser iridotomy, incisional iridectomy, prophylactic iridotomy of the fellow eye)
5. Pre- and post-operative care for patients facing laser iridotomy or incisional iridectomy
6. Low-vision and social services referral
7. Follow-up evaluation

MAJOR OUTCOMES CONSIDERED

- Visual function
- Quality of life

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In the process of revising this document, a detailed literature search of MEDLINE for articles in the English language was conducted on the subject of primary angle closure (PAC) for the years 1999 to 2004.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Ratings of Strength of Evidence:

- Level I provides strong evidence in support of the statement. The design of the study allowed the issue to be addressed, and the study was performed in the population of interest, executed in such a manner as to produce accurate and reliable data, and analyzed using appropriate statistical methods. The study produced either statistically significant results or showed no difference

in results despite a design specified to have high statistical power and/or narrow confidence limits on the parameters of interest.
- Level II provides substantial evidence in support of the statement. Although the study has many of the attributes of one that provides Level I support, it lacks one or more of the components of Level I.
- Level III provides a consensus of expert opinion in the absence of evidence that meets Levels I and II.

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The results of a literature search on the subject of primary angle closure were reviewed by the Glaucoma Panel and used to prepare the recommendations, which they rated in two ways. The panel first rated each recommendation according to its importance to the care process. This "importance to the care process" rating represents care that the panel thought would improve the quality of the patient's care in a meaningful way. The panel also rated each recommendation on the strength of the evidence in the available literature to support the recommendation made.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Ratings of Importance to the Care Process

Level A, most important
Level B, moderately important
Level C, relevant, but not critical

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by Council and approved by the Board of Trustees of the American Academy of Ophthalmology (September 2005).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Ratings of importance to the care process (A-C) and ratings of strength of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Diagnosis

The initial history and physical examination includes evaluation for both primary and secondary types of angle closure. This includes the appropriate components of the comprehensive adult medical eye evaluation, (Preferred Practice Patterns Committee, "Comprehensive adult medical eye evaluation," 2005) [A:III] with particular attention to those aspects relevant to the various types of angle closure.

History

Specific questioning includes asking about the use of topical or systemic medication (e.g., sulfonamides, topiramate, phenothiazines) that may induce angle narrowing and symptoms that suggest intermittent angle-closure attacks (e.g., blurred vision, halos around lights, aching eye or brow pain, eye redness). [A:III] The patient should be asked about a family history of acute angle-closure glaucoma (Leighton, 1976; Perkins, 1974; Salmon, 1999). [B:II]

Physical Examination

If acute angle closure is present, some components of the examination may be postponed. Components of the physical evaluation that are particularly relevant for the diagnosis and management of angle closure include the following.

Assessment of Refractive Status

It is important to assess refractive status, [A:III] since hyperopic eyes, especially in older patients, have narrower anterior-chamber angles (Van Herick, Shaffer, & Schwartz, 1969) and are at increased risk of primary angle closure (PAC) (Lowe, 1970).

Pupil [A:III]

- Size
- Reactivity

External Examination [A:III]

- Conjunctival hyperemia
- Corneal clarity

Slit-lamp Biomicroscopy [A:III]

- Central and peripheral anterior-chamber depth
- Anterior-chamber inflammation suggestive of a recent or current attack
- Corneal edema
- Iris atrophy, especially sector types; posterior synechiae; or mid-dilated pupil suggestive of a recent or current attack
- Signs of previous angle-closure attacks (Becker-Shaffer's Diagnosis, 1999) (e.g., peripheral anterior synechiae, segmental iris atrophy, glaukomflecken, posterior synechiae, pupillary dysfunction, irregular pupil)

Determination of Intraocular Pressure (IOP)

Intraocular pressure is measured in each eye, [A:III] preferably using a contact applanation method (typically a Goldmann tonometer) before gonioscopy. [A:III] Measuring central corneal thickness should be postponed until resolution of an acute attack (Aghaian et al., 2004). [A:III]

Gonioscopy

Gonioscopy of both eyes should be performed on all patients in whom angle closure is suspected. [A:III] This is required to evaluate the angle anatomy, appositional closure, and presence of peripheral anterior synechiae (Bhargava, Leighton, & Phillips, 1973). [A:III]

Other Components of the Initial Evaluation

Although a dilated examination may not be advisable in patients with anatomic narrow angles or angle closure, an attempt should be made to evaluate the fundus and optic nerve using the direct ophthalmoscope or biomicroscope. [A:III] For patients with PAC or narrow angle who are not in an acute attack, pupil dilation is contraindicated until iridotomies have been performed. [A:III] Evaluation and documentation of the optic nerve head, retinal nerve fiber layer, and visual fields may be postponed until an acute attack is adequately treated.

Management

Anatomic Narrow Angle (Primary Angle-Closure Suspect)

In patients with narrow angles, iridotomy should be considered in eyes regarded as at risk for developing angle closure. [A:III] Patients with narrow but open angles should be followed for development of IOP elevation, evidence of progressive narrowing, or development of synechial angle closure. [A:III]

Iridotomy may be indicated for eyes with narrow angles under one or more of the following additional circumstances: [A:III]

- Previously normal IOP is elevated.
- A potentially occludable angle is present.
- Peripheral anterior synechiae (PAS) that are attributable to episodes of angle closure are present.

- There is progressive narrowing of the angle.
- Medication is required that may provoke pupillary block.
- Symptoms are present that suggest prior angle closure.
- The patient's occupation/avocation makes it difficult to access immediate ophthalmic care (e.g., the patient travels frequently to developing parts of the world or works on a merchant vessel).
- For the fellow eye in patients who have had an attack of acute PAC (as described in the section about "acute primary angle closure" under Orientation)

Patients at risk for angle closure should be warned of the danger of taking medicines (e.g., over-the-counter decongestants, motion sickness medication, anticholinergic agents) that could cause pupil dilation and induce an angle-closure attack (Wolfs et al., 1997). [A:III] They should also be informed about the symptoms of acute angle-closure attacks and instructed to notify their ophthalmologist immediately if symptoms occur (Wilensky et al., 1993). [A:III]

Acute Primary Angle Closure

The definitive treatment for acute PAC is surgical, either by means of laser iridotomy or incisional iridectomy if a laser iridotomy cannot be successfully performed (Saw, Gazzard, & Friedman, 2003; "Laser peripheral iridotomy," 1994). [A:III] In acute angle-closure attacks, medical therapy is usually initiated first to lower the IOP to reduce pain and clear corneal edema in preparation for iridotomy. [A:III]

Medical therapy includes some or all of the following, based on the patient's overall physical and medical status:

- Topical beta-adrenergic antagonists
- Topical alpha$_2$-adrenergic agonists
- Topical or systemic carbonic anhydrase inhibitors
- Topical miotics
- Systemic hyperosmotic agents

Laser iridotomy is the preferred surgical treatment because it has a favorable risk-benefit ratio ("Laser peripheral iridotomy," 1994; Robin & Pollack, 1982; Quigley, 1982). [A:II] When laser iridotomy is not possible or if the acute angle-closure attack cannot be medically broken, incisional iridectomy remains an effective alternative. [A:III] When incisional iridectomy is required and extensive synechial closure is recognized or suspected, primary filtering surgery may be considered. Patients who require bilateral incisional iridectomy should have surgery on one eye at a time (several days apart) whenever feasible to avoid simultaneous bilateral complications. [A:III]

The fellow eye of a patient with an attack of acute PAC should be evaluated since it is at high risk for a similar event. The fellow eye should receive a prophylactic iridotomy if the chamber angle is anatomically narrow, [A:II] since approximately half of fellow eyes of acute angle-closure patients will suffer acute attacks within 5 years (Saw, Gazzard, & Friedman, 2003; Bain, 1957; Wilensky et al., 1993; Edwards, 1982; Ang, Aung, & Chew, 2000).

Chronic Primary Angle Closure

Patients with chronic PAC may have elevated IOP as a result of a chronic compromise of aqueous outflow through appositional or synechial angle closure, or damage to the trabecular meshwork from the acute angle closure. In such patients, synechial angle closure usually starts superiorly in the narrowest part of the angle and may progress circumferentially. Miotics may aggravate pupillary block due to anterior rotation of the ciliary body and, when used chronically, may increase the risk of synechial angle closure, especially if cataract formation increases lens-iris contact. Peripheral iridotomy is performed to relieve the pupillary block component and this usually halts the progression of synechial closure and progressive IOP elevation.

Surgery and Postoperative Care

The plan for care prior to and after laser iridotomy or iridectomy includes the following elements:

- At least one preoperative evaluation by the surgeon (AAO, 2003) [A:III]
- Informed consent prior to surgery ("Laser peripheral iridotomy," 1994) [A:III]
- At least one IOP check within 30 to 120 minutes following surgery (Robin, Pollack, & deFaller, 1987; Rosenblatt & Luntz, 1987; Barnes et al., 1999) [A;III]
- Use of topical anti-inflammatory agents in the postoperative period, unless contraindicated [A:III]

Preoperative miotics facilitate laser iridotomy or iridectomy. Medications should be used perioperatively to avert sudden IOP elevation, particularly for patients who have severe disease (Robin, Pollack, & deFaller, 1987). [A:III]

The ophthalmologist who performs laser iridotomy or incisional iridectomy must ensure that the patient receives adequate postoperative care (AAO, 2003). [A:III]

Follow-up evaluation should include the following elements: [A:III]

- Evaluation of the patency of iridotomy
- IOP measurement
- Gonioscopy, if it was not performed immediately after iridotomy
- Pupil dilation to decrease the risk of posterior synechiae formation
- Fundus examination as clinically indicated

Lensectomy

Numerous studies document the widely held clinical impression that lensectomry significantly widens the anterior-chamber angle in eyes with narrow/occludable angels and in angle-closure glaucoma, except in plateau iris syndrome. While there is currently insufficient evidence to recommend the use of cataract surgery in the management of PAC, it can be considered with or without goniosynechialysis.

Follow-up Evaluation

Patients with a residual open angle or a mix of open angle and some PAS after laser iridotomy who also have glaucomatous optic neuropathy should be followed as specified in the Primary Open-Angle Glaucoma, Preferred Practice Pattern (PPP) (Glaucoma Panel, Preferred Practice Patterns Committee, "Primary open-angle glaucoma," 2005) [A:III]. Patients who do not have glaucomatous optic neuropathy should be followed as specified in the Primary Open-Angle Glaucoma Suspect, Preferred Practice Pattern (Glaucoma Panel, Preferred Practice Patterns Committee, "Primary open-angle glaucoma suspect," 2005) [A:III].

Provider and Setting

The performance of certain diagnostic procedures (e.g., tonometry, perimetry, pachymetry, optic disc imaging, and photography) may be delegated to appropriately trained and supervised personnel. Most diagnostic and therapeutic procedures can be undertaken safely on an outpatient basis. Hospitalization may be indicated for intensive treatment of an acute angle-closure attack so that patients can be monitored closely after surgical procedures associated with a high risk of serious short-term postoperative complications. It may also be indicated for patients in whom surgical complications have occurred or for patients who have special medical or social needs.

Counseling/Referral

If the diagnosis or management is in question or if the condition is refractory to treatment, consultation with or referral to an ophthalmologist with specialist training or experience in managing this condition may be desirable. Patients with significant visual impairment or blindness should be referred to, and encouraged to use, appropriate vision rehabilitation and social services (AAO, 2001). [A:III]

Definitions:

Ratings of Importance to Care Process:

Level A, most important
Level B, moderately important
Level C, relevant, but not critical

Ratings of Strength of Evidence:

- Level I provides strong evidence in support of the statement. The design of the study allowed the issue to be addressed, and the study was performed in the population of interest, executed in such a manner as to produce accurate and reliable data, and analyzed using appropriate statistical methods. The study produced either statistically significant results or showed no difference in results despite a design specified to have high statistical power and/or narrow confidence limits on the parameters of interest.
- Level II provides substantial evidence in support of the statement. Although the study has many of the attributes of one that provides Level I support, it lacks one or more of the components of Level I.
- Level III provides a consensus of expert opinion in the absence of evidence that meets Levels I and II.

CLINICAL ALGORITHM(S)

An algorithm for the management of patients with acute primary angle closure is provided in the guideline document.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for most recommendations (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Overall

Prevention and appropriate treatment of primary angle closure

Specific

- *Laser iridotomy* reverses appositional angle closure, and it prevents or retards formation of primary angle closure. Timely treatment also may prevent damage to the optic nerve, trabecular meshwork, iris, lens, and cornea.
- *Peripheral iridotomy* may halt the progression of synechial closure and progressive intraocular pressure elevation.

POTENTIAL HARMS

- Complications of *laser iridotomy* include increased intraocular pressure; laser burn of cornea, lens, or retina; development of posterior synechiae; and the possible development of a ghost image in vision.
- *Miotics* may aggravate pupillary block and, when used chronically, may increase the risk of synechial angle closure, especially if cataract formation increases lens-iris contact.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- *Preferred Practice Patterns* provide guidance for the pattern of practice, not for the care of a particular individual. While they should generally meet the needs of most patients, they cannot possibly best meet the needs of all patients. Adherence to these *Preferred Practice Patterns* will certainly not

ensure a successful outcome in every situation. These guidelines should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonable directed at obtaining the best results. It may be necessary to approach different patients' needs in different ways. The physician must make the ultimate judgment about the propriety of the care of a particular patient in light of all of the circumstances presented by that patient. The American Academy of Ophthalmology is available to assist members in resolving ethical dilemmas that arise in the course of ophthalmic practice.

- Preferred Practice Patterns are not medical standards to be adhered to in all individual situations. The Academy specifically disclaims any and all liability for injury or other damages of any kind, from negligence or otherwise, for any and all claims that may arise out of the use of any recommendations or other information contained herein.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm
Personal Digital Assistant (PDA) Downloads
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Sep (revised 2005)

GUIDELINE DEVELOPER(S)

American Academy of Ophthalmology - Medical Specialty Society

SOURCE(S) OF FUNDING

American Academy of Ophthalmology (AAO)

GUIDELINE COMMITTEE

Glaucoma Panel; Preferred Practice Patterns Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

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Douglas E. Gaasterland, MD: IRIDEX -- Retainer.

Ronald L. Gross, MD: Alcon, Allergan, Ista, Merck, Pfizer -- Contract payments for research performed. Ad hoc consulting fees and reimbursement of travel expenses. Reimbursement of travel expenses for presentation at meetings or courses.

Henry D. Jampel, MD: Alcon, Pfizer -- Contribution to research or research funds. Allergan -- Financial interest in a company or companies supplying the equipment,

process, or product presented. Pfizer -- Reimbursement of travel expenses for presentation at meetings or courses.

Bruce E. Prum, Jr., MD: Alcon -- Ad hoc consulting fees and reimbursement of travel expenses. Pfizer -- Contribution to research or research funds.

Other authors have no financial interest in the equipment, process, or product presented or competing equipment, process, or product presented.

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GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Summary benchmarks for preferred practice patterns. San Francisco (CA): American Academy of Ophthalmology; 2006 Nov. 21 p.

Available in Portable Document Format (PDF) from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on November 20, 2000. The information was verified by the guideline developer on December 20, 2000. This NGC summary was updated by ECRI on January 6, 2006. The updated information was verified by the guideline developer on February 9, 2006.

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