LETTER TO THE EDITOR

Relationship between urinary and serum growth hormone and pubertal status

SIR,—We read with interest the paper by Crowne *et al* on the relationship between serum and urinary growth hormone concentrations during puberty.[1] As the authors pointed out we carried out very similar studies and came to very different conclusions. In our early studies of 24 normal children of both sexes over the full range of puberty stages we found very good correlation ($r=0{\cdot}79$, $p<0{\cdot}001$) between urinary growth hormone excretion and overnight mean plasma growth hormone concentration.[2] We have recently extended these studies comparing diabetic and normal adolescents and found the same correlation in both patient groups ($r=0{\cdot}70$, $p<0{\cdot}001$).[3]

Crowne *et al* suggest that the discrepancy between their study and ours could be explained by the fact that we studied mostly children in early puberty. In fact the predominance was in late (Tanner stages 3–5, n=15) rather than early puberty (stages 1–2, n=9). We have reanalysed our most recent results and still observe the same good correlation between urinary and plasma growth hormone in late ($r=0{\cdot}69$, n=17) and early ($r=0{\cdot}71$, n=19) puberty in both sexes.

The methodology for measurement of both urinary and plasma growth hormone concentrations was very similar in our studies and that of Crowne *et al*, and we believe that the important differences between the two studies are the collection methods and the way the urinary growth hormone data are presented. In the majority of their subjects Crowne *et al* used a 24 hour collection period with a 20 minute sampling interval for the serum profiles, whereas we used overnight collection with 15 minute blood sampling. The relationship between urinary growth hormone excretion and plasma growth hormone concentrations may not be constant throughout the 24 hours.

More importantly perhaps, Crowne *et al* reported urinary growth hormone excretion in relation to urinary creatinine excretion. Whereas this convention may be useful for checking the completeness of overnight urine collections, in this particular case it can be very misleading. We have examined overnight urine samples from 151 normal adolescents at different stages of puberty, and demonstrated that the urinary excretion of creatinine increases during puberty (see table). If urinary growth hormone excretion rates are expressed as a ratio of creatinine excretion therefore, it will be difficult to discern any increase of excretion of growth hormone during puberty, and any correlation which exists with plasma growth hormone concentrations will be lost. If a small group were studied over a limited range of puberty stages, this change in creatinine excretion would not be so significant, and indeed Crowne *et al* did present some data to support this position. In the subgroups of prepubertal children and in the group of six boys in early puberty, significant correlations were seen between urinary growth hormone excretion related to creatinine and mean serum growth hormone concentrations ($r=0{\cdot}82$ and $r=0{\cdot}74$ respectively).[1]

We believe that a note of caution should be added to the use of urinary creatinine ratios during puberty, and suggest that urinary growth hormone excretion should be expressed as a timed excretion rate without reference to creatinine. In our experience this does reflect overnight mean plasma growth hormone concentrations with some accuracy during normal puberty.

Mean (SEM) overnight urinary creatinine excretion (mmol/hour) in 151 normal adolescents. Figures in squared brackets indicate numbers of subjects at each puberty stage

Puberty stage	Boys	Girls	Combined
1	0·21 (0·02) [30]	0·22 (0·03) [7]	0·21 (0·02) [37]
2	0·28 (0·02) [25]	0·23 (0·03) [8]	0·27 (0·02) [33]
3	0·34 (0·03) [14]	0·42 (0·09) [23]	0·39 (0·05) [37]
4	0·37 (0·06) [8]	0·45 (0·05) [23]	0·39 (0·04) [31]
5	—	0·49 (0·04) [13]	0·49 (0·04) [13]

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1 Crowne, EC, Wallace WHB, Shalet SM, Addison GM, Price DA. Relationship between urinary and serum growth hormone and pubertal status. *Arch Dis Child* 1992;**67**:91–5.
2 Edge JA, Hourd P, Dunger DB, Edwards R. Urinary growth hormone during puberty in normal and diabetic children. *Clin Endocrinol (Oxf)* 1989;**30**:413–20.
3 Hourd P, Edge JA, Dunger DB, Dalton N, Edwards R. Urinary growth hormone excretion during puberty in type I (insulin-dependent) diabetes mellitus. *Diabetic Med* 1991;**8**:237–42.

Drs Crowne and Shalet comment:
We read the above letter with interest and thank the authors for their comments. In reply, although we reported our results as growth hormone: creatinine ratios, in line with other recent publications, we did also look at the correlation between total urinary growth hormone (uGH) excretion (pg/ml) and mean serum growth hormone. There was still no significant correlation between these parameters in the pubertal children, either in the total group (n=22) $r=-0{\cdot}26$, $p=0{\cdot}24$; group 1 (postcranial irradiation, n=14) $r=-0{\cdot}02$, $p=1{\cdot}0$; or group 2 (normals, n=8) $r=-0{\cdot}4$, $p=0{\cdot}22$.

Therefore the use of growth hormone: creatinine ratios cannot explain the different findings of the two studies. We feel that the inherent variability in uGH excretion in puberty as a result of changes in both growth hormone secretion and renal function must affect these correlations. The use of tightly defined subgroups of children in different pubertal stages may improve correlations between uGH and serum growth hormone but has implications for the establishment of normal ranges in pubertal children and therefore the use of uGH measurement in pubertal children with growth problems.

Neonatal BCG immunisation

SIR,—The annotation by Clarke and Rudd was a very helpful review of neonatal BCG immunisation.[1] However the technical difficulty of intradermal injections in newborn infants was not mentioned, although poor technique is likely to result in inadequate immunisation or avoidable local side effects.

The percutaneous multiple puncture technique, described over 30 years ago[2] appears to be both safe and effective.[3] The multiple puncture technique requires a more concentrated vaccine, suspended in dextran, and an adapted Heaf gun with a 20 G needle head. Any risk of the transmission of infection can be eliminated by the use of disposable magnetic heads for the Heaf gun.

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1 Clarke A, Rudd P. Neonatal BCG immunisation. *Arch Dis Child* 1992;**67**:473–4.
2 Lorber J. Freeze dried BCG vaccination of newborn infants by the multiple puncture method. *Tubercle* 1959;**40**:21–5.
3 Cundall DB, Ashelford DJ, Pearson SB. BCG immunisation of infants by percutaneous multiple puncture. *BMJ* 1988;**297**:1173–4.

Malnutrition in children with cancer

SIR,—In their report of energy intake and basal metabolic rate in children with malignant disease receiving maintenance chemotherapy, Bond *et al*[1] refer to our work exploring the incidence of malnutrition in children with cancer.[2] They state that we found nutritional status to be generally adequate at diagnosis but to deteriorate as a result of treatment. In fact we found that nutritional status was frequently inadequate at diagnosis. This finding directly contrasts with nearly all other studies.[3 4] Our study of 48 newly diagnosed children with malignant solid tumours showed a marked discrepancy in the incidence of malnutrition assessed by conventional means when compared with arm anthropometry. Using conventional indices of weight for height, and height for age (as used by Bond *et al* themselves) only 7% of our patients were assessed as being malnourished at diagnosis. However, using arm anthropometry (mid upper arm circumference and triceps skinfold thickness) 27% of our patients were identified as malnourished. These conclusions were confirmed in a larger series of 100 newly diagnosed patients from our own institution that included children with leukaemia.[5] Attempts to assess energy intake at diagnosis suggested that a large number of patients (44%) were consuming considerably less energy both than the recommended daily allowance for their age, and estimates of their own previous 'normal' intakes. Children with intra-abdominal solid tumours were more likely to be malnourished at diagnosis (35%) than those with leukaemia (15%) or extra-abdominal solid tumours (7%). It is evident that the presence of a large tumour load in a young child (with or without ascites or pleural effusion) could have a significant influence on weight and weight for height, making this an unreliable index of nutritional status at diagnosis.

We agree that treatment itself is likely to be an important factor in subsequent nutritional progress and in our study the prevalence of malnutrition, identified by arm anthropometry, rose to 46% over a median follow up period of 7·5 months.[2]

We conclude therefore that malnutrition in children with cancer is more common than generally recognised, particularly so at diagnosis, and that impaired energy intake is a factor in its causation. Further studies such as those by Bond and coworkers are required to explore the suggestion that changes in energy utilisation are also important, either at diagnosis or during treatment. Clinicians however must be aware of the greater incidence of malnutrition in these children and initiate appropriate strategies for nutritional support.[6]

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1 Bond SA, Han AM, Wootton SA, Kohler JA. Energy intake and basal metabolic rate during maintenance chemotherapy. *Arch Dis Child* 1992; **67**:229–32.
2 Smith DE, Stevens MCG, Booth IW. Malnutrition in children with malignant solid tumours. *Journal of Human Nutrition and Dietetics* 1990;**3**: 303–9.
3 Donaldson SS, Wesley MN, DeWys WD, Suskind RM, Jaffe N, Van Eys J. A study of the nutritional status of pediatric cancer patients. *Am J Dis Child* 1981;**135**:1107–12.
4 Carter P, Carr D, Van Eys J, Coody D. Nutritional parameters in children with cancer. *J Am Diet Assoc* 1983;**82**:616–21.
5 Smith DE, Stevens MCG, Booth IW. Malnutrition at diagnosis of malignancy in childhood: common but mostly missed. *Eur J Pediatr* 1991; **150**:318–22.
6 Smith DE, Handy DJ, Holden C, Stevens MCG, Booth IW. An investigation of the use of nasogastric supplementary feeding in malnourished children undergoing treatment for malignancy: a pilot study. *Journal of Human Nutrition and Dietetics* 1992;**5**:37–43.

Rehabilitation and outcome after severe head injury

SIR,—The recent paper by Scott-Jupp *et al* is an important contribution to the subject of rehabilitation of head injured children.[1] It correctly highlights the inadequacy of present services including support and training for teachers who provide long term educational services.

We studied 220 children of whom half were followed up for three years after injury.[2] We found a substantial cognitive improvement between one and three years, a time when rehabilitation programmes have often ceased. Reporting on cognitive and behavioural problems at six months after severe injury must include many still in the early stages of recovery and before these cognitive gains have occurred.

In our study the relationship between length of coma and outcome is clear. Of 109 patients still comatose on transfer to rehabilitation (median 62 days) 48 remained completely dependent for all activities of daily living, against only one with partial dependency of 111 admitted conscious. The outcome in patients still comatose at three months and six months after injury was also found to be quite different.

Of interest is the fact that 87 (35%) of our children had a history of learning disorder or had shown attention deficit, impulsiveness, or emotional behavioural problems before injury. This would support the authors' impression that many of their children did have pre-existing problems placing them at increased risk for injury.

The data from Scott-Jupp *et al* is interesting,[1] but only a small number of children were followed up for a substantial time and the results must be interpreted with caution.

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1 Scott-Jupp R, Marlow N, Seddon N, Rosenbloom L. Rehabilitation and outcome after severe head injury. *Arch Dis Child* 1992; **67**:222–6.
2 Boyer MG, Edwards P. Outcome 1 to 3 years after severe traumatic brain injury in children and adolescents. *Injury* 1991;**22**:315–20.

Paediatrics in the accident and emergency department

SIR,—I read the article by Phillips and Robson with interest.[1] The writers say that the Specialty Advisory Committee requires only three months paediatric experience before accreditation as a consultant. In 1974 when a working party was set up to discuss the training programmes for consultants in charge of emergency departments and the possibility of planning a programme for senior registrars, paediatrics was listed as being 'a minor specialty' and it was with the greatest difficulty that I managed to persuade other members of the working party that it was so important that a specific requirement of time should be included.

I agree that three months is not enough but I can assure you that to achieve even that was a considerable victory.

I have felt for a long time that community paediatricians could play a most useful part in accident and emergency departments where children are seen but which are not part of a children's hospital. Appointments that are linked between the hospitals and the community are valuable at junior levels and can be even more so at senior ones.

A properly run paediatric accident and emergency department can save money for a hospital by reducing the numbers of children who are admitted. This can apply with many types of problems. One example among many, in Sheffield, is that of the about 200 children who are seen each year with acutely painful hips, the majority are dealt with without admission.

Many *x* ray films, drugs, and unnecessary investigations can be avoided with benefit both to the child and to the finances of the hospital. A lot of problems, medical, surgical and social, can be recognised at an early stage and treated.

More children are brought to accident and emergency departments than to all outpatient departments put together—they deserve a service that is appropriate to their needs and to the needs of their parents.

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1 Phillips BM, Robson WJ. Paediatrics in the accident and emergency department. *Arch Dis Child* 1992;**67**:560–4.

Intravenous volume replacement: which fluid and why?

SIR,—Lucinda Huskisson has done well in her outline of the continuing debate on which fluid to use during resuscitation.[1] Doctors involved in the resuscitation of major trauma are now increasingly using the methodology of Advanced Trauma Life Support.[2] This concentrates on the first hour after trauma—the 'golden hour'—and presents a standardised approach to the management of trauma. With regard to fluid replacement, Hartmann's solution and blood are the only two fluids advocated. In the child a regimen of three challenges of 20 ml of Hartmann's solution per kg is advised followed by 10 ml per kg of blood if the patient is still unstable. Continuing instability as judged by cardiac status, conscious level, skin perfusion, and urine output should prompt definitive operative care. Paediatricians who find themselves involved in resuscitation in the accident and emergency department should be aware of this protocol as it serves to keep arguments over crystalloids and colloids out of the resuscitation room—as Dr Huskisson demonstrates by her 57 references that debate takes longer than a golden hour.

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1 Huskisson L. Intravenous volume replacement: which fluid and why? *Arch Dis Child* 1992;**67**: 649–53.
2 American College of Surgeons. *Advanced trauma life support*. Chicago: American College of Surgeons, 1989.

Sister journals

SIR,—David Mellor was undoubtedly right to criticise the English translations of the titles and abstracts of articles published in *Archives Françaises de Pédiatrie*.[1] Some of them were certainly inaccurate and/or clumsy. We have taken his comments to heart and retained a biomedical translator. Let us hope that he will soon have no cause for such comments.

Dr Mellor cannot understand why there are many fewer original articles and clinical reports in *Archives Françaises de Pédiatrie* than in *Archives of Disease in Childhood*. There are two very simple explanations. First, French paediatricians publish their best work in English language, mainly American, journals. Curiously, the dominance of English in the scientific world has led clinicians and researchers wanting to be sure that their work is known to publish in English. This is exacerbated by the tendency of granting bodies in France to give a priority to such publications.

Second, many of the subscribers to *Archives Françaises de Pédiatrie* are more interested in articles on new techniques, analyses, and applications than in research articles. This problem is not peculiar to French paediatrics; several other European journals have the same balance. The survival of our journal depends on the number of subscribers, and more and more of them do not want articles that are too research oriented or that deal with very rare conditions. This may be unfortunate, but it is the case.

The French, in common with other Europeans, probably have less difficulty reading and writing English than the English have in