Their study demonstrates an expected physiological response of the myocardium to stress factors such as indicated above, and does not imply any specific abnormality in diabetic patients.

Yours sincerely,
A. D. B. Harrower

References

1. Thuesen I, Sandahl Christiansen J, Falstie-Jensen N, Christiansen CK, Hermansen K, Mogensen CE and Henningsen P (1985) Increased myocardial contractility in short-term Type 1 diabetic patients: an echocardiographic study. Diabetologia 28: 822-826
2. Harrower ADB, Small DR and Railton R (1986) Variability of left ventricular function at diagnosis and after treatment in insulin dependent diabetes. Diabetes Res (in press)

Dr. A. D. B. Harrower
Medical Unit
Monklands District General Hospital
Monkscourt Avenue
Airdrie ML6 OJS
UK

Reply from the authors

Dear Professor Berger,

We appreciate the comments by Dr. Harrower on our paper [1]. We fully agree that haemodynamics in Type 1 (insulin-dependent) diabetic patients during conditions of standard, and especially during conditions of poor, metabolic control is influenced by several factors, and that similar echocardiographic abnormalities are likely to be found in patients suffering from diseases other than diabetes. The important thing, however, is that haemodynamic abnormalities seem to be reversible with correction of the metabolic disturbances seen in diabetes, as also reported by Mathiasen et al. [2]. These findings seem completely compatible with the above-mentioned results from Dr. Harrower's group.

On the other hand, we do not agree that the demonstrated cardiac hypercontractility demonstrated in the 24 diabetic patients during conditions of standard metabolic control is merely a function of increased heart rate. Mean circumferential shortening velocity is certainly influenced by heart rate, which is closely related to ejection time, but left ventricular fractional shortening is not.

We accept that increased myocardial contractility is an expected physiological response of the myocardium to stress factors and, therefore, fully agree that the findings reported by no means are specific to diabetes mellitus. However, as also discussed in the paper [1], we find that hypercontractility can be found in Type 1 diabetic patients during ordinary 'out-patient' metabolic conditions. Therefore, it can be considered a part of everyday life, and might be of clinical relevance, since haemodynamic changes are likely to play an important part in the development of diabetic microvascular disease.

Yours sincerely,
L. Thuesen and J. Sandahl Christiansen

References

1. Thuesen L, Sandahl Christiansen J, Falstie-Jensen N, Christensen CK, Hermansen K, Mogensen CE, Henningsen P (1985) Increased myocardial contractility in short-term Type 1 diabetic patients: an echocardiographic study. Diabetologia 28: 822-826
2. Mathiesen ER, Hilsted J, Feldt-Rasmussen B, Bonde-Petersen F, Christensen NJ, Parving H-H (1985) Effect of metabolic control of haemodynamics in short-term insulin-dependent diabetic patients. Diabetes 34: 1301-1305

Dr. L. Thuesen
II University Clinic of Internal Medicine
and University Department of Cardiology
Kommunehospitalet
DK-8000 Aarhus C
Denmark

Abnormal identification of the sweet taste of D-glucose anomers

Dear Sir,

Several physiological processes triggered by D-glucose, such as the stimulation of insulin secretion or the inhibition of glucagon release, display anomeric specificity, with α-D-glucose being more efficient than β-D-glucose [1, 2]. In the islet cells, the anomeric specificity of the secretory response is thought to be secondary to the higher rate of utilization of α- as distinct from β-D-glucose, as recently reviewed in this journal [3]. The α-anomer of D-glucose was also reported to taste sweeter than the β-anomer [4]. A perturbation of the latter hierarchy in an otherwise normal subject is reported here.

Normal and diabetic subjects were asked to taste three iced solutions containing either no glucose or each of the two anomers dissolved in water immediately prior to the test at a concentration of 4 g/dl. The latter concentration was selected on the basis of 20 preliminary trials in which normal subjects were invited to taste iced solutions containing increasing concentrations of equilibrated D-glucose (nil, 0.6, 1.2, 1.8, 2.5 and 5.0 g/dl). The perception of a sweet taste was usually achieved at a concentration of 1.2 g/dl (13 cases) or more (7 cases). However, up to 1.8 g/dl, the establishment of a graded response was often doubtful. This was never the case in the range between 1.8 and 5.0 g/dl. Fifteen normal subjects, 6 males and 9 females, 25 to 57 years old, all members of our laboratory staff, identified α-D-glucose as sweeter than β-D-glucose when tested on one (7 cases), two (6 cases) or three (2 cases) separate occasions, with only 3 hesitant responses in a total of 25 trials. One member of our staff, a normal female aged 42, identified β-D-glucose as sweeter than α-D-glucose on five distinct occasions over a period of one year. On three of these occasions, 2 to 4 iterative trials were performed, and opposite results were also encountered. Thus, in this subject, the hierarchy in the sweet taste of D-glucose anomers was considered to be absent, if not reversed. Her two sons were also tested twice during each of two separate interviews. The oldest son (12 years) identified α-D-glucose as sweeter all 4 times, whilst the youngest son (10 years) did so in 3 out of 4 trials.

Since diabetes mellitus is proposed to represent a disorder of the α-stereospecific glucoreceptor [4], 23 diabetic subjects from the diabetes outpatient clinic, including 9 males and 14 females, aged 19 to 82 years, were also examined each on only one occasion. Seventeen subjects [8 Type 1 (insulin-dependent) and 9 Type 2 (non-insulin-dependent) patients] identified α-D-glucose as sweeter than β-D-glucose. Three patients, aged 30 to 57, provided a faltering answer; 3 other patients, aged 57 to 73, selected β-D-glucose as the sweetest anomer. These 6 patients included 3 Type 1 and 3 Type 2 diabetic patients. It would thus appear that the normal anomeric preference in taste is often preserved in diabetic patients. However, considering the size of both the normal and diabetic samples, as well as the differences in age and cultural status between these two groups, we feel it premature to elaborate on the precise incidence of anomeric preferences in healthy and diabetic subjects. Nevertheless, the knowledge that certain persons may fail to identify the sweeter taste of the α-an-

omer of D-glucose should encourage more sophisticated studies on the anomeric preference of other physiological and biochemical processes [5] in both normal subjects and patients affected by a perturbation of glucose homeostasis.

Yours sincerely,
F. Malaisse-Lagae and W.J. Malaisse

References

1. Niki A, Niki H, Miwa I, Okuda J (1974) Insulin secretion by anomers of D-glucose. Science 186: 150–151
2. Matschinsky FM, Pagliara AS, Hover B, Haymond MW, Stillings SN (1975) Differential effects of alpha- and beta-D-glucose on insulin and glucagon secretion from the isolated perfused rat pancreas. Diabetes 24: 369–372
3. Malaisse WJ, Sener A (1985) Glucokinase is not the pancreatic B-cell glucoreceptor. Diabetologia 28: 520–527
4. Niki A, Niki H (1975) Is diabetes mellitus a disorder of the glucoreceptor? Lancet 2: 658
5. Malaisse WJ, Malaisse-Lagae F, Sener A (1983) Anomeric specificity of hexose metablism in pancreatic islets. Physiol Rev 63: 773–786

Dr. W.J. Malaisse
Laboratory of Experimental Medicine
Brussels Free University
115, Boulevard de Waterloo
B-1000 Brussels
Belgium