PostScript

LETTERS

Low calcium intake and hypovitaminosis D in adolescent girls

We recently reported that 73% of adolescent girls attending an inner city school in Manchester, UK had hypovitaminosis D (serum 25-hydroxyvitamin D concentration <30 nmol/l). However, none of the subjects had clinical features of vitamin D deficiency or disturbance of their serum calcium or inorganic phosphate concentrations.¹ Rajeswari *et al*² have suggested that low dietary calcium intake, which is common in many parts of India, exacerbates symptoms of vitamin D deficiency.

We studied 50 post-menarchal girls from a state-run school in Pune, India during February 2006, using a similar protocol to that used previously.¹ Informed consent was obtained from parents and the study was approved by the Ethical Committee of the Hirabai Cowasji Jehangir Medical Research Institute. None of the subjects were receiving vitamin D or any other dietary supplements. A 7 day food frequency questionnaire and Gopalan *et al*'s³ tables of the nutrient value of Indian foods were used to estimate daily dietary intake of calcium and vitamin D.

The findings of this study were compared with those of a companion study previously undertaken in Manchester (table 1). While there are always problems when comparing two cross-sectional studies, undertaken in different continents and using different biochemical assays, we were surprised to find that the prevalence of hypovitaminosis D in Pune girls (70%) living at latitude 18.34° N

(abundant sunshine) was similar to that in Manchester girls (73%) living at latitude 53.4°N. Secondary hyperparathyroidism, low serum calcium concentration, musculoskeletal symptoms and skeletal deformities were also more common among Pune girls. The median dietary calcium intake of Pune girls was 449 (356–538) mg/day, which is lower than the recommended intake for girls of this age in the UK (800 mg/day). Furthermore, the dietary calcium in Pune girls was derived from non-dairy products, such as vegetables, pulses and cereals, from which only approximately 10% of calcium is absorbed. Thus, the estimated amount of dietary calcium absorbed by Pune girls was only around 58 mg/day, explaining the higher incidence of secondary hyperparathyroidism. High serum parathyroid hormone concentration leads to increased synthesis of 1,25-dihydroxyvitamin D, which is known to degrade 25-hydroxyvitamin D to inactive 24,25-dihydroxyvitamin D, thereby depleting body stores of vitamin D.⁴ We therefore speculate that cutaneous vitamin D synthesis might have been normal in Pune girls but that their low calcium and high fibre diet led to depletion of body stores of vitamin D. From the results of this and our previous study,¹ we conclude that dietary calcium intake should be considered when assessing the adequacy of an individual's vitamin D status.

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Table 1 Clinical, biochemical and dietary parameters of Pune and Manchester girls

	Pune girls,* (n = 50)	Manchester girls,† (n = 51)
Age (SD), years	14.7 (0.7)	15.3 (0.4)
Weight, median (range), kg	39.4 (35.9–42.9)	54.5 (50.0–61.0)
Height, median (range), cm	150.8 (5.32)	158.5 (5.4)
Body surface area exposed to sunlight, median (range)	30%	14% (9.0%–19.0%)
Subjects with serum 25-hydroxyvitamin D concentrations <30 nmol/l	70%	73%
Subjects with parathyroid hormone concentration above the upper end of the assay reference range	48%	3%
Subjects with serum calcium concentration below the lower end of the assay reference range	74%	0%
Subjects who complained of non-specific aches and pains	76%	26%
Subjects with genu varum or genu valgum	44%	0%
Median time in seconds to complete the Gower's manoeuvre (a measure of proximal muscle function)	3 (2–5)	2.6 (2–4.4)
Estimated dietary vitamin D intake, µg/day	0.1 (0.1–0.8)	0.2 (0.1–0.9)
Estimated calcium intake (mg/day) derived from dairy products	65 (31–76)	401 (195–594)
Estimated daily total calcium intake, mg/day	449 (356–538)	Data not available

*Intact serum parathyroid hormone among Pune girls was measured using an immunoassay (BioSource, Europe, Nivelles, Belgium). The reference range is 1.1–6.4 pmol/l, sensitivity is 0.22 pmol/l and interassay variation is 10%. Serum concentration of 25-hydroxyvitamin D was measured using radioimmunoassay (DiaSorin, Stillwater, MN, USA). The sensitivity is 3.75 nmol/l and interassay variation is <5%.

†Biochemical assays have been previously described.¹

Blood pressure charts in UK children

The study by Jackson *et al* on blood pressure centiles for Great Britain¹ provides us with valuable information and insight into children's blood pressure centiles measured on automated monitors. This is the first time we have been able to see normative data for such large numbers of children in the UK.

There are, however, a few things in this publication that we would like to discuss. It is generally accepted that blood pressure in children depends not only on sex and age but also on the height of the child. The correlation with height is physiologic and needs to be taken into consideration when evaluating the child. In, for example, 2-year-old girls with height between the 5th and 95th centile, this difference can be 7 mm Hg. Thus, we were surprised to see only a weak correlation with height and disappointed to see that the authors' extensive data were not integrated with height.

The correlation with weight, found by the authors, has more to do with the increasing and often pathologic blood pressure in obesity. We also wondered if this strong correlation was related to the size of the blood pressure cuff. The difference between a cuff that

encircles 80% or 100% of the circumference of the arm can be significant, especially in obese children.

Secondly, we were surprised to see that the authors had redefined hypertension to be above the 98th centile compared to the commonly used 95th centile without any explanation. The definition of hypertension is clearly much more complex in children compared to in adults. Children, so far, lack long-term prospective outcome data showing which blood pressure is optimal for each age and the definition is thus strictly statistical. We do not dispute that the 98th centile might well be a better definition than the 95th. However, the international agreement that is followed by most doctors treating children with hypertension refers to the 95th centile not the 98th.

Thirdly, the blood pressure values shown in the new graphs are clearly much higher than those commonly used,² even if they are difficult to compare as different centiles are given. As an example, a 17-year-old boy of median height would be defined as hypertensive at 136 mm Hg in the old charts and at 143–144 mm Hg in the new. This is also a clinically very significant difference. One reason for this could be the well-known difference between manual and automated blood pressure measurements.

We would strongly suggest that the authors use their important data to set reference levels outlining the 95th centile for age and height centiles in children. Such graphs would be invaluable in clinical practice particularly where automated machines are the only available option for monitoring blood pressure in children.

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Blood pressure centiles for Great Britain: can they be safely applied to clinical practice?

The study by Jackson *et al*¹ attempts to fill a gap in our knowledge in a very important area. Paediatricians in the United Kingdom have traditionally not included a blood pressure measurement as part of routine clinical assessment, as hypertension is not generally considered to be a common paediatric problem. Those who did check blood pressure had to rely on normal values derived from European and North American studies. The provision of blood pressure centiles for Great Britain is therefore a big step in the right direction and this is warmly welcomed. The data have been pooled from large representative samples and the

methodology appears to be robust. The authors have chosen the well tested traditional nine-centile system, which all British health professionals are familiar with. However, a number of issues should be raised.

Firstly, the observed blood pressure appears to be remarkably high in a significant proportion of the paediatric population. This is most obvious in the pubertal boys, nearly quarter of whom would be labelled as hypertensive according to the definition suggested by the British Hypertension Society (BHS). In fact, the BHS classification of blood pressure level states that the optimal blood pressure for adults is a value of <120 mm Hg systolic and <80 mm Hg diastolic. Although <130 mm Hg and <85 mm Hg may be accepted as normal, any value above 130/85 mm Hg is at least high normal if not hypertensive.² This is not concordant with the international definition of high blood pressure as suggested by World Health Organization and International Society of Hypertension. In our own cardiology practice we struggle to see such high blood pressure values even in patients with coarctation of the aorta who have undergone surgery! Moreover, if the author's suggested definition of hypertension (blood pressure above the 98th centile) is applied, many children currently labelled as hypertensive would fall into the category of high normal/normal blood pressure. For any clinician this is a challenging conundrum. One has to ask if it is wise to label these children as normotensive when clearly a few years down the line they may be classified as hypertensive by our adult physician colleagues. Does accepting this new definition of hypertension inevitably mean that we are choosing to ignore an important risk factor for future coronary heart disease? There is a growing body of evidence to suggest that risk factors for coronary artery disease may be present in fetal life. Tireless efforts by professional bodies to prevent risk factors for ischaemic heart disease have encouraged attempts to achieve even lower blood pressure values in adults. Consequently, adopting higher normal blood pressure values in adolescence is going to be difficult to justify and is likely to lead to confusion, let alone a reduction in future risk of coronary artery disease.

Secondly, the BHS guidelines for the management of hypertension recommend that younger patients (aged <20 years) should not be presumed to have essential hypertension and should be investigated for an underlying cause. In the light of the current dataset, this would mean that a quarter of British pubertal males need investigation for an underlying problem, and if they are not investigated, are we choosing to ignore a potential renal/renovascular condition?

Thirdly, by adopting a new centile system for defining normal and high blood pressure we are choosing to differ from both our American and European counterparts. This is at a time when there is universal agreement on the definition of hypertension in adults. The blood pressure centiles in the North American population are based on more recent data (1999–2000 National Health and Nutrition Examination Survey) and in view of the ongoing obesity epidemic, a much lower cut-off value for defining hypertension was recommended.³ It was also suggested that high normal blood pressure, which is an indication for lifestyle changes, should be relabelled as prehypertension in order to promote preventive

measures such as healthy diet and activity. Admittedly these centiles are somewhat labour intensive and time consuming to use in routine clinical practice. In fact, for the busy clinician the formula suggested by Somu *et al*⁴ may prove to be an easier and quicker tool to identify children with hypertension while remaining within accepted norms.

Incorporating the new British blood pressure centiles into clinical practice effectively translates into ignoring a substantial number of children who would otherwise be a target for lifestyle and perhaps medical interventions. This is contrary to the recommendations made by British Hypertension Society and endorsed by National Institute for Health and Clinical Excellence.⁵ We do not therefore feel comfortable in adopting the new blood pressure centiles or definitions of normal and high blood pressure values in children. We call for an open debate regarding the right way forward.

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Nasal swabs for detection of respiratory syncytial virus RNA

Nasal swabs offer a sensitive sampling method for the detection of respiratory viruses in children. Respiratory syncytial virus (RSV) is an exception and it is detected more often in nasopharyngeal aspirates (NPA) than in nasal swabs when it is searched for using immunoassays or viral culture.^{1,2} Therefore, more laborious and painful NPA have been the first-choice specimen for high-yield recovery of RSV by conventional methods. We wanted to examine whether the use of reverse transcription-polymerase chain reaction (RT-PCR) increases the usefulness of nasal swabs by comparing the performance of nasal swab-RT-PCR with NPA-immunoassays in the detection of RSV infections in children.

We studied 112 children admitted to the Department of Paediatrics, Turku University Hospital, Turku, Finland between November 2003 and February 2004 when there was an RSV epidemic in Finland. The committee on