SHORT REPORTS

Effect of an extra intake of carbohydrate at dinner on morning after fasting plasma glucose values in types I and II diabetes

When confronted with an unusually high fasting blood glucose value diabetic patients often blame an exceptionally large meal the preceding evening. What we know about digestion time,^{1,4} however, may make this explanation seem unlikely, and we therefore decided to put it to the test.

Patients, methods, and results

We studied 58 diabetic patients admitted to hospital for education and improvement in their metabolic control. They received in random order at 1900 on two consecutive days either their usual meal (meal A) or an identical meal supplemented by an extra load of carbohydrates along with protein and fat (meal B). Of the 58 patients, 31 had insulin dependent (type I) disease (18 men, 13 women; mean age 43.9 (SD 13.9) years; weight 66.4 (10.6) kg; height 168 (11) cm; duration of disease 12.2 (7.8) years); 26 received two insulin injections daily, three received three injections daily, and two one injection a day plus a 7.5-8.4 MJ (1800-2000 kcal) 50% carbohydrate diet. The 27 other patients had non-insulin dependent (type II) disease (12 men, 15 women; mean age 55.8 (SD 8.3) years; weight 73.3 (9.3) kg; duration of disease 10.3 (6.2) years) treated with a 5.0-5.9 MJ (1200-1400 kcal) diet either alone (n=3) or plus metformin 850 mg/day (n=20) or metformin 850 mg/day and glibenclamide 15 mg/day (n=4).

Individual differences in fasting plasma glucose (Δ FPG) concentrations between the supplemented (meal B) and standard (meal A) meals in the two groups of diabetics. Difference recorded as positive when $\text{FPG-B} > \text{FPG-A}$ and negative when $\text{FPG-A} < \text{FPG-B}$. Bars are means and SD.

Conversion: SI to traditional units—Glucose: 1 mmol/l $\approx$ 18 mg/100 ml.

Meal A given to patients with type I disease consisted of 75 g carbohydrate, 25 g fat, 40 g protein, 2.9 MJ (685 kcal) in those receiving a 7.5 MJ diet or 85 g carbohydrate, 25 g fat, 40 g protein, 3.0 MJ (725 kcal) in those receiving an 8.4 MJ diet. Meal A given to patients with type II disease consisted of either 55 g carbohydrate, 15 g fat, 35 g protein, 2.1 MJ (495 kcal) or 60 g carbohydrate, 15 g fat, 40 g protein, 2.2 MJ (535 kcal) in those receiving a 5.0 or 5.9 MJ diet.

Meal B was the same as meal A but with the addition of a piece of homemade cake providing an extra 90 g carbohydrate (53 g as starch, 37 g as sucrose), 12 g fat, and 13 g protein—that is, a supplement of 2.1 MJ (508 kcal).

Venous blood samples were collected at 1900 (before each meal) and at 0800 the next day and analysed for plasma glucose concentrations (autoanalyser; Beckman, Fullerton, USA).

Statistical analysis was by Student's *t* test for paired or unpaired data and linear regression analysis. Results are given as means and standard deviation (SD).

Patients with type I disease—In the 31 patients with type I diabetes the plasma glucose concentrations before meals A and B were 11.8 (3.1) and 12.2 (3.9) mmol/l (212 (55) and 219 (70) mg/100 ml) respectively ($p=0.35$; NS). The mean

fasting plasma glucose concentrations at 0800 after the two meals (FPG-A, FPG-B) were 12.2 (5.3) and 14.2 (5.3) mmol/l (219 (95) and 255 (95) mg/100 ml) respectively ($p<0.02$). The figure shows the individual differences in fasting plasma glucose values between meals A and B. In 21 cases the difference was positive (FPG-B $>$ FPG-A), in nine negative, and in one nil. The mean difference was 2.1 (4.7) mmol/l (37 (84) mg/100 ml).

Patients with type II disease had mean values of 9.7 (2.6) and 9.4 (2.8) mmol/l (174 (47) and 170 (51) mg/100 ml) before meals A and B, respectively ($p=0.5$; NS), and at 0800 values of 10.6 (2.8) and 10.9 (2.9) mmol/l (191 (51) and 197 (53) mg/100 ml) ($p=0.6$; NS). The individual differences in fasting values between the two meals were positive in 13 cases, negative in 11, and nil in three, with a mean of 0.3 (3.1) mmol/l (6 (55) mg/100 ml) (figure).

In neither group of patients did the fasting plasma glucose concentration correlate with the degree of metabolic control as judged by the mean of the two following fasting plasma glucose values—(FPG-A + FPG-B)/2.⁵

Comment

These findings show that after a largely enriched meal containing a considerable amount of carbohydrate taken at 1900 the fasting plasma glucose concentration at 0800 the next day was slightly but significantly higher in patients with type I diabetes but not in those with type II disease. The deterioration in type I was not accompanied by symptoms and in most cases was of little importance. Though such an extra load of carbohydrate may have a deleterious effect on postprandial blood glucose control in patients with type II or type I diabetes, and therefore should be avoided (unless they are lean and adjust their insulin accordingly), the excess cannot be detected from the fasting blood glucose value next morning.

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Department of Diabetes, Hôtel-Dieu Hospital, 75181 Paris Cedex 04, France

J BELKHADIR, MD, lecturer
T ROSSET, MD, lecturer
F ELGRABLY, MD, senior registrar
M J HAARDT, MD, lecturer
F BORNET, MD, consultant physician
G TCHOBROUTSKY, MD, professor and head of department
G SLAMA, MD, professor and consultant physician

Correspondence to: Professor Slama.

Totally implantable vascular access for long term chemotherapy

Patients receiving repeated courses of cytotoxic treatment require central venous access when peripheral administration of cytotoxic agents is ruled out by inadequate peripheral veins. Such central access may also be valuable for patients with haemophilia and other haematological diseases. Central venous access has traditionally been achieved by repeated cannulation and more recently by using long term, tunnelled, percutaneous catheters, such as the Hickman catheter. To attempt to circumvent the inconvenience and sepsis associated with such catheters¹⁻³ the "Port-A-Cath" system has been developed, which is totally implantable. This system consists of a silicone catheter connected to a 2.5 $\times$ 1.3 cm stainless steel chamber, in which there is a silicone injection port (figure).

Under general or local anaesthesia the catheter is inserted into a central vein through the arm, neck, or groin and connected by a subcutaneous tunnel to the portal, which is implanted subcutaneously on the chest wall. In

women the portal can often be concealed in the edge of the breast. The portal must be flushed both monthly with heparinised saline and after each use.

Patients

Port-A-Cath systems were inserted in 40 patients (16 men, 24 women) at three centres. Thirty seven patients had malignant disease, two aplastic anaemia, and one Christmas disease. The cephalic vein was used for access in 26 patients, the internal jugular vein in 10, the subclavian vein in two, and the external jugular and external iliac veins in one each. Eleven patients received cover with prophylactic antibiotics when their portals were inserted.

At insertion nine patients had abnormal white cell counts, two patients abnormal clotting variables, and five patients platelet counts below $20 \times 10^9/l$. The portal was used for blood sampling, as well as administration of virtually all the commonly used cytotoxic agents and blood and blood products.

Thirty six patients found the Port-A-Cath entirely satisfactory, but four found it unacceptable, due largely to discomfort when inserting the needles. The six patients who had previously had an arteriovenous fistula or Hickman catheter for prolonged venous access much preferred the Port-A-Cath. The portals had been in position for an average of 11.6 months (range 1-24 months), and most were still in use, only six having been removed.

Five important complications have occurred, all attributable to errors in the use of the portal. Two portals became infected. One portal was extruded spontaneously when the wound broke down after the start of high dose chemotherapy within 24 hours of inserting the portal. Two portals thrombosed, but one was cleared with urokinase. Four patients died with their Port-A-Cath in situ. None of these deaths could be attributed to the Port-A-Cath.

Diagram of implanted portal.

Comment

The Port-A-Cath system is a totally implantable unit that is simple to use. It allows blood samples to be taken or drugs to be administered intermittently over a long period. The only potential source of infection is an inadequate sterile technique at injection. This accounted for the two septic complications in our series. Meticulous technique is essential, and we suggest that only experienced staff should use the portal. Thrombosis is an avoidable complication if the portal is flushed monthly with heparinised saline, although several patients lasted over two months between flushes. There is an undoubted learning curve with this system, and we have encountered fewer complications as experience has accrued. Our results, however, compare favourably with those of other series.^{4,5} Patients can inject the portal themselves. One patient has successfully injected factor IX 150 times.

The Port-A-Cath offers considerable advantages over alternative forms of prolonged central venous access. It provides a reliable and easily managed long term route to the central venous system for the clinician, and is acceptable and inconspicuous for the patient, allowing normal life between courses of chemotherapy.

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St Thomas's Hospital, London SE1 7EH

A E YOUNG, MChir, FRCS, consultant surgeon
D R ALLEN, FRCS, surgical registrar
KATHERINE HARROP-GRIFFITHS, FRCS, surgical registrar

Broadgreen Hospital, Liverpool

W A CORBETT, FRCS, lecturer in surgery

University Hospital of South Manchester, Manchester

M LAMBERT, FRCS, lecturer in surgery

Correspondence to: Mr Young.

Bleeding from peptic ulcers and use of non-steroidal anti-inflammatory drugs in the Romford area

We are conducting a trial of electrocoagulation in the treatment of bleeding peptic ulcers. A recent report of peptic ulcers related to piroxicam¹ prompted us to examine our data to see how many patients presenting with bleeding peptic ulcers were taking this or other non-steroidal anti-inflammatory drugs. We did not distinguish between different formulations or proprietary preparations of the same drug.

Present series and results

Between November 1982 and March 1985, 460 patients with a presumptive diagnosis of upper gastrointestinal bleeding were examined by gastroscopy within 24 hours of admission. A total of 204 patients were noted to have peptic ulcers, which were bleeding or had stigmata of recent haemorrhage (adherent clot or visible vessel). The data collected about these patients included medication before admission. Unfortunately, other information such as length of treatment was not collected routinely as this was not central to our study. For this reason also data were not collected on patients bleeding from other causes.

Of the 204 patients, 53 (26%) had been taking non-steroidal anti-inflammatory drugs before admission. The table shows the number and percentage of patients taking the commonly found drugs and their mean age. It also shows the frequency of prescription of those drugs nationally and within the North East Thames region in 1983.

There was a difference between the observed distribution and that expected from the North East Thames prescribing data ($\chi^2=13.6$; $df=4$; $p<0.01$). This difference lay mainly with piroxicam and ketoprofen, which were observed more frequently, and with ibuprofen, which was observed less frequently than expected from the prescribing frequency. This assumes that the prescribing frequencies in the Romford area were representative of the regional figures.

Of the 14 patients receiving piroxicam, 12 were taking this drug alone. It is claimed that both piroxicam and ketoprofen are rarely associated with upper gastrointestinal haemorrhage^{2,4} and so might be given to those patients with previous peptic ulceration. The table shows that few of the patients presenting with bleeding peptic ulcers while taking these drugs had a history of peptic ulceration.

Comment

It is suspected that non-steroidal anti-inflammatory drugs may be associated with peptic ulceration and its complications. If piroxicam and ketoprofen are rarely associated with gastrointestinal haemorrhage, then we might expect fewer patients to present with peptic ulcer bleeding while receiving these drugs. Both drugs are commonly prescribed, however, so we tried to obtain a comparison with the prescribing frequency in our region. From this it appears that these drugs are more frequently associated with gastrointestinal bleeding than might be expected. We cannot exclude the possibility that other drugs prescribed before those indicated might have contributed to the peptic ulceration. The possibility of the district having a different prescribing pattern from the region also cannot be excluded. Unfortunately, more local data are not available, so there is no way of confirming or refuting this.

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