

Assessment of glaucoma referral letter for quality and accuracy among patients referred to a tertiary eye care center

Prasanna Venkataraman, Premanand Chandran, Mohamed Faheem, Vinoth Arunaachalam, Nabeed Aboobacker, Ganesh V Raman

Purpose: To assess the quality and accuracy of glaucoma referrals from ophthalmologist. **Methods:** Retrospective review of patients chart with referral letter to a tertiary glaucoma center between January and December 2017. Patients aged <16 years, lens-induced glaucoma, uveitic glaucoma, and glaucoma following retinal and corneal surgery were excluded. **Results:** A total of 184 patients referred by 55 ophthalmologists were included. Mean patient age (SD) was 57.8 ± 14 years. Intraocular pressure was not documented in the referral letter in 113 (61%) patients, gonioscopy in 174 (95%) patients, disc findings in 149 (81%) patients, and visual fields in 175 (95%) patients. Thirteen (37%) of the 35 patients referred as open angle glaucoma were found to have angle closure glaucoma. Pseudoexfoliation glaucoma was diagnosed in 29 (16%) patients, of which 18 were missed by the referring ophthalmologist. **Conclusion:** In our study >90% of referral letter did not have the essential parameters. A standard template for glaucoma referral is suggested, which will help the patient to get better transfer of care.

Key words: Angle closure glaucoma, glaucoma, gonioscopy, referral letter

Access this article online

Website:

www.ijo.in

DOI:

10.4103/ijo.IJO_914_19

Quick Response Code:



Glaucoma is the leading cause of irreversible blindness in the world. Prevalence of primary open angle glaucoma (POAG) varies between 1.6 and 4%, and primary angle closure glaucoma (PACG) varies between 0.5 and 1.8% in south Indian population. Prevalence of blindness due to POAG ranges between 1.5 and 11.1% and PACG ranges between 5.9 and 20%.^[1-5] Blindness due to glaucoma was more common with PACG than POAG despite the prevalence being lower. This demands the need to know the angle status in all patients suspected or diagnosed with glaucoma, so that angle closure glaucoma will not be missed. Treatment of angle closure glaucoma differs from open angle in a way that primary management was laser peripheral iridotomy in these eyes to get rid of pupillary block along with antiglaucoma medication.

Glaucoma largely being an asymptomatic disease warrants early diagnosis and treatment to prevent the patient from becoming blind. In a developing country like India, access to health care is poor; early diagnosis and treatment remain a challenge. Ophthalmologist working at the primary and secondary eye care level plays a major role in diagnosing and referring them to tertiary eye care for further management. To the best of our knowledge, there was no study from India which looked into the glaucoma referrals. Hence, the purpose of the study is to evaluate the quality of referral and the accuracy of diagnosis among the patients referred to a tertiary eye care center.

Methods

We retrospectively reviewed the records of patients referred to glaucoma clinic in a tertiary care center between January 2017 and December 2017. The study was approved by the Institute ethics committee. This study adhered to the tenets of the Declaration of Helsinki. Patients aged <16 years, lens-induced glaucoma, uveitic glaucoma, and glaucoma following retinal and corneal surgery were excluded from the study.

Data collected from the referral were age, gender, visual acuity, intraocular pressure (IOP), gonioscopy, disc findings, antiglaucoma medication (AGM), visual field analysis, diagnosis, and reason for referral. All patients underwent comprehensive eye examination including IOP with Goldmann applanation tonometer (GAT), central corneal thickness measurement, gonioscopy with Sussman 4 mirror gonioscope, and optic disc assessment with 90-D lens by glaucoma specialist. Angle was considered occludable if $\geq 180^\circ$ of the posterior trabecular meshwork was not visible. In eyes with occludable angle, indentation was performed to look for the presence of peripheral anterior synechiae. Optic nerve was considered glaucomatous if there was neuroretinal rim

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Cite this article as: Venkataraman P, Chandran P, Faheem M, Arunaachalam V, Aboobacker N, Raman GV. Assessment of glaucoma referral letter for quality and accuracy among patients referred to a tertiary eye care center. Indian J Ophthalmol 2020;68:471-4.

Department of Glaucoma, Aravind Eye Hospital, Coimbatore, Tamil Nadu, India

Correspondence to: Dr. Premanand Chandran, Aravind Eye Hospital, Avinashi Road, Coimbatore - 641 014, Tamil Nadu, India. E-mail: drcgpremanand@yahoo.co.in

Received: 13-May-2019

Revision: 02-Sep-2019

Accepted: 17-Sep-2019

Published: 14-Feb-2020

thinning, notching, nerve fiber layer defect, or asymmetric disc cupping (difference in cup to disc ratio >0.2 between 2 eyes) in the absence of asymmetry in disc size between the 2 eyes. Visual field was assessed with Humphrey visual field analyzer.

Patients were categorized into one of the following diagnosis:

- Glaucoma suspect: IOP <21 mm Hg, open angle with suspicious disc changes and/or suspicious visual fields not definitive of glaucoma
- Ocular hypertension (OHT): IOP >21 mm Hg, open angle with normal optic disc and visual fields
- POAG: IOP >21 mm Hg, open angle and definite disc damage with or without visual field damage
- Normal tension glaucoma (NTG): IOP <21 mm Hg, open angle and definite disc damage with or without visual field damage
- Primary angle closure suspect (PACS): Eye with $\geq 180^\circ$ of posterior trabecular meshwork not visible on gonioscopy in the absence of synechiae, elevated IOP and glaucomatous optic disc damage
- Primary angle closure (PAC): PACS with elevated IOP and/or synechiae without glaucomatous optic disc damage
- PACG: PAC with glaucomatous optic disc and visual field damage
- Pseudoexfoliation glaucoma (PXG): IOP >21 mm Hg, open or occludable angle, definite optic disc damage with or without visual field damage and presence of pseudoexfoliation material.

Statistical analysis included mean and standard deviation (SD) for continuous variables and percentages for categorical variables. Statistical analysis was performed using commercial software (Stata ver. 13.1; StataCorp, College Station, Tx).

Results

A total of 232 patients were referred by 55 ophthalmologists during the study period, of which 184 met the inclusion criteria [Fig. 1]. Mean age (SD) of the study population was 57.8 ± 14 years; 109 (59%) patients were male and 75 (41%) were female. IOP was not mentioned in the referral letter in 113 (61%) patients. Of the 71 (39%) patients with documented IOP, GAT was used in 48 (68%), noncontact tonometer (NCT) in 14 (20%), and Schiottz tonometer in 9 (12%) patients.

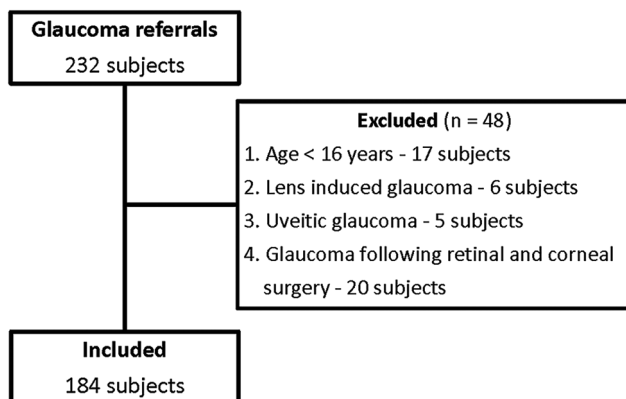


Figure 1: Flow chart of the study cohort

Gonioscopy was not documented in 174 (95%) patients. We found the angle to be occludable in 103 (59%) of the 174 patients. Ten patients had angle status (7 open and 3 occludable) mentioned in their referral letter. Of the 7 patients with open angle, 4 were found to have occludable angle necessitating laser iridotomy. Optic nerve head detail was available in 35 (19%) patients, visual field analysis was available in 9 (5%) patients, and central corneal thickness was documented in 8 patients (4.4%). Sixty (33%) patients were on AGM at the time of referral with a mean of 1.93 ± 1.7 . Of these 60 patients, 2 were diagnosed to be normal and their AGM was stopped.

Among the 102 patients referred as glaucoma suspect, we concurred with the diagnosis of glaucoma suspect in 6 patients, and identified OHT in 7 patients, POAG in 17 patients, NTG in 1 patient, PXG in 11 patients, primary angle closure disease (PACD) in 54 patients, and 6 patients were normal. Six out of 11 patients with pseudoexfoliation had occludable angle. Of the 54 patients diagnosed with PACD, 18 had optic neuropathy.

Thirty-five patients were referred as POAG, in which 13 were diagnosed with PACG, 5 with PXG and 2 with OHT. Among the 30 patients referred as PACD, 4 were found to be normal and 1 had PXG. All the 11 patients referred as PXG had the disease, of which 9 had occludable angle and underwent laser peripheral iridotomy. Comparison between referral diagnosis and actual diagnosis at our glaucoma clinic is shown in Table 1.

Positive predictive value of referral diagnosis was 32% (95% CI 25% to 39%) overall, with PXG having the highest (100%; 95% CI 68% to 100%) followed by PACD (83%; 65% to 94%), OHT (50%; 3% to 97%), POAG (43%; 27% to 60%), glaucoma suspect (6%; 2% to 13%), and NTG (0%).

Discussion

Glaucoma being a chronic and silent disease goes undiagnosed until late in the disease. Population-based studies from South India have reported that $>80\%$ of patients diagnosed with primary glaucoma were undetected previously.^[2-5] This shows the magnitude of undiagnosed glaucoma in the country. The reasons for this were the asymptomatic nature of the disease in its early stages, poor access to health care, lack of awareness about the disease, and lack of comprehensive eye examination who seek eye care.

Table 1: Comparison between referral and actual diagnosis

Diagnosis	Referral diagnosis No (%)	Actual diagnosis No (%)
Glaucoma suspect	102 (56)	8 (4)
Ocular hypertension	2 (1)	10 (5.5)
Normal tension glaucoma	4 (2)	1 (0.5)
Primary open angle glaucoma	35 (19)	32 (17.5)
Primary angle closure disease	30 (16)	94 (51)
Pseudoexfoliation glaucoma	11 (6)	29 (16)
Normal	-	10 (5.5)

to all doctors in our referral database and request them to use it when they are referring a patient. This format also reminds everyone of the checklist that needs to be completed while managing a patient with glaucoma.

Major limitation of our study is its retrospective nature. We did not contact the referring doctor to get information about the missed parameters in the referral letter. Nondocumentation of relevant parameters in the referral letter does not necessarily mean that the referring doctor has not performed the procedure.

Conclusion

Our study highlights the need for improvement in glaucoma referral letter. Using a standard referral template will help in better transfer of care from the primary physician to the tertiary eye care center.

Acknowledgment

We would like to thank all our referral doctors for the dedication and the care they give to the patients despite their limited resources and logistics, and play a major role in eliminating needless blindness.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040: A systematic review and meta-analysis. *Ophthalmology* 2014;121:2081-90.
2. Ramakrishnan R, Nirmalan PK, Krishnadas R, Thulasiraj RD, Tielsch JM, Katz J, *et al.* Glaucoma in a rural population of southern India: The Aravind comprehensive eye survey. *Ophthalmology* 2003;110:1484-90.
3. Vijaya L, George R, Baskaran M, Arvind H, Raju P, Ramesh S, *et al.* Prevalence of primary open angle glaucoma in an urban South Indian population and comparison with a rural population: The Chennai glaucoma study. *Ophthalmology* 2008;115:648-54.
4. Vijaya L, George R, Arvind H, Baskaran M, Ramesh S, Raju P, *et al.* Prevalence of primary angle closure disease in an urban South Indian population and comparison with a rural population: The Chennai glaucoma study. *Ophthalmology* 2008;115:655-60.
5. Garudadri C, Senthil S, Khanna RC, Sannapaneni K, Rao HB. Prevalence and risk factors for primary glaucomas in adult urban and rural populations in the Andhra Pradesh eye disease study. *Ophthalmology* 2010;117:1352-9.
6. Founti P, Topouzis F, Hollo G, Cvenkel B, Lester M, Haidich AB, *et al.* Prospective study of glaucoma referrals across Europe: Are we using resources wisely? *Br J Ophthalmol* 2018;102:329-37.
7. Sheehan W, Adams D, Wells C, Booth A. Does Goldmann applanation tonometry performed by community optometrists reduce referrals? A pilot study. *Br J Ophthalmol* 2011;95:295.
8. Varma DK, Simpson SM, Rai AS, Ahmed IIK. Undetected angle closure in patients with a diagnosis of open-angle glaucoma. *Can J Ophthalmol* 2017;52:373-8.
9. Varma DK, Kletke SN, Rai AS, Ahmed IIK. Proportion of undetected narrow angles or angle closure in cataract surgery referrals. *Can J Ophthalmol* 2017;52:366-72.
10. Thomas R, George T, Braganza A, Muliylil J. The flashlight test and van Herick's test are poor predictors for occludable angles. *Aust N Z J Ophthalmol* 1996;24:251-6.
11. Krishnadas R, Nirmalan PK, Ramakrishnan R, Thulasiraj RD, Katz J, Tielsch JM, *et al.* Pseudoexfoliation in a rural population of Southern India: The Aravind comprehensive eye survey. *Am J Ophthalmol* 2003;135:830-7.
12. Heijl A, Bengtsson B, Hyman L, Leske C, for the Early Manifest Glaucoma Trial Group. Natural history of Open-angle glaucoma. *Ophthalmology* 2009;116:2271-6.
13. Arvind H, Raju P, Paul PG, Baskaran M, Ramesh SV, George RJ, *et al.* Pseudoexfoliation in South India. *Br J Ophthalmol* 2003;87:1321-3.
14. Cheng J, Beltran-Agullo L, Trope GE, Buys YM. Assessment of the quality of glaucoma referral letters based on a survey of glaucoma specialists and a glaucoma guideline. *Ophthalmology* 2014;121:126-33.
15. Canadian Ophthalmological Society Glaucoma Clinical Practice Guideline Expert Committee. Canadian Ophthalmological Society evidence-based clinical practice guidelines for the management of glaucoma in the adult eye. *Can J Ophthalmol* 2009;44:s7-54.