

The Multidisciplinary Glaucoma Monitoring Clinic at The Royal Victorian Eye and Ear Hospital

Debra Gleeson, AssocDipAppSc(Orth)

Department of Diagnostic Eye Services (Orthoptics), The Royal Victorian Eye and Ear Hospital, Melbourne, Australia

ABSTRACT

An ageing population worldwide is and will increasingly overburden existing eye health services due to an associated increase in age-related ocular disease. This has necessitated the development of different eye care schemes to alleviate this problem, particularly in the area of glaucoma. These schemes utilise community optometrists, and hospital-based optometrists, orthoptists and ophthalmic nurses. The various schemes have aided in a range of ways, from reducing false-positive glaucoma referrals to hospital clinics, to diagnosing, monitoring and in some cases treating suitable glaucoma patients.

The Royal Victorian Eye and Ear Hospital (RVEEH) Glaucoma Monitoring Clinic (EGMON) which started in 2007 utilises a multidisciplinary team of ophthalmic consultants, optometrists, orthoptists and ophthalmic nurses. The

EGMON Clinic was set up in response to increasing numbers attending the RVEEH glaucoma clinics, the largest tertiary glaucoma service in Victoria. This was affecting the availability of appointments for new and review patients.

Orthoptists have the theoretical knowledge and the clinical background to play an important role in the provision of services to patients with glaucoma and other types of chronic eye disease.

This study describes the establishment of the multidisciplinary EGMON Clinic at the RVEEH and the clinical protocols and processes used in the clinic. The outcomes and the results of the patient survey on the effectiveness of the clinic are also discussed.

Keywords: glaucoma, shared-care, multidisciplinary clinics, orthoptists, optometrists, ophthalmic nurses

INTRODUCTION

Glaucoma describes 'a group of ocular disorders with multi-factorial aetiology united by a clinically characteristic intraocular pressure-associated optic neuropathy'.¹ It constitutes the second leading cause of blindness in the world.²

An ageing population worldwide has resulted in an increase in the number of people over 65 years old, particularly in those 80 years or older.³ One of the main risk factors for the development and progression of glaucoma is being over 65 years of age and it is estimated that one in ten Australians over 80 have glaucoma. The number of people worldwide with primary open angle glaucoma (POAG) and angle closure glaucoma (ACG) combined is expected to rise from 60.5 million in 2010 to 79.6 million by 2020, the majority of these (74%) having POAG.² In 2002 it was reported that 12% of world blindness is the result of glaucoma, with an even higher proportion in Australia at 18%.⁴ Over 8.4 million people worldwide will be bilaterally blind from

primary glaucoma in 2010 rising to 11.1 million by 2020.² At least 50% of those with glaucoma are unaware that they have the disease.⁵

In Australia the prevalence of glaucoma is expected to increase from 208,000 in 2005 to 379,000 in 2025 due to the ageing population.⁵ POAG is the most prevalent glaucoma subtype (70%)⁵ and once diagnosed requires lifelong observation and management.⁶ The annual cost of POAG alone in Australia in 2005 was \$1.9 billion and is expected to increase to \$4.3 billion by 2025.⁵ The economic impact on health services will be enormous and limited healthcare resources will be increasingly overburdened.

Other factors identified that contribute to a rise in hospital glaucoma patient presentations are an increase in optometric case findings, raised public awareness and more aggressive management of ocular hypertension (OHT) and POAG cases.⁷

SHARED-CARE GLAUCOMA SCHEMES

The increasing workload for glaucoma specialists and long waiting lists for appointments has necessitated the need for a more integrated team-based approach to patient care. The

Correspondence: **Debra Gleeson**
Department of Diagnostic Eye Services (Orthoptics),
The Royal Victorian Eye and Ear Hospital,
32 Gisborne St, East Melbourne, Vic 3002, Australia
Email: debra.gleeson@eyeandear.org.au

development of shared-care schemes involving optometrists and hospital-based eye care professionals including orthoptists, ophthalmic technicians and ophthalmic nurses are being introduced to meet these escalating service demands.

A shared-care screening service operating between the Rotterdam Eye Hospital and ten local optometrists trained by the hospital and provided with a GDx machine was initiated in 1999. Hospital-based ophthalmic technicians assess the optometrists' findings and electronically-submitted GDx data and recommend further tests at the hospital or follow-up by the optometrist. Ophthalmologists were available to provide advice.⁸

A similar project was set up by Portsmouth Hospital where the glaucoma specialist triaged the glaucoma referrals. Referrals were allocated to either a hospital appointment or were determined to be suitable for the refinement scheme, where patients would attend the community optometrist. Data sent by the community optometrist aided the hospital-based glaucoma specialist to determine whether the patient was discharged, given a hospital appointment or was monitored by the optometrist.⁹ Another United Kingdom-based glaucoma referral refinement scheme was established in Manchester and involved optometrists referring glaucoma suspects to optometrists with specialised training. Patients that met the referral criteria were referred directly to the eye hospital and those that did not were referred back to the initial referring optometrist.¹⁰ Both of these schemes endeavoured to reduce the number of false positive glaucoma suspect referrals to the hospital eye services.

Shared-care services are being widely utilised in the United Kingdom (UK). In 2006 a national UK study found that sixty-six ophthalmic departments were operating glaucoma based shared-care schemes.¹¹ The fourteen optometrist shared-care schemes were mainly community-based, whereas the fifty-two multidisciplinary schemes comprising optometrists, orthoptists and nurses were hospital-based. Ten of the schemes consisted of a team of optometrists, orthoptists and/or nurses. All the schemes managed both new and review glaucoma patients, and glaucoma suspects.¹¹

In South Australia a shared-care service with authorised optometrists to co-manage glaucoma patients with an ophthalmologist commenced in 2008.¹²

The Bristol Shared Care Glaucoma Study found that optometrists with appropriate training were able to make reliable measurements in the assessment of glaucoma patients and glaucoma suspects.^{6,13,14} There were no significant differences in patient outcomes over the two-year study period. However it was deemed unlikely to be more cost-effective than the hospital eye service with the annual cost per patient being £68.98 to £108.98 in community optometric shared-care compared to £14.50 to £59.95 under hospital care.⁶ A 30-month randomised

clinical trial was conducted at the Rotterdam Eye Hospital comparing the costs and quality of care of stable glaucoma patients by optometrists and ophthalmic technicians with glaucoma specialists. The results showed that the quality of care was similar, and that despite a higher number of visits per year the mean hospital costs were lower by utilising the multidisciplinary team.¹⁵

THE GLAUCOMA MONITORING CLINIC, THE ROYAL VICTORIAN EYE AND EAR HOSPITAL

The Glaucoma Monitoring Clinic (EGMON) at The Royal Victorian Eye and Ear Hospital (RVEEH) commenced in 2007. It is a multidisciplinary clinic set up to monitor chronic glaucoma patients. The current team comprises of four orthoptists, two optometrists and three ophthalmic nurses, a glaucoma fellow and one or two fellowship trained glaucoma specialists.

The practice guidelines followed by the team are those of the American Academy of Ophthalmology¹⁶ and also of the Australian Government's National Health and Medical Research Council.¹⁷ These guidelines present the current best evidence for the screening, diagnosis, management and prevention of glaucoma. A glaucoma clinical notes template is used and a standardised protocol is followed.

Patients are referred from the Glaucoma Investigation Research Unit (GIRU). All types of glaucoma patients are seen in the EGMON clinic, however they are less acute cases requiring three months or longer review times. The EGMON clinic also refers appropriate patients with physiological cupping, primary angle closure post laser peripheral iridotomy, glaucoma suspects and OHT cases to a community shared-care program of hospital-linked practitioners. The patients alternate their appointments between the hospital and these practitioners. There are predetermined protocols for referral back to the hospital.¹⁸

The optometrists, orthoptists and nurses do a full work-up on the patients. A comprehensive medical history to ascertain information relating to risk factors, systemic health, medications and other issues such as drug allergies that may affect progression or management is taken on each patient. The intraocular pressure is measured by Goldmann applanation tonometry and the central corneal thickness is recorded. In addition to the general slit-lamp examination performed by the orthoptist at the RVEEH, team members have learnt to conduct a structured anterior segment examination to identify the signs associated with glaucoma risk or presence, and other ocular problems.

Other skills performed at the slit-lamp include gonioscopy to assess the drainage angle and the use of an indirect lens to assess the optic disc and retina. These tests are fundamental parts of a comprehensive examination in glaucoma. These skills require a great deal of practice for proficiency, and to

become acquainted with the range of normal and abnormal presentations. In the 2006 UK shared-care schemes it was the optometrist who was the most likely clinician to perform disc and fundus assessment,¹¹ however in the EGMON clinic all team members perform these assessments.

A number of studies have identified that optometrists with appropriate training are able to make reliable measurements in assessing glaucoma patients and suspects.^{6,15,19} At the time of writing this paper evidence of studies on the reliability of orthoptists or ophthalmic nurses' measurements in assessing glaucoma patients were not identified in the literature. The Grade 1 and 2 ophthalmic technicians working in the Rotterdam Eye Hospital Glaucoma Follow-up unit were not making optic disc assessments or performing gonioscopy.¹⁵

An internal clinical audit of the EGMON clinic in 2009–2010 of patient comorbidities showed that 20% had diabetes, 9% attended medical retinal clinic and 17% attended other specialist clinics, so to be able to recognise other ocular pathology such as diabetic retinopathy and macular degeneration is important when assessing the retina.

In diagnosing glaucoma and monitoring for progression, analysis of both structure (by optic disc and retinal nerve fibre layer assessment) and function (by visual field analysis) is essential. One or two members of the EGMON team perform Humphrey visual fields, visual acuity and subjective refraction if required. Ocular imaging by way of GDx nerve fibre analyser, Heidelberg retinal tomography, ocular coherence tomography and anterior segment ocular coherence tomography are all helpful tools for diagnosis and management. The ability to interpret these results is also an important part of the role of the multidisciplinary team. Patients are sent to the medical photography unit for these tests and for disc photos, which are mandatory for monitoring progression.

Once all the necessary assessments are completed the EGMON team members present the findings and suggested management plan to the consultant who makes the final clinical decision. In the UK shared-care schemes of 2006, optometrists, orthoptists and nurses in some schemes were making management decisions and in some cases prescribing medication.¹¹

An integral function of this clinical model is ongoing staff training and development, with the first 30 minutes of each clinic devoted to teaching. Each week on a rotational basis, team members prepare presentations on glaucoma or related ocular or systemic topics, discuss research papers, journal reviews or case studies. Depression, which is common in those with chronic disease, low vision and the visual requirements for driving are amongst topics that have been discussed. Practical training in clinical skills is provided on a one-on-one basis during the clinic.

EVALUATION

The EGMON clinic was set up in response to increasing numbers of patients attending the RVEEH glaucoma clinics, the largest tertiary glaucoma service in Victoria. The increase was impacting the availability of appointments for patient review. Six-month, nine-month and twelve-month review appointments were an average 29.1 weeks overdue. With the introduction of the EGMON clinic overdue review appointments have reduced to 3.3 weeks, helping to alleviate delays in monitoring and intervention. However there is still a large back-log of patients to be seen and the EGMON clinic has at this stage been unable to achieve its target of seeing 45 patients per session. The clinic is looking at ways to increase the numbers from the current template of 35 to 40 patients. Consultations in the EGMON clinic have increased the quality of care, enabling all patients to have a dilated examination each visit (unless contraindicated). All the necessary tests can be performed at the one visit eliminating the need for an extra appointment, which in turn opens up more appointment spaces.

In 2010 patients were given a questionnaire to assess their response to the new clinic. They were asked to rate the length of question time available to them during consultation and their waiting time in clinic. In regard to question and consultation time, 78% rated this as excellent or very good and 98% were happy with the waiting time. This concurs with the Bristol community optometrist shared-care scheme with 87% and 94% rating the same factors very satisfactory.¹³ The EGMON clinic results showed that the patients' overall satisfaction with the service had increased from 50% in 2006–2007 to 84% in 2009–2010 rating the service excellent or very good. This was deemed to be due to the reduced waiting times in clinic and longer consultations. Other measures of success noted in a 2009–2010 audit were that 91% of patients had a dilated fundus examination and 91% had a recent gonioscopy recorded. This is in contrast with the snap-shot of UK shared-care schemes in 2006 where in 14 of the 30 schemes seeing new patients, a gonioscopy was not performed.¹¹ An internal audit conducted by the EGMON clinic showed greater than 90% adherence to the preferred practice patterns guidelines.¹⁶

CONCLUSION

In offering a team-care approach to monitoring glaucoma the EGMON clinic has maximised and enhanced the skills of some of the existing hospital orthoptic and ophthalmic nurse workforce. The increased knowledge base has been useful in working on other clinics such as the general eye clinics, enabling the orthoptist to identify and present the relevant information, for example risk factors for glaucoma or glaucoma progression, changes in ocular or systemic

health, drug contraindications, and to organise the necessary tests to aid glaucoma management prior to the patient seeing the consultant.

One of the current EGMON orthoptists works on an orthoptically led glaucoma review clinic seeing less complex cases (glaucoma suspects and stable POAG) at Alfred Health.²⁰ This fortnightly clinic started as an off-shoot of the EGMON clinic in 2012. Patients are seen by the glaucoma specialist on alternate visits and these appointments are expedited if changes are noted following predetermined protocols. Due to its success, another EGMON clinic will commence at the RVEEH in late August 2013 staffed by one to two glaucoma consultants and four to five orthoptists.

Increased knowledge and enhancement of practical skills can only strengthen the role of the orthoptist in eye care. Orthoptists play a major role in outpatient collaborative care and so are well placed with their clinical knowledge and skills to take this step forward to aid in the provision of services to the increasing numbers of patients with chronic eye disease. Roles such as these will increase the viability and employment opportunity of orthoptists in a rapidly changing healthcare environment.

ACKNOWLEDGEMENTS

I would like to thank Dr Cathy Green, Professor Jonathon Crowston, and all the previous and current glaucoma consultants and fellows who have worked on the EGMON clinic for their patience, guidance and instruction. Many thanks also to my multidisciplinary team mates, your help and pre-clinic teaching has been inspiring.

A big thank you to Linda Santamaria, your patience, guidance and invaluable assistance has been crucial in enabling me to produce my first article.

REFERENCES

- Casson RJ, Chidlow G, Wood JP, et al. Definition of glaucoma: clinical and experimental studies. *Clin Experiment Ophthalmol* 2012;40(4):341-349.
- Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. *Br J Ophthalmol* 2006;90(3):262-267.
- Shaarawy TM, Sherwood MB, Hitchings RA, Crowston JG. *Glaucoma Volume 1: Medical Diagnosis & Therapy*. Philadelphia: Saunders Elsevier; 2009.
- Resnikoff S, Pascolini D, Etya'ale D et al. Global data on visual impairment in the year 2002. *Bull World Health Organ* 2004;82(11):844-851.
- Dirani M, Crowston JG, Taylor PS, et al. Economic impact of primary open-angle glaucoma in Australia. *Clin Experiment Ophthalmol* 2011;39(7):623-632.
- Gray SF, Spry PG, Brookes ST, et al. The Bristol shared care glaucoma study: outcome at follow up at 2 years. *Br J Ophthalmol* 2000;84(5):456-463.
- Morley AM, Murdoch I. The future of glaucoma clinics. *Br J Ophthalmol* 2006;90(5):640-645.
- de Mul M, de Bont AA, Reus NJ, et al. Improving the quality of eye care with tele-ophthalmology: shared-care glaucoma screening. *J Telemed Telecare* 2004;10(6):331-336.
- Trikha S, Macgregor C, Jeffery M, Kirwan J. The Portsmouth-based glaucoma refinement scheme: a role for virtual clinics in the future? *Eye (Lond)* 2012;26(10):1288-1294.
- Henson DB, Spencer AF, Harper R, Cadman EJ. Community refinement of glaucoma referrals. *Eye (Lond)* 2003;17(1):21-26.
- Vernon S A, Adair A; Shared care in glaucoma: a national study of secondary care lead schemes in England. *Eye (Lond)* 2010;24(2):265-269.
- Lu CY, Lu VH, Goldberg I, Day RO. Towards integrated care: Australia's new model of care for patients with glaucoma. *Med J Aust* 2010;193(4):200-201.
- Gray SF, Spencer IC, Spry PG, et al. The Bristol Shared Care Glaucoma Study: validity of measurements and patient satisfaction. *J Public Health Med* 1997;19(4):431-436.
- Spry PG, Spencer IC, Sparrow JM, et al. The Bristol Shared Care Glaucoma Study: reliability of community optometric and hospital eye service test measures. *Br J Ophthalmol* 1999;83(6):707-712.
- Holtzer-Goor KM, van Sprundel E, Lemij HG et al. Cost-effectiveness of monitoring glaucoma patients in shared care: an economic evaluation alongside a randomized controlled trial. *BMC Health Serv Res* 2010;10:312-322.
- American Academy of Ophthalmology. Preferred Practice Pattern Guidelines; 2010 [cited 2013 May 26th] Available from: <http://one.aao.org/CE/PracticeGuidelines/PPP.aspx>.
- Australian Governments National Health and Medical Research Council - Guidelines for the screening, prognosis, diagnosis, management and prevention of glaucoma; 2010. [cited 2013 May 26th] Available from: <http://www.nhmrc.gov.au/guidelines/publications/cp113-cp113b>.
- Clews S. The Royal Victorian Eye and Ear Hospital Community Eye Care Partnership. [cited 2013 May 26th] Available from: www.aonavic.com.au/docs/presentation3.pdf.
- Harper R, Reeves B, Smith G. Observer variability in optic disc assessment: implications for glaucoma shared care. *Ophthalmic Physiol Opt* 2000; 20(4):265-273.
- Thorburn D, Koklanis C. [Orthoptic-led glaucoma monitoring clinic at Alfred Health. Abstract from 69th Annual Orthoptic Scientific Conference 2012]. *Aust Orthopt J* 2012;44(2):26.