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Synergy between thinness and intensive sports activity in delaying menarche

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Abstract

In a study to assess the effects of intensive physical activity and thinness on menarche records of 648 girls aged 10-14 were analysed. The girls were classified as thin or not thin on the basis of their body mass index, and whether or not they engaged in intensive sports activity was established. The presence of either thinness or intensive sports activity was associated with roughly a twofold decrease in the proportion of girls who had reached menarche; the presence of both factors was associated with roughly a fourfold decrease. These results did not appear to depend on age.

Thus intensive sports activity and thinness appear to have a synergistic effect in delaying menarche.

Introduction

Two recent reports by Frisch *et al*^{1,2} showed an association between intensive physical activity, thinness, and delayed menarche. It is difficult, however, to disentangle the potential effects of thinness and physical activity: the first report described the experience of ballet dancers, in whom both factors occur together,¹ and the second dealt predominantly with college athletes, augmented by only a small control group.² To gain insight into the respective roles of both factors a comparison should be made between equally thin girls who do and do not

engage in intensive physical activities, and vice versa. We found such a comparison could be made by reanalysing data previously collected during a population survey. Elsewhere³ we showed that the data from this survey are compatible with the hypothesis of an association between thinness and delayed menarche. Here, we have added physical activity to the analysis and looked into the interaction of both factors.

Subjects, methods, and results

Between 1975 and 1978 a population survey was undertaken in the Dutch town of Zoetermeer, a suburb near the Hague, to determine the prevalence of several chronic diseases and their determinants. Of a total of 13 462 invited inhabitants aged 5 and over, 10 532 participated. The overall response rate was 78%; in children and adolescents the response rate was 82% or higher. All participants were measured and weighed in indoor clothing and without shoes. Female subjects, in a part of the survey directed at establishing the prevalence of infections of the lower urinary tract, were asked about their age at menarche. In another part of the survey, directed at cardiovascular risk factors, we collected information about sports activity. In particular, we determined whether a person was engaged in intensive sports activity as a member of a sports club or participated in competition sport, or both.

The records of 648 girls aged 10-14 at the time of sampling were analysed. We classified the girls as being thin or not thin on the basis of the body mass index (weight in kg/(height in m)³), which is regarded as the best weight:height index for obesity.⁴ Thinness was defined as a body mass index of 17 or smaller. Likewise, we constructed yes-or-no categories for intensive sports activity, based on the information about membership of a sports club or participation in competition sport. In all four combinations of these categories we counted the number of girls who had reached menarche at the time of the survey.

The table shows the results. The presence of either thinness or intensive sports activity was associated with roughly a twofold decrease in the proportion of girls who had reached menarche. When both factors were present the decrease was about fourfold.

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Proportions of girls aged 10-14 who had reached menarche according to whether they were thin and indulged in intensive sports activity

			%	SE*	Proportion
Thin:					
Intensive sport	..	..	15	±3.4	16/109
No intensive sport	..	..	37	±4.3	47/126
Not thin:					
Intensive sport	..	..	47	±4.4	60/129
No intensive sport	..	..	75	±2.6	214/284

*SE = Standard error.

Discussion

Our data are compatible with the hypothesis that both thinness and physical activity may cause delayed menarche. In addition, the effects of these two factors seem synergistic⁵: several girls who would have reached menarche if either thinness or intensive sports activity had been present alone had not reached menarche when both factors were present together. Since metabolic changes are probably associated with sports activity and with thinness, synergism of the effects makes sense.

One objection to our analysis is that a certain body mass index might not have the same meaning in a person who is physically active as in a person who is not, owing to different lean:fat ratios. We have no means to correct for this in our data. Other possible objections might be that in subjects aged 10-14 the body mass index rises with age, and that at this critical age drastic changes in physical activity might occur. To take such confounding influences into account we performed the analysis

again with smaller age groups, halving the five-year age category. The synergistic relation persisted in each of the two resulting age groups. On finer stratification by single years of age the gradient between the thin and not-thin and sports and no-sports categories remained in the same direction, though the smallness of the numbers made it difficult to judge synergy confidently. Thus our data reinforce and refine the earlier hypotheses of Frisch *et al.*,^{1,2} particularly since the information was collected during a population survey without obvious selection and without advance knowledge about the factors entailed in the hypotheses.

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Bromocriptine in management of large pituitary tumours

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Abstract

Bromocriptine has an accepted place in the management of small pituitary tumours that secrete either prolactin or growth hormone. The treatment of large tumours with extrasellar extensions is more difficult, however: though surgery is the standard treatment, it is often unsuccessful in returning excessive hormone secretion to normal and may cause hypopituitarism. A prospective trial was undertaken to assess the frequency with which changes in pituitary function and size of large tumours occurs. Nineteen patients were studied before and during treatment with bromocriptine (7.5 to 60 mg/day) for three to

22 months, using contrast radiology and a detailed assessment of pituitary function. Eighteen patients had hyperprolactinaemia and two of these also had raised concentrations of growth hormone; one patient had an apparently non-functioning tumour. In 12 patients (63%) tumour size decreased with bromocriptine and no tumours enlarged. Nine patients had visual-field defects, which improved in seven, becoming normal in five. Pituitary function improved in nine patients (47%) becoming entirely normal in three.

Bromocriptine should be the treatment of choice in patients with large pituitary tumours with extrasellar extensions, provided close supervision is maintained.

Introduction

Bromocriptine, a long-acting dopamine agonist, lowers abnormal circulating hormone concentrations in patients with small pituitary tumours that secrete prolactin and growth hormone and it has an accepted place in their management.¹⁻⁶ The best treatment for large pituitary tumours that extend out of the sella turcica, however, is more difficult and controversial. Mostly these tumours secrete prolactin though they may be truly non-functioning or, more rarely, secrete either growth hormone or adrenocorticotrophin.⁷ Urgent surgical decompression is normally recommended if the tumour extends upwards to affect the visual pathways or laterally to affect the oculomotor nerve.

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