

significant, our incidence of acute renal failure would have been considerably higher, and the survival rate much more favourable.

One of us (AM) has also conducted a prospective study of renal function in babies requiring ventilatory support for four or more days during their first week of life. The study group of 22 babies, mean (SD) gestation 31 (4.3) weeks, represented about 10% of those admitted to the neonatal unit over a six month period and were typical of those requiring intensive care. Depending on the criteria used, the incidence of acute renal failure in the study group was between 5% (hyperkalaemia) and 82% (urinary sodium concentration exceeding 40 mmol/l for 48 hours).

Sick newborns are treated with many drugs having renal effects, such as in this study: frusemide (n=17), isoprenaline (n=6), tolazoline (n=4), epoprostenol (n=3), dopamine (n=2), and sodium nitroprusside (n=1). The natriuretic effect of frusemide, for example, may be delayed until beyond the third day after administration and its duration of action is variable,<sup>3</sup> making interpretation of urinary sodium and fractional excretion of sodium impossible and invalidating their use as parameters for acute renal failure.

We agree that retrospective diagnosis of acute renal failure is far from ideal, but it should be appreciated that prospective recognition may also be difficult. Only by carefully monitoring urine output and critically assessing biochemical parameters will accuracy of diagnosis improve.

#### References

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## Thyroid function in children after treatment for acute lymphoblastic leukaemia

Sir,

It is known that cranial irradiation during central nervous system prophylaxis of acute lymphoblastic leukaemia can cause endocrine deficiencies, including thyroid dysfunction.<sup>1</sup> Shalet *et al* showed that five out of 58 patients treated for acute lymphoblastic leukaemia had raised serum thyroid stimulating hormone concentrations after treatment with 2400 or 2500 cGy cranial irradiation,<sup>1</sup> and Robison *et al* showed that 10% of long term survivors treated with 1800 or 2400 cGy cranial or craniospinal irradiation had thyroid abnormalities, which included primary hypothyroidism, compensated hypothyroidism, thyroid adenoma, and carcinoma.<sup>2</sup>

In an attempt to discover whether thyroid damage occurs with low dose cranial irradiation, we evaluated thyroid function by measuring concentrations of serum thyroxine and thyroid stimulating hormone in 64 out of 98 patients with acute lymphoblastic leukaemia. They were

diagnosed between August 1981 and September 1985 and had received prophylactic treatment to their central nervous systems. The latter comprised 1800 cGy cranial irradiation in 10 fractions over 12 days which was given soon after achieving complete remission and intrathecal methotrexate. All patients were treated according to a protocol devised at this hospital<sup>3</sup> or the UKALL X pilot protocol.<sup>4</sup> The 30 girls and 34 boys were aged between 2 and 12 years (mean 6.2) at diagnosis. Thyroid status was evaluated between three and six years (mean 4.9) from diagnosis.

One out of the 64 children was found to have a mildly raised thyroid stimulating hormone concentration (6.4 mU/l) at three years from diagnosis but this returned to normal within four months. Serum thyroxine concentration was normal when tested on three occasions over this period. The remaining 63 children had normal thyroid function. No patient had clinical evidence of thyroid neoplasia.

A proportion of patients in the study of Robison *et al* received craniospinal irradiation that involved direct irradiation to the thyroid gland. Although they found no association between radiation dose or field and thyroid hypofunction, we surmise that direct irradiation of the thyroid, together with higher dose used in some patients, may account for the increased incidence of thyroid abnormality in their series. None of our patients received irradiation of the spine, and all were treated at the low dose of 1800 cGy. The dose of scattered radiation received by the thyroid gland was assessed in 10 patients and was found to be between 2.5 and 4% of the total dose.

We conclude, therefore, that prophylactic irradiation confined to the cranium at the dose of 1800 cGy is not deleterious to the thyroid gland up to six years from diagnosis.

#### References

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E P CARTER  
Queen Elizabeth Hospital for Children,  
Hackney Road, London E2 8PS

A D LEIPER and J M CHESSELLS  
Departments of Haematology and Oncology,  
The Hospital for Sick Children,  
London WC1N 3JH

A HURST  
Department of Radiotherapy,  
St Bartholomew's Hospital,  
London EC1A 7BE