PREAMBLE

Significance:

Glaucoma occurs in 1-2% of white people aged over 40 years, rising to 5% at 70 years and exponentially with advancing age. There is a strong racial predisposition with a prevalence of 3.9/1,000 in blacks 1 and a strong familial association with a ten fold increased risk for individuals with an affected first-degree relative. Primary open angle accounts for two thirds and normal pressure glaucoma for about a quarter of those affected 2.

In the nursing home population, glaucoma has been found to have a prevalence of up to 45% 3. Despite this very high prevalence one recent study found only 48% of residents had been screened for glaucoma by an ophthalmologist 4. On site eye examinations for screening, surveillance and monitoring are not usual practice. The burden of resulting visual loss in the elderly LTC patient can be considerable in terms of quality of life, physical and mental functioning and communication. There are no guidelines for the management of glaucoma in the nursing home from either US or Canadian professional ophthalmology organizations. Treatments tend to be based on individual practice preference and dependant on regular eye exams in the office of the ophthalmologist.

Definition, Symptoms and Risk Factors:

Glaucoma is a group of disorders characterized by progressive optic neuropathy that is often associated with increased intra-ocular pressure (IOP). All forms of glaucoma show optic nerve cupping, and peripheral visual field loss. Early open-angle glaucoma is asymptomatic, with patients experiencing symptoms only very late in the disease course. Such symptoms of glaucoma might include glare (in bright sunlight or at night) and poor contrast differentiation or inability to distinguish shapes in a poorly illuminated environment.

Primary open-angle glaucoma is the most common form, accounting for 60-70% of the cases. The level of IOP is greater than 21 mmHg. Onset is insidious with a slowly progressive course. An early symptom is decreased, peripheral vision, with central acuity preserved. Symptoms appear late in the disease. The main risk factor is raised IOP. Other risk factors include increasing age, severe myopia, black race and family history of glaucoma; hypertension, and diabetes are variably associated with glaucoma in the literature.

Acute angle closure glaucoma is a rapid and severe rise in IOP caused by physical obstruction of the anterior chamber drainage angle. Symptoms include unilateral inflammation and pain (eye or eyebrow

2 Clinical Evidence, BMJ Publishing Group, May 2002
4 Voytas J Kowalski D Wagner S Carlson A Maddens M, Eye Care in the Skilled Nursing Facility; A Pilot Study of Prevalence and Treatment Patterns of Glaucoma J AM Med Dir Assoc 2004; 5, 156-160
pain), pressure over the eye, a reddened eye, moderate pupil dilation that is non-reactive to light, a cloudy cornea, blurring and decreased visual acuity, photophobia and seeing halos around lights. Risk factors include elderly women, far-sightedness, cataract and family history. Anticholinergic medications (antidepressants, antipsychotics) can precipitate an acute episode.

Normal pressure (or low tension) glaucoma is normal IOP that is too high for an individual patient. The IOP is less than 22 mmHg but the patient shows characteristic glaucomatous optic nerve and visual field changes. Screening for elevated IOP alone is not sensitive and specific for the diagnosis of glaucoma: many patients with glaucoma do not have high IOPs. Most people with IOPs above the normal range do not have glaucoma.

**Prognosis:**

Advanced field loss is found in 20% of patients at diagnosis. Progression results in difficulty moving from a bright room to a darker room and impaired judgment of steps and kerbs. Blindness occurs from gross loss of visual field or loss of central vision. Once early field defects present, and where IOP is greater than 30 mmHg, untreated people may lose the remainder of the visual field in 3 years or less. Progression of visual field loss is slower in normal pressure glaucoma. Acute angle glaucoma leads to rapid loss of vision.

**Aims of Therapy:**

- To prevent, halt or slow progressive visual loss.
- To minimize adverse effects from treatment.
- To preserve the structure and function of the optic nerve

**Choice of Topical Treatment and Clinical Evidence:**

Randomized controlled trials (RCTs) have found that topical medical treatment reduces IOP compared with placebo. The trials with long term follow up (AGIS, NTGS, CIGTS, OHTS, EMGT) have found clear benefit in terms of protection against loss of visual field.

All of the available topical treatments are effective for reducing IOP. Choice of an agent is often prescriber preference with consideration for patient compliance (once daily versus bid-tid administration), potential systemic side effects, cost and provincial funding status, desired extent of reduction in IOP and previous therapy.

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5 Alan M. Alderman Mel P. Daly, Geriatrics 2001
PROTOCOL

Upon admission to a Continuing Care facility, the admission topical medical treatments will be continued for a maximum time of 6-8 weeks, or up to the initial care conference, during which time further information regarding the treatment history and consulting ophthalmologist will be obtained.

A. When there is a history of ophthalmology consults within the last two years, the Pharmacy Provider (PP) and/or Attending physician will contact the ophthalmologist to obtain the required information to support current drug choice - including history, if any, of side effects to beta blocker therapy (i.e. bradycardia, hypotension, bronchospasm) and to establish the treatment regimen. The prescribing physician will be asked to change to a topical beta-blocker as the first line of therapy provided there are no contraindications or history of those agents having already been tried and failed or where not tolerated.

B. In the event that there is no traceable history of care by an ophthalmologist, drug therapy will be prescribed according to the most current treatment identified at the time of admission by the patient and family and a referral for ophthalmology for examination and review of treatment will be considered.

Agents:

**Beta blocker**

(levobunolol, timolol; non-selective)

(betaxolol; beta-1 selective) Recommend using selective beta-1 blockers only when target pressure is relatively lenient & other considerations (i.e. bronchospasm) are mild contraindications only

**Adrenergic agonist**

brimonidine (Alphagan®); or LCA

**Topical carbonic anhydrase inhibitor**

brinzolamide (Azopt®); dorzolamide (Trusopt®)

dorzolamide/timolol maleate (Cosopt®); is to be substituted with single entity agents when therapy is more cost effective; (ASL-01)

**Prostaglandin receptor agonist**

latanoprost (Xalatan®); (ASL-01)

bimatoprost (Lumigan®); travoprost (Travatan®); all prostaglandin receptor agents will be auto substituted to latanoprost (Xalatan®); (ASL-01)

latanoprost/timolol maleate (Xalacom®); is to be substituted with single entity agents when therapy is more cost effective;(ASL-01)

**Oral Carbonic Anhydrase Inhibitor**

(acetazolamide)
NOTE: Low Cost Alternative (LCA) Formulary guideline applies to combination medications. When appropriate, concomitant single agent topical medications are tried prior to therapy with combination medications such as timolol + pilocarpine (Timpilo®) or timolol and latanoprost (Xalatan®), or timolol and dorzolamide (Cosopt®).

Treatment:

1. If more than one topical ophthalmic drug is being used, the drugs should be administered at least 5 minutes apart.

2. Medications can be used singly or in combination to achieve the desired IOP. It has been suggested to begin treatment with a single agent. If therapeutic failure, discontinue and try an alternate agent. If mono-therapy fails, combination therapy with two or more agents is recommended.

3. Poor compliance can inhibit therapeutic response and lead to unsuccessful treatment. In non-institutionalized older patients with cognitive and physical impairments, whose self-administration of topical therapy is not supervised, non-compliance with prescribed treatment should be considered as a possible cause for previous drug failure. Following admission to a Continuing Care facility, compliance is ensured through administration by trained staff.

4. To reduce systemic absorption, advise patient to close eye for 3-5 minutes. Systemic adverse effects are uncommon. Careful monitoring is assured by twenty-four hour nursing care. When using non-selective topical beta-blockers (i.e. timolol, levobunolol), nursing staff is reminded to monitor for bronchospasm in patients with pulmonary disease, and a reduced heart rate and hypotension in patients with cardiovascular disease. Betaxolol, a selective beta 1 receptor blocker, may be used with fewer complications in patients with mild pulmonary disease.

5. In the presence of deteriorating general health status and where the patient is judged to have only a very limited life expectancy, the need and rationale for ongoing topical therapy should be reassessed.

Acknowledgements

Dr. Karen Verstraten, (Calgary)
Dr. Andy Crichton, (Calgary)

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6 Jean Gray et al, Therapeutic Choices, Canadian Pharmaceutical Association, 2000
7 Handbook of Geriatric Drug Therapy, 2000
8 David B Reuben et al, Geriatrics at your Fingertips, American Geriatrics Society, 5th Ed, 2003
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