

An Eastern art form for a Western disease: randomised controlled trial of yoga in patients with poorly controlled insulin-treated diabetes.

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Abstract

There is increasing interest in the use of complimentary therapies. At present, there is a paucity of data examining the effectiveness of such therapies in patients with diabetes. We have examined the influence of providing yoga for patients with diabetes that is poorly controlled despite the best efforts of the multidisciplinary team.

After obtaining ethical approval, 37 patients with poorly controlled diabetes were randomised to a traditional intensive education programme and simple exercises or a 16 week (32 session) Hatha yoga plan.

Participation in regular yoga sessions did not improve glycaemic control but insulin requirements remained stable in the yoga group and increased in the controls. Although quality of life was not altered, all but one subject in the yoga group opted to continue with yoga long term after completion of the study. Copyright © 2002 John Wiley & Sons, Ltd.

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Key words

yoga; complimentary therapies; insulin

Introduction

Dealing with the poorly controlled patient with diabetes already on insulin is a common and perplexing problem. Exercise may be beneficial, but is often not taken up because of social embarrassment, poor self-esteem and a negative view of body image. Participation in a supervised exercise programme does not inevitably result in weight loss or improved insulin sensitivity¹.

Yoga aims for the perfect union of body, mind and spirit, through a system of pos-

tures, breath controls, sounds and meditation. Small, uncontrolled studies suggest that regular yoga can have beneficial effects on blood glucose, body weight and a reduction in the need for oral hypoglycaemic agents in patients with type 2 diabetes². The aim of this study was to determine whether participation in regular yoga sessions would benefit patients with poorly controlled insulin treated diabetes mellitus.

Participants and Methods

After obtaining ethical approval, 37 patients with poorly controlled diabetes ($HbA_{1c} > 8.5\%$ despite insulin and intensive education, 14 with type 1 diabetes) were recruited from our hospital diabetes clinic. All participated in four, monthly group education sessions run by the multidisciplinary team. Topics covered were use of insulin, diet and carbohydrates, complications and a general workshop on diabetes. Information and advice about simple exercise was also given. At the first visit they were randomised, using opaque envelopes to conceal allocation, to continuing with the education and simple exercises (control group) or to participate in a 16 week (32 session) Hatha yoga plan attending bi-weekly with each session lasting 90 min. Endpoints were measured at baseline, 1, 2, 3 and 4 months and sum-

marised as an average monthly change for each individual. Quality of life was assessed using a validated questionnaire based tool³. Four subjects in the control group dropped out early in the study and provided no further data. Four subjects discontinued yoga after one session because of musculoskeletal problems (three individuals) and new onset angina (one individual), but still contributed data.

Results

Patient details at baseline are given in Table 1. Means of the average monthly increase in each parameter are compared between the two groups using the independent samples *t*-test. Baseline values of each parameter, age and type of diabetes were adjusted for using multiple linear regression. Results (Table 2) are presented as the mean difference in average monthly increase between the groups with the 95% confidence interval and *p*-value. Positive values indicate that the average monthly increase tends to be higher in controls.

Comment

Subjects in this study were recruited on the basis of poor control despite multiple visits to the diabetes multidisciplinary team and insulin injection therapy and thus the traditional medical model appeared to have

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Table 1. demographic details (mean and standard deviation)

Baseline parameters	Yoga group	Control group
Age	60.3 years (7.8)	61.4 years (10.7)
Duration of diabetes	10.6 years (5.3)	14.3 years (8.7)
Weight	85.9 kg (16.3)	76.6 kg (14.9)
HbA _{1c}	9.6% (1.1)	10.1% (1.5)
Chol	5.2 mmol (0.6)	5.6 mmol (0.9)
Tgs	3.1 (2.4)	2.3 (1.4)
HDL	1.1 (0.4)	1.5 (0.5)
LDL	3 (0.6)	3.4 (0.9)
Ratio	5.1 (1.9)	4.2 (1.3)
SBP	154.4 mm Hg (23.1)	145.4 mm Hg (21.9)
DBP	81.3 mm Hg (8.8)	79.5 mm Hg (8.8)

Table 2. Results presented as mean difference in average monthly increase between groups with 95% confidence intervals and *p*-value.

N = 33	Average increase per month	(Ave. increase per month in controls)–(ave. increase in yoga group)	Ave. increase per month in controls)–(ave. increase on yoga group) adj. for baseline, age and type of diabetes
	Mean (95% CI) <i>p</i>	Mean (95% CI) <i>p</i>	Mean (95% CI) <i>p</i>
HbA _{1c}	-0.08 (-0.19,0.04) <i>p</i> = 0.18	0.03 (-0.21,0.27) <i>p</i> = 0.80	0.10(-0.14,0.34) <i>p</i> = 0.38
Tot cholesterol	-0.03 (-0.09,0.02) <i>p</i> = 0.19	0.04 (-0.07,0.15) <i>p</i> = 0.46	0.12(0.00,0.24) <i>p</i> = 0.05
TGs	0.01 (-0.09,0.10) <i>p</i> = 0.89	0.16 (-0.02,0.35) <i>p</i> = 0.08	0.17 (-0.04,0.39) <i>p</i> = 0.11
HDL	0.03 (0.01,0.04) <i>p</i> = 0.009	-0.01 (-0.04,0.03) <i>p</i> = 0.76	0.00 (-0.04,0.05) <i>p</i> = 0.89
LDL	-0.06 (-0.10,-0.01) <i>p</i> = 0.02	0.02 (-0.07,0.12) <i>p</i> = 0.61	0.05 (-0.06,0.17) <i>p</i> = 0.32
Chol:HDL ratio	-0.11 (-0.19,-0.04) <i>p</i> = 0.01	0.14 (-0.03,0.31) <i>p</i> = 0.10	0.10 (-0.08,0.27) <i>p</i> = 0.27
Systolic	-0.4 (-1.8,1.0) <i>p</i> = 0.55	0.9 (-1.9, 3.8) <i>p</i> = 0.51	1.2 (-1.7,4.1) <i>p</i> = 0.40
Diastolic	-0.0 (-0.7,0.6) <i>p</i> = 0.90	-0.7 (-2.0,0.7) <i>p</i> = 0.34	-0.1 (-1.5,1.2) <i>p</i> = 0.84
Weight	0.04 (-0.16,0.23) <i>p</i> = 0.69	0.00(-0.40,0.40) <i>p</i> = 1.00	0.07 (-0.41,0.54) <i>p</i> = 0.77
QOL	0.4 (-0.2,1.0) <i>p</i> = 0.16	-0.5 (-1.7,0.7) <i>p</i> = 0.42	0.2 (-0.9,1.2) <i>p</i> = 0.76
Pulse rate	0.1 (-0.7,0.8) <i>p</i> = 0.88	0.6 (-0.9,2.1) <i>p</i> = 0.43	0.4 (-1.2,2.1) <i>p</i> = 0.60
Daily insulin requirement	1.1 (-0.4, 2.6) <i>p</i> = 0.13	1.9 (-1.0, 4.0) <i>p</i> = 0.19	3.1 (0.2, 5.9) <i>p</i> = 0.04

little else to offer. Participation in regular yoga sessions did not improve glycaemic control, although sample size was small and confidence intervals wide. With yoga, insulin requirements remained stable whilst daily requirements increased in the

control group. The failure of yoga to influence quality of life was surprising as all but one subject in the yoga group opted to continue with yoga long-term after completion of the study.

The practice of yoga is associated with

improvements in mood and well-being with the effect greater than that seen with aerobic exercise⁴. These effects may be mediated through the hypothalamic–pituitary–adrenal axis, although recent evidence indicates that yoga and meditation

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Key Points

- Yoga appears to be a safe and popular additional therapy for patients with insulin treated diabetes
- Although HBA1c is unchanged, insulin dose requirements are stabilised.

can produce changes in brain electrical activity, cerebral blood flow and glucose metabolism⁵.

Although a number of novel pharmacological agents may become available for the treatment of diabetes, it is likely that none will be free from adverse effects or be inexpensive. There is evidence that patients are increasingly interested in complimentary approaches to care although few of these

'therapies' have been subjected to rigorous scientific assessment. Nevertheless, unlike many 'traditional' therapies, yoga may be applicable to a large number of diabetic individuals and appears to be safe, inexpensive and remarkably popular with its consumers. However, it remains to be determined whether this form of complimentary therapy produces tangible benefits for different groups of patients with diabetes.

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Diabetes Vignettes

Insulin injection site

No 19 in a regular educational series of brief illustrated descriptions of interesting or unusual diabetes-related cases and conditions.

Examination of the recommended insulin injection sites during annual review may not always be adequate. Here are examples of two patients who had a more thorough examination combined with improved communication after they complained of wide fluctuation in their blood glucose levels including hypoglycaemic attacks.

One patient recently (Figure 1) was discovered to have injected exclusively at the lateral aspect of the elbow for about 20 years. Another (Figure 2) was injecting into each lower limb between the knees and ankles. Convenience and easy accessibility were the reasons given for injecting into these abnormal sites.

Figure 1



Figure 2



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