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Who should screen for diabetic retinopathy in Hong Kong?

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In Hong Kong, the estimated age-standardized prevalence of type 2 diabetes mellitus for the 35-to-64 years' age-group is around 10%.¹ The incidence of diabetic retinopathy is approximately 30% in patients diagnosed with diabetes mellitus. This suggests that there are about 700,000 diabetic patients in Hong Kong, half of whom are undiagnosed. It is estimated that around 70% of diabetic patients are being regularly followed up in Hong Kong Hospital Authority (HA) facilities and 30% in the private sector. Not surprisingly, visual complications arising from sight-threatening diabetic retinopathy has caused a significant burden on social and health care systems, within both the public and private sectors.

Several multi-center randomized controlled clinical trials have demonstrated that diabetic retinopathy can be prevented or its natural course altered.^{2,3} The incidence of diabetes-related blindness can be reduced by early detection and treatment of retinopathy. Recommendations on screening strategies for diabetic patients by professional health care organizations, like the American Academy of Ophthalmology (AAO) and the American Diabetes Association,^{4,5} are well established. There is no doubt that ideally every diabetic patient should be screened by ophthalmologists who are experienced in managing diabetic retinopathy, because they are the service providers for treating this disease entity. Furthermore, a comprehensive ophthalmic examination during screening is important for detecting and quantifying the spectrum of other ophthalmic pathology, which might coexist with diabetic retinopathy. Such pathologies include cataract and glaucoma, both of which are more prevalent in diabetic patients and can be medically significant. Ophthal-

mologists, being medical doctors, are most appropriate to discuss the importance of diabetic control and other systemic complications of diabetes with patients during their clinic consultations, particularly if they already have diabetic retinopathy. Ophthalmologists can also reinforce the need for patient compliance with their family physician's care plan. Liaison with physicians directly regarding clinical findings and ophthalmic management is an essential component in formulating a holistic care plan for the patient. For example, suboptimal blood pressure control may be noted during a comprehensive ophthalmic consultation, in which case the patient can be educated or referred back to their physician to optimize hypertension control.

Only when the accessibility or availability of ophthalmology services is in doubt (for reasons of geography, insufficient numbers of ophthalmologists in a given area, or financial constraints) should the screening responsibility be delegated to other accredited health care professionals. The latter could be family physicians, nurse specialists, optometrists, or accredited photograph readers.

New developments in fundus photography with digital non-mydiatic cameras have initiated new screening strategies for diabetic retinopathy. In some countries, national photo screening options such as the Ophdiat program in France⁶ and the English National Screening Programme for Diabetic Retinopathy in the United Kingdom⁷ have been set up. These help improve the reach of diabetic retinopathy screening and improve the screening accessibility in remote areas, where ophthalmology services are not readily available. Accredited personnel in the photographic reading centers can evaluate

the captured images.^{6,7} Implementation of such programs inevitably raise concerns about their cost effectiveness.⁸ Factors which can influence their cost effectiveness include: manpower and instrumentation costs, the incurred workload and pressure on health service due to false-positive referrals and other diabetes-related or -unrelated eye diseases being picked up during the screening.⁹ Patient compliance to the screening programs may also be a challenge. Photo screening has been found useful in increasing the number of diabetic patients that can be screened and its effectiveness is recognized by an AAO meta-analysis.¹⁰ According to that analysis, there was sufficient evidence from randomized clinical trials showing that single-field digital fundus photography can serve as a screening tool for diabetic retinopathy to identify patients for referral, evaluation and management by ophthalmologists.¹⁰

In Hong Kong, our health care system differs from that in other countries. About 30% of diabetic patients are under the care of private physicians. Geographical accessibility to an ophthalmologist is not a problem locally. The determinant factors for regular diabetic retinopathy screening by an ophthalmologist include: the cost for comprehensive screening and the availability of ophthalmologist, which differs considerably between the public and private sectors (115 private ophthalmologists vs. 150 specialists + trainees in HA). Last but not least, patient education on the importance of regular diabetic retinopathy screening can also have a substantial influence on screening.

The affordability of an ophthalmic examination differs markedly among patients attending the private sector. Most of these diabetic patients, however, do not have diabetic retinopathy (70%) and an annual screening suffices, in which case the average daily cost is minimal. The advantages of an ophthalmologist-led screening service are obvious. If any sight-threatening retinopathy is detected, it can be treated promptly or referred to the public sector. This provides very important triaging for new cases entering the HA ophthalmology outpatient clinics and avoids unnecessary delays. The downsides of screening by a non-ophthalmologist include incomplete information or inappropriate referral, largely due to inexperience or insufficient training. Possibility of deferred treatment does exist when patients are referred to an ophthalmologist or HA eye clinic for further care. The inappropriate referrals create unnecessary pressure on the public health care system, which is already heavily overloaded.

In a public health care setting, affordability is basically not an issue to the patient. On the contrary, it is not practical for ophthalmologists to perform comprehensive ophthalmic examinations for every patient, due to the large number of patients to be seen. Thus, making new technology like digital mydriatic or non-mydriatic photography with reporting by an experienced ophthalmologist provides cost-effective diabetic retinopathy screening,⁶ especially in a public health

care system. If the availability of ophthalmologists is in doubt, the photo-reading responsibility may be delegated to an accredited eye health care professional (family physician, nurse specialist, optometrist, or photograph reader). Of equal, if not more, importance, these programs should have an audit component so that false-positive and false-negative rates can be calculated. By this means the examination strategy, its sensitivity, and its cost effectiveness can be enhanced to prevent overloading the public service when a population-wide screening program is implemented. A good communication channel could facilitate up-to-date information on the patient's ophthalmic condition and management, so that the physician can formulate a holistic care plan.

Diabetic retinopathy is only one of the complications of diabetes mellitus, other systems will also be affected. In this context, family and internal medicine physicians, and special nurses are in a good position to carry out diabetic retinopathy photographic screening, especially during comprehensive complication assessment. These programs can provide a one-stop service, to detect different systemic complications in one visit, thus improving compliance to screening and patient education. With a critical caseload, the technique of photo taking and interpretation can be enhanced through practice and audit. Ophthalmologists can be involved in different phases to provide training, support, accreditation, and quality assurance.

In Hong Kong, outside the context of a well-structured comprehensive complication screening program, the benefits of a separate consultation by a non-ophthalmologist for diabetic retinopathy screening appears doubtful and may even be detrimental to the public health care. Inexperience in the interpretation of clinical findings and absence of auditing on referrals by individual screeners may generate many inappropriate referrals, putting excessive stress on already-saturated public ophthalmology services. This would definitely undermine the quality and safety of the existing system. Patients should therefore be educated and encouraged to seek care from a medical eye doctor, who can provide timely treatment for their eye problems and understand their other systemic medical conditions. Physicians should refer their patients to ophthalmologist colleagues, who can directly treat and report back on eye conditions after regular screening. Ophthalmologists should stand in the front line to provide seamless, affordable eye screening programs to all diabetic patients. A well-planned public-private interface program can rationalize the gap between the supply and demand of ophthalmology services in the public and private health care sectors. Professional bodies like the Hong Kong Medical Association and the Hong Kong Ophthalmological Society can take an active role in this issue.

To provide the best care for our patients, communication between physicians, nurses, and ophthalmologists is of utmost importance. It is only through a multidisciplinary approach that we can expect to reduce the visual morbidity caused by diabetic retinopathy.

References

1. Lam TH, Liu LJ, Janus ED, Lam KS, Hedley AJ; Hong Kong Cardiovascular Risk Factor Prevalence Study Steering Committee. Fibrinogen, other cardiovascular risk factors and diabetes mellitus in Hong Kong: a community with high prevalence of Type 2 diabetes mellitus and impaired glucose tolerance. *Diabet Med.* 2000;17:798-806.
2. Progression of retinopathy with intensive versus conventional treatment in the Diabetes Control and Complications Trial. Diabetes Control and Complications Trial Research Group. *Ophthalmology.* 1995;102:647-61.
3. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. UK Prospective Diabetes Study Group. *BMJ.* 1998;317:703-13.
4. American Diabetes Association. Standards of medical care in diabetes—2009. *Diabetes Care.* 2009;32 Suppl 1:S13-61.
5. American Academy of Ophthalmology Retina Panel. Preferred practice pattern guidelines: diabetic retinopathy. San Francisco: American Academy of Ophthalmology; 2008.
6. Chabouis A, Berdugo M, Meas T, et al. Benefits of Ophdiat, a telemedical network to screen for diabetic retinopathy: a retrospective study in five reference hospital centres. *Diabetes Metab* 2009;35:228-32.
7. United Kingdom National Screening Committee. Essential elements in developing a diabetic retinopathy screening programme : workbook 4.3, June 2009. London: Health Departments of the United Kingdom. Available from <http://nscscreening.org.uk>. Accessed Apr 2010.
8. Siu SC, Ko TC, Wong KW, Chan WN. Effectiveness of non-mydriatic retinal photography and direct ophthalmoscopy in detecting diabetic retinopathy. *Hong Kong Med J.* 1998;4:367-70.
9. Scanlon PH, Carter S, Foy C, Ratiram D, Harney B. An evaluation of the change in activity and workload arising from diabetic ophthalmology referrals following the introduction of a community based digital retinal photographic screening programme. *Br J Ophthalmol.* 2005;89:971-5.
10. Williams GA, Scott IU, Haller JA, Maguire AM, Marcus D, McDonald HR. Single-field fundus photography for diabetic retinopathy screening: a report by the American Academy of Ophthalmology. *Ophthalmology.* 2004;111:1055-62.



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