Microvascular complications

A73 (P511)

Agreement between optometrists acting as primary and secondary graders and sensitivity and specificity for identifying proliferative diabetic retinopathy in a community optometry based diabetic eye screening programme

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Aim: To evaluate agreement in grading levels between primary and secondary graders with ophthalmologists and to calculate sensitivity and specificity for identifying sight-threatening disease in an optometry-based retinopathy screening programme.

Methods: Retrospective data from 2,725 patients registered in the North Nottinghamshire retinal screening programme were analysed. The proportion of disagreement leading to an upgrading of retinopathy level was also investigated. In all cases, ophthalmology diagnosis was used as the arbitrator and considered to be gold standard.

Results: Agreement between primary and secondary graders was 51.4% and 75% for detecting no retinopathy (R0) and background retinopathy (R1), respectively. Of these, 83% of agreement was reported between primary grader and ophthalmology and 60% of agreement was observed between secondary grader and ophthalmology. The sensitivity and specificity of detecting proliferative retinopathy were 78.2% and 98.1% respectively which translates to 41.1% agreement for R3 between ophthalmology and the primary grader. The level of disagreement at R1 between primary and secondary grader that was later diagnosed as R3 was 0.23%. None of the patients upgraded from any level of retinopathy to R3 required urgent laser therapy.

Conclusion: These data provide information on the safety and effectiveness of a community based retinal screening programme which uses an optometrist at both primary and secondary grader level. The sensitivity level was short of the recommended 80% threshold but may reflect data specific to R3. None of the false negatives required urgent laser therapy which reflects a subsequent 'clinical' diagnosis by ophthalmologist, rather than a misdiagnosis by optometrist.

A74 (P514)

Distribution of diabetic retinopathy in the population attending the Diabetic Retinopathy Screening Service for Wales 2011–2012

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Objectives: The Diabetic Retinopathy Screening Service for Wales (DRSSW) is a community based mobile service, screening all persons with diabetes over the age of 12 years. Our aim was to determine variation in the level of any (anyDR) and referable (RDR) diabetic retinopathy across Wales.

Methods: Digital images were obtained using a Canon DGi camera (two 45° fields per eye) following mydriasis (1% tropicamide) and graded using a standardised DRSSW protocol. The distribution of anyDR and RDR (pre-proliferative DR or worse ± maculopathy) in the 22 local health boards (LHBs) in Wales was examined using performance control charts to determine which LHBs were within normal limits and those that showed greater than expected variation.

Results: In total, 102,187 persons (5.8% Type 1 diabetes; 93.8% Type 2 diabetes) were screened between January 2011 and January 2012; 31,835 (31.2%) had anyDR and 3,410 (3.3%) had RDR. The median (interquartile range) age was 66 (65–67) years and 56.6% were male. Fifteen of 22 (68.2%) LHBs were within 2SD of the mean for anyDR, four had lower than expected levels of anyDR and three were higher, with 20/22 (90.9%) within 3SD. Sixteen of 22 (72.7%) were within 2SD of the mean for RDR, two had lower than expected levels of RDR and four higher, with all 22 LHBs within 3SD.

Conclusion: Within the DRSSW there was good agreement on the extent of any DR and RDR across the 22 LHBs. Further investigation is required to determine if there are any examples of good practice in those areas with lower levels of anyDR and RDR.

A75 (P512)

Twenty years on: more or less diabetic retinopathy at diagnosis of Type 2 diabetes?

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Aims: To compare characteristics of those newly diagnosed with Type 2 diabetes between 2005 and 2012 with those recruited to the UK Prospective Diabetes Study (UKPDS) (1978–1990).

Methods: Data were collected for those on the screening register of the NHS Diabetic Eye Screening Programme. Outcomes from digital retinal screening were extracted from the screening programme database and clinical information was extracted from primary care records for those diagnosed with Type 2 diabetes between 2005 and 2012. Clinical characteristics and diabetic

retinopathy (DR) grading outcomes from patients aged 65 or below were analysed using SAS and compared with data from newly diagnosed patients in the UKPDS.

Results: Data were available for 2,070 men and 1,375 women of whom 1,403 (68%) men and 990 (72%) women had no retinopathy. Of those with DR 20% had microaneurysms in one eye, 9% had microaneurysms in both eyes and 2% had referable retinopathy, and there was more retinopathy in men than women ($p = 0.0033$). Patients were of similar age to those in the UKPDS with lower HbA1c (mean difference –1.8%, –20mmol/mol), higher systolic and diastolic blood pressure (+7 and +2mm Hg) and were heavier (body mass index +4kg/m^2). Proportionately more in the UKPDS had any DR (39% men and 34% women) and more had referable DR (15% and 11%, $p < 0.0001$).

Conclusions: Patients in this screening programme have less DR and less referable DR and are less hyperglycaemic, more hypertensive and heavier than those newly diagnosed patients recruited to the UKPDS. This has implications for screening programmes and risk estimation.

A76 (P446)

Mortality and requirement of renal replacement therapy in patients with Type 1 diabetes: a 29 year prospective observational study

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Aims/objectives: We investigated long-term mortality and requirement of renal replacement therapy (RRT) in an observational cohort study of 647 patients with Type 1 diabetes to study risk factors for late complications and mortality.

Methods: The anthropometric and laboratory data of all Type 1 patients with diabetes attending their yearly diabetes check-up at our outpatients department in 1983 (n = 647, 47% females) were recorded. In 2012 we investigated the two endpoints death and renal replacement therapy by record linkage with national registries. The patients were grouped according to quartiles of their baseline HbA1c.

Results: During the 29 year follow-up, 145 patients died [mortality rate 860 (95% confidence interval (CI) 721–1000) per 100,000 person-years] and 55 received renal replacement therapy [incidence rate 335 (95% CI 247–424) per 100,000 person-years]. Mortality was higher in males ($p < 0.02$), but incidence of RRT was equally high in both genders. Patients in the highest HbA1c quartile (HbA1c > 8.3%) had the highest mortality rate and incidence of RRT ($p < 0.05$). In Cox proportional hazards analyses age, HbA1c, gender, microalbuminuria and macroalbuminuria and previous RRT were predictors of mortality. Presence of microalbuminuria or macroalbuminuria at baseline, HbA1c above 8.3%, creatinine clearance and body mass index were predictors of requirement of RRT.

Conclusions/summary: In this cohort of Type 1 patients with diabetes who were observed over a long period of time, poor glycaemic control and the presence of microalbuminuria or macroalbuminuria were linked to increased mortality and necessity of RRT, which emphasizes the necessity of good glycaemic control.

A77 (P447)

The interrelationship between hypertension, chronic kidney disease and proteinuria in people with diabetes: a cohort study

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Aims: There is a complex interrelationship between hypertension and chronic kidney disease (CKD) in people with diabetes. We developed a logistic regression model to explore their effect on adverse renovascular outcomes.

Methods: A cohort of adults (n = 35,502) with diabetes from the Quality Improvement in Chronic Kidney Disease (QICKD) trial has been followed up over a period of 2.5 years. The logistic regression model identified the contribution to renovascular risk of hypertension and CKD. We used a composite outcome of all-cause mortality, cardiovascular events and progression to end-stage renal failure. Other known cardiovascular risk factors were adjusted for.

Results: In the cohort 15,813 (44.5%) people were found to have CKD. Comorbid hypertension was present in almost everyone with CKD: 15,244 (96.4%). In all, 5,862 (16.5%) people were identified who had hypertension without CKD. The odds ratio (OR) of an adverse outcome was 1.16 [95% confidence interval (CI) 1.00–1.34; $p = 0.049$] for people with diabetes, hypertension and CKD, and 1.62 (95% CI 1.39–1.88; $p < 0.001$) for people with diabetes, hypertension and CKD with proteinuria. People with diabetes, no hypertension and CKD did not have a significantly increased OR, whereas people with diabetes, no hypertension and CKD with proteinuria did: OR 2.02 (95% CI 1.06–3.84; $p = 0.033$).

Conclusions: In people with diabetes and CKD, with or without hypertension, proteinuria increased the OR of an adverse renovascular event. There is a very strong correlation between hypertension and CKD in people with diabetes.

A78 (P448)

People with diabetes and unmonitored renal function are at increased risk of an adverse outcome: a cohort study

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Aims: We investigated the impact of failing to monitor renal function on adverse outcomes in people with diabetes using routinely collected primary care data.

Methods: A cohort of people with diabetes (n = 35,502) from the Quality Improvement in Chronic Kidney Disease (QICKD) trial was followed up over a period of 2.5 years. A composite outcome of all-cause mortality, cardiovascular events and progression to end-stage renal failure was used. The outcome of known renal function was compared with the outcome of people who had not had their renal function monitored, using a multilevel logistic regression model.

Results: Proteinuria and estimated glomerular filtration rate had been measured in primary care for the majority of the cohort (87.4%). People who had not had their renal function monitored were at higher risk of cardiovascular events and death than those with normal renal function: odds ratio 1.42 (95% confidence interval 1.21–1.66, $p < 0.001$). People with proteinuria only, CKD stages 3–5 only and CKD stages 3–5 with proteinuria had an odds ratio of adverse outcome of 1.24 (1.10–1.41, $p < 0.001$), 1.18 (1.04–1.34, $p = 0.012$) and 1.65 (1.44–1.89, $p < 0.001$) respectively. People with unmonitored renal function were found to have lower prescription rates of ACE inhibitors or angiotensin II receptor blockers (41.4%) than patients with no evidence of CKD (54.8%) or patients with CKD (76.3%).

Conclusions: Monitoring of renal function in primary care for people with diabetes is suboptimal. Unmonitored individuals are less likely to be on renoprotective medication which may contribute to the higher risk of progressive renal impairment and cardiovascular events.