EDITOR'S CHOICE

Pilot study of random finger prick glucose testing as a screening tool for type 2 diabetes mellitus in the emergency department

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ABSTRACT

Background: A study was undertaken to determine the prevalence of undiagnosed hyperglycaemia among patients in the emergency department (ED) and to evaluate the usefulness of random fingerprick plasma glucose (RFPG) screening in the ED with GP follow-up.

Methods: A cross-sectional pilot study of 101 non-diabetic patients in the ED aged ⩾45 years was performed.

Results: 31 (30.7%) had never had diabetic screening. 67 (66.3%) had plasma glucose levels ⩾5.5 mmol/l and were advised to consult their GP; 38 (56.7%) did so and 23 (60.5%) of these had follow-up testing. Nine patients (8.9%) were ultimately diagnosed with impaired glucose metabolism.

Conclusion: There is considerable potential for diabetic screening in the ED setting.

It is estimated that 7.2% of Australians aged >25 years have type 2 diabetes mellitus and that 50% are undiagnosed.[1–4] We aimed to determine the prevalence of undiagnosed hyperglycaemia among patients in the emergency department (ED) and to evaluate the usefulness of random fingerprick plasma glucose (RFPG) screening in the ED with GP follow-up.

METHODS

A prospective cross-sectional pilot study was performed between June 2006 and March 2007 in a tertiary referral ED (annual census 55 000). Convenience samples of consecutive patients presenting during 13 separate 4-hour enrolment periods on all 7 days of the week were enrolled. Enrolment periods were dictated by the availability of the principal investigator, were scattered throughout the study period and comprised approximately equal numbers of 08.00–12.00 h, 12.00–16.00 h and 16.00–20.00 h blocks. Patients were excluded if they were aged <45 years, refused to participate, were diabetic or unable to consent due to illness or communication difficulty.

Data were collected using a researcher-administered questionnaire prior to RFPG testing. The primary end points were the proportions of patients who had hyperglycaemia (RFPG ⩾5.5 mmol/l, the Diabetes Australia screening cut-off level), who followed up after an abnormal screening result and who were ultimately found to have abnormal glucose tolerance.

The RFPG was measured with a single MediSense Optium machine (Abbott Laboratories, Doncaster, Australia). Patients with RFPG ⩾5.5 mmol/l were advised to consult their GP within 1 month of discharge and were followed up by telephone at 2 months.

RESULTS

Of 394 consecutive patients who presented during the 13 enrolment periods, 293 were excluded (178 aged <45 years, 46 diabetic, 61 unable to consent, 8 refused). Of the 101 patients enrolled, 31 (30.7%, 95% confidence interval (CI) 22.1% to 40.8%) had never been screened for diabetes. Sixty-seven patients (66.3%, 95% CI 56.2% to 75.3%) had an RFPG ⩾5.5 mmol/l (range 5.5–12.7 mmol/l). Thirty-eight (56.7%) of these followed up with their GP and 23 (60.5%) had follow-up tests. Nine enrolled patients (8.9%, 95% CI 4.4% to 16.7%) were ultimately diagnosed with impaired glucose metabolism.

Patients failed to follow up for a variety of reasons including no memory of the ED visit or GP referral letter (n = 12), too busy (n = 9), thinking the hospital would take care of them (n = 7), having died (n = 6) or being too ill (n = 5).

Patients with RFPG ⩾5.5 mmol/l tended to be female and to have a family history of diabetes, a lower level of education, a higher body mass index and symptoms of polydipsia (table 1).

DISCUSSION

While approximately 9% of our patients were diagnosed with abnormal glucose tolerance, the true prevalence is unknown as almost half did not follow up. However, the results are consistent with other ED studies and indicate that considerable proportions of patients in the ED with this condition are undiagnosed. George *et al*[5] identified 4.9% of patients with undiagnosed abnormal glucose tolerance. Charfen *et al*[6] found that 130 (67.0%) of 194 high-risk or hyperglycaemic patients had potentially clinically important abnormalities of glucose homeostasis on retesting.

Given these findings, there is considerable potential for diabetic screening in the ED setting. Ultimately, however, the success of ED screening will be dependent upon follow-up testing. Effort is required to maximise follow-up rates including mailing GPs directly, ED diabetes education and alternatives for follow-up testing. The failure of some GPs not to retest was surprising but consistent with the low rates of previous screening. The findings suggest a lack of GP proactivity rather than infrequent GP visits. The enthusiasm expressed by our patients for opportunistic screening in the ED is encouraging. However, cost-effectiveness studies

Table 1 Patient variables as a function of RFPG level

	RFPG <5.5 mmol/l (n = 34)	RFPG ⩾5.5 mmol/l (n = 67)
Men	21 (61.8%)	29 (43.4%)
Median (range) age (years)	69.5 (45–92)	71.0 (47–80)
Family history of diabetes	10 (29.4%)	22 (32.8%)
Completed secondary education	11 (31.5%)	13 (19.4%)
Median (range) BMI (kg/m^2)	25.0 (19.1–38.3)	26.8 (15.7–41.6)
Median (range) RFPG (mmol/l)	5.0 (3.5–5.4)	6.6 (5.5–12.7)
GP reviews less frequently than every 6 months	28 (82.4%)	59 (88.1%)
Never been screened	10 (29.4%)	21 (31.3%)
Polydipsia	10 (29.4%)	23 (34.3%)
Urinary frequency	8 (23.5%)	17 (25.4%)

to evaluate the resource implications and ultimate worth of ED screening will be required.

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