The University of Queensland

The Discipline of General Practice

Screening for Diabetic Retinopathy Using Retinal Photography: the Inala Indigenous Health Experience

Dr Geoff Spurling[1 2]
Dr Deb Askew[1]
Associate Professor Noel Hayman[1 2]
Professor Claire Jackson[1]

1 University of Queensland
2 Queensland Health

Background

- Eye and sight problems the most common long term health problem for indigenous Australians
- Diabetic retinopathy leading cause of preventable blindness in adults
- Almost 100% preventable through early detection and laser treatment

Diabetic Retinopathy in Indigenous Populations

- Increased rates of diabetes
- Access to appropriate screening
- NHMRC recommendation is yearly screening

Experience of the Inala Indigenous Health Service

- High prevalence of diabetes
- Poor access to screening despite:
  - PA hospital eye clinic 20 minutes away
  - Bulk Billing ophthalmologists
  - Bulk Billing optometrists in the shopping centre across the road

Primary Research Question

Does retinal photography in indigenous primary care improve access to screening?

Secondary Research Questions

- Is screening using retinal photography feasible?
- Is it acceptable to patients and staff in general practice?
- What risk factors predict diabetic retinopathy in an indigenous primary health care setting?

Methods (1) Setting Up

- Buying the camera – Canon CR-DGi non-mydriatic retinal camera (Paris)
  - $30 000
- Training the staff
  - GPs to read the photos (1 day workshop)
    - Masters of Medicine – Primary eye care subject
  - Practice Nurses to take the photos
- Space
  - Needs a dark room

Methods (2) Recruitment

- Inala Elders supported the project
- Ethics - UQ
- All indigenous patients with diabetes presenting for their ADC
- October 2007 to October 2008
- Dilated if photo inadequate

Methods (3) Data Collection

- GPs coded photos according to a special reporting form
- Demographic data, biometric indices retrieved from patients' ADC of the same day

Gender, age, duration of disease, HbA1c, BP

- Eye referral history collected from patient record

Previous year for optometrist/ ophthalmologist

- Semi-structured phone interviews with patients regarding their experience
- Data entered into MS Access Database 2003

Results (1) Baseline Characteristics

- 88 patients recruited in first year (58% of the regular patients with diabetes in our practice)
- 44% male

	Median (range)
Age	52 years (24 - 78)
Diabetic duration	5 years (0.5 to 34)
Systolic blood pressure	130 mm Hg (100-177)
HbA1c	7.75 % (4.8 - 14)

Results (2) Year Before Photo

23 (26%) were referred (ophthalmologist/ optometrist)

16/23 (70%) were actually seen

Results (2) Year Before Photo

Out of 88 patients:

16 (18%) were appropriately followed up

- 10 (63%) of these patients did not have diabetic retinopathy

72 (82%) did not have adequate follow up in the year preceding the photo

- 23 (32%) of these patients did have diabetic retinopathy

20.6% (6/29) had diabetic retinopathy and were appropriately followed up (normally 44% +)

Results (3) Photo Results

- **Adequacy**

136/176 (77%) eyes were interpretable

6 (7%) patients were dilated

- **Results**

57 (65%) did not require referral

29 (33%) diabetic retinopathy

31 (35%) referred as a result of the photo

Results (4)

- Predictors of Diabetic Retinopathy (Logistic regression)
  - Unadjusted: HbA1c and duration of diabetes
  - Adjusted for age/ sex and other predictors:
    - Duration of diabetes

    Odds ratio 1.18 (95% CI 1.08 to 1.29) $p<0.001$:

Model explains 29% of the variability in diabetic retinopathy

Qualitative Results - 10 semi-structured interviews

9/10 were very positive and liked the "one stop shop", preferable to going to specialist outpatients and beneficial

1/10 thought GPs should leave this type of screening to the specialists

The University of Queensland

The Discipline of General Practice

Normal Retina

The Discipline of General Practice

Mild Diabetic Retinopathy

The Discipline of General Practice

Moderate Diabetic Retinopathy

The Discipline of General Practice

Moderate Diabetic Retinopathy

The Discipline of General Practice

Toxoplasmosis

The Discipline of General Practice

Severe Non-Proliferative Diabetic Retinopathy

The Discipline of General Practice

Proliferative Diabetic Retinopathy

The University of Queensland

The Discipline of General Practice

Glaucoma

Limitations

- Only 1 year of experience in one setting

Difficult to generalise to other indigenous health services

- Need a really big study (RCT) to show a benefit for a clinically significant outcome like vision
- Set up costs
- Training of staff

GPs and practice nurses and aboriginal health workers

- Clinic Space

Diabetic Retinopathy Screening

Development of retinopathy associated with glycaemic control, duration of disease, high blood pressure (UKPDS)

Stratton IM, Kohner EM, Aldington SJ, Turner RC, Holman RR, Manley SE,Matthews DR. UKPDS 50: risk factors for incidence and progression of retinopathy in Type II diabetes over 6 years from diagnosis. Diabetologia. 2001 Feb;44(2):156-63.

Succesful retinal photograph program in the Kimberley with similar results to Inala Indigenous health

Murray RB, Metcalf SM, Lewis PM, Mein JK, McAllister IL. Sustaining remote-area programs: retinal camera use by Aboriginal health workers and nurses in a Kimberley partnership. Med J Aust. 2005 May 16;182(10):520-3

Question?

Do we really need tight control (HbA1c <7%) in order to prevent blindness in our patients with diabetes??

Lehman R., Krumholz, H. Tight control of blood glucose in long standing type 2 diabetes *BMJ* 2009;338:b800

Recent Evidence

- UKPDS

17 year follow up showed tight control made no difference to cardiovascular outcomes and reduced the risk of retinal photocoagulation by a small amount

- ADVANCE, ACCORD

tight control in an older population shows no difference for CV outcomes

- Veterans study (VADT) showed no difference with tight control on outcomes such as macrovascular or microvascular outcomes

Screening for diabetic retinopathy and appropriate treatment with laser can almost totally prevent blindness.

Holman R, Paul S, Bethel MA, Matthews D, Neil A. 10-year follow 4 up of intensive glucose control in type 2 diabetes. *N Engl J Med* 2008;359:1577-89.

ADVANCE Collaborative Group. Intensive blood glucose control and 2 vascular outcomes in patients with type 2 diabetes. *N Engl J Med* 2008;358:2560-72.

Action to Control Cardiovascular Risk in Diabetes Study Group. 1 Effects of intensivé glucose lowering in type 2 diabetes. *N Engl J Med* 2008;358:2545-59.

Duckworth W, Abraira C, Moritz T, Reda D, Emanuele N, Reaven P, et 3 al. Glucose control and vascular complications in veterans with type 2 diabetes. *N Engl J Med* 2008;360:129-39.

Olafsdottir E, Andersson DK, Stefansson E. Visual acuity in a population with regular screening for type 2 diabetes mellitus and eye disease. *Acta Ophthalmol*

Benefits to the Community

- Diabetic retinopathy screening in a culturally competent setting
- Well accepted
- Increased coverage of screening
- More appropriate referrals
- Should lead to less blindness

Policy Implications

- Retinal Photography most appropriate in settings where access to appropriate screening is difficult and high rates of diabetes
- Indigenous or Rural settings (or both)
- Motivated urban clinics
- Takes the load off busy outpatient departments
- **Needs Appropriate Resources**

NEW ITEM NUMBER for retinal photography associated with the Annual Diabetic Cycle of Care

The University of Queensland

The Discipline of General Practice

Acknowledgements

Inala Elders

Supporting research at the Inala Indigenous Health service

Inala Indigenous Health Service

Practice Nurses

Enthusiastically embraced the project and took the photos

Dr Clare Maher

Read photos and contributed ideas and support to the project

Ophthalmologists

double read the photos

The University of Queensland

The Discipline of General Practice

Questions Welcome

Dr Geoffrey Spurling

g.spurling@uq.edu.au