SHORT REPORTS

Sex hormones, sex hormone binding globulin, and lung cancer: a 12 year prospective study in a cohort of men aged 50-79

Four case-control studies have shown that patients with lung cancer have lower serum testosterone concentrations than healthy controls.¹⁻⁴ One study also showed considerably higher concentrations of sex hormone binding globulin in patients with lung cancer.⁴ These studies included severely debilitated patients, often with metastatic cancer. Sex hormone concentrations may have been affected by malnutrition or liver damage. This is the first prospective study to determine whether the hormonal changes preceded the development of lung cancer.

Patients, methods, and results

Between 1972 and 1974, 6110 adults (82% of white adults aged between 50 and 79 in Rancho Bernardo, California) participated in a survey that included questions about cigarette smoking. Weight and height were measured, and venous blood samples were taken from fasting subjects between 0700 and 1100. Plasma was frozen at -70°C and stored until 1985-6, when hormone assays were carried out. Samples were selected at random, depending on the availability of frozen plasma. Hormone assays were performed by radioimmunoassay.

Nine hundred and fifty four men (99.9%) were followed up for 12 years, and death certificates were obtained for all those who died. Lung cancer was classified as ICD codes 160 to 165. Lung cancer in survivors was ascertained by letter in 1983 and by interview in 1984-6. The incidence of all non-fatal cancer was confirmed by a review of medical records in 86 of all 92 cases (93%).

Among the 904 men whose hormone concentrations were recorded and who were 50-79 years old between 1972 and 1974, 25 fatal and six non-fatal cancers subsequently developed. Four patients who died of lung cancer within two years of the survey were excluded from the analyses.

There were no significant differences in the mean concentrations of sex hormones and sex hormone binding globulin between subjects who did and did not develop lung cancer either before or after adjustment for age (table).

Negative correlation between crude and age adjusted hormone and sex hormone binding globulin concentrations and subsequent development of lung cancer in men aged 50-79. Figures are given as mean (SD)

	Men who did not develop lung cancer (n=873)	Men who subsequently developed lung cancer	
		Total No (n=27)	No of deaths (n=21)
Age (years)	65.8 (7.1)	65.9 (5.8)	65.8 (6.3)
Body mass index (kg/m ²)	25.8 (3.0)	25.2 (2.8)	25.4 (3.0)
Dehydroepiandrosterone sulphate (μmol/l):			
Crude	3.94 (2.47)	3.80 (2.06)	3.96 (2.25)
Age adjusted	3.94	3.80	3.96
Androstenedione (nmol/l):			
Crude	2.80 (1.11)	2.76 (1.04)	2.84 (1.16)
Age adjusted	2.80	2.76	2.84
Testosterone (nmol/l):			
Crude	18.56 (6.48)	18.31 (6.91)	18.73 (7.31)
Age adjusted	18.52	18.34	18.73
Oestrone (nmol/l):			
Crude	0.18 (0.07)	0.18 (0.07)	0.18 (0.07)
Age adjusted	0.18	0.18	0.18
Oestradiol (nmol/l):			
Crude	0.14 (0.04)	0.13 (0.05)	0.14 (0.06)
Age adjusted	0.14	0.13	0.14
Sex hormone binding globulin (nmol/l):			
Crude	33.6 (19.8)	32.6 (18.3)	32.8 (18.9)
Age adjusted	33.6	32.6	32.8

There were negative correlations between the concentrations of testosterone, dehydroepiandrosterone sulphate, androstenedione, and sex hormone binding globulin and body mass index ($p<0.01$). Adjusting for age and body mass index and stratifying for smoking habits did not change the results.

Comment

The lack of association between sex hormone or sex hormone binding globulin concentrations and the subsequent development of lung cancer in

this study contrasts with three case-control studies in which patients with lung cancer were found to have comparatively low plasma testosterone concentrations¹⁻³ and one study in which they were found to have both low testosterone and high sex hormone binding globulin concentrations.⁴ The report of considerably increased sex hormone binding globulin concentrations in men with lung cancer has not been supported by others.^{3,5}

Although negative results raise the question of insufficient statistical power, our study includes more cases of lung cancer than all but one of the case-control studies.¹ Different types of lung cancer have different sex hormone receptors that might affect sex hormone concentrations in different ways, but we have no reason to believe that the types of lung cancer in this population differed from those in the case-control studies.¹⁻⁵ Sex hormone concentrations have circadian rhythms that could affect the results if blood from patients and control subjects was drawn at different times. All blood samples in this study, however, were obtained from fasting subjects in the morning.

Normal and malignant lung tissues have receptors and metabolising enzymes for sex hormones. Despite the theoretical plausibility of an association between sex hormones and lung cancer, this study suggests that the previously reported lower testosterone and higher sex hormone binding globulin concentrations must have occurred after the development of lung cancer and are not therefore risk factors.

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Underfloor heating: an unrecognised hazard in infancy

Heat stroke has been implicated as one of the many possible mechanisms of the sudden infant death syndrome (cot death).^{1,2} Sunderland and Emery reported that 15 of 24 babies who had died suddenly had rectal temperatures in excess of 38°C on admission to the mortuary.³ We report a case of cot death in an infant whose temperature on admission to the accident and emergency department was 42°C.

Case report

A 4 month old boy was brought to an accident and emergency department one morning in January. The birth had been uneventful, and the only relevant history was minor infections of the upper respiratory tract. The child had seemed well the previous evening. Death was certified shortly after admission. The rectal temperature was 42°C, but this information was not passed on to the pathologist who carried out the necropsy (CG).

Necropsy showed some pulmonary oedema with occasional petechiae but no other distinctive findings. There were no burns and no evidence of congenital

abnormality. Histological, microbiological, and chemical pathological examination yielded unremarkable results, and the sudden infant death syndrome was diagnosed by exclusion.

A few months later at a confidential survey of postperinatal mortality we were informed of the high rectal temperature and the fact that the child had slept in a carry cot placed on an uncarpeted floor equipped with off peak heating controlled with a time switch.

As one of us (MAG) had experience of severe burns sustained by adults lying unconscious on uncarpeted floors with underfloor heating we decided to determine the ambient temperatures reached in a carry cot placed on such a floor. In a maisonette equipped with similar underfloor heating the thermostat was set at 16°C, and temperature was measured with a pen recorder continuously for four days. The recorder was placed in the cot and covered with two blankets as the child had been, though the child had also been wearing a vest, a nappy, and a babysuit. The lowest temperature recorded under the blankets in the carry cot was 31°C at noon, when the heating had been off for several hours. Peak temperatures of 42°C were reached when the heating was on, and temperatures ranged from 34°C to 38°C for several hours at a time. Temperatures where the cot base touched the floor reached a maximum of 44°C and were often above 40°C.

Comment

These findings suggest that placing a carry cot directly on a heated floor is dangerous. We can find no studies or reports of similar accidents. The hazards of placing carry cots directly on floors with underfloor heating should be more widely known. This type of heating is common in council properties throughout the United Kingdom.

We thank Her Majesty's coroner for West Yorkshire for permission to report the case.

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Babywalkers and infant burns

Babywalkers are mobile metal frames supporting a plastic seat that allow infants who cannot yet walk to achieve premature bipedal motion. Increasing evidence suggests that these devices cause unacceptable levels of morbidity. British government figures, in parallel with American trends, show an increase in burns and scalds—the most disfiguring forms of injury—associated with babywalkers. Our own recent experiences confirm this.

Case reports

Between April 1986 and May 1987 five infants, aged 4 to 10 months, presented to the plastic surgery unit at this hospital with burns closely associated with the use of babywalkers (table). Four of the accidents occurred in spite of supervision by an adult at the time of injury. Three patients (cases 2, 1, and 4) required admission with 4%, 6%, and 12% burns, and the last of these needed skin grafting. Two of those admitted later developed hypertrophy of their scars. The fourth child (case 5) was lucky to escape severe injury when his walker ignited on contact with a gas fire, and in the final case healing of a contact burn was complicated by finger contracture.

Details of five infants with burns associated with use of babywalkers presenting to Leicester Royal Infirmary

Case No	Age (months)	Parent present	Mechanisms of injury	Injuries sustained	Treatment	Follow up
1	7	No	Reversed into gas fire	6% Burns to head and neck	20 Days of inpatient care	Hypertrophic scars and hair loss
2	4	Yes	Reversed into gas fire	4% Burns to head	17 Days of inpatient care	Mild scarring to cheek
3	10	Yes	Advanced into oven	Palm burns	Outpatient care	Mild finger contracture
4	9	Yes	Pulled kettle down	12% Burns to head, trunk, and arms	Resuscitation; 24 days of inpatient care; skin grafts on 18th day	Some scar hypertrophy
5	10	Yes	Reversed into gas fire. Walker seat caught fire	Minor burns to head	GP care	Well healed

Comment

An increasing number of patients with serious burns, and other injuries, associated with the use of babywalkers are presenting to hospitals in developed countries.¹ The burns sustained can lead to disfiguring scars in important places; the hands (41%) and the head (33%) are the most common.¹ Babywalkers are an inherent, but widely unrecognised, source of danger for children, who, with the dramatic increase in mobility that babywalkers give them, are becoming the infant equivalent of the adolescent motorcyclists who litter our orthopaedic wards.

Furthermore, strong evidence suggests that babywalkers actually defeat their very purpose by hindering the development of normal movement.⁴ Public information campaigns have had limited effect on home safety⁵ and are therefore unlikely to alter these burn rates. We believe that the continued sale and use of babywalkers should be urgently reviewed.

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Alcohol and response to treatment of gout

Excessive consumption of alcohol has long been associated with gout in susceptible people.¹⁻³ Although patients with gout are generally advised to stop drinking alcohol or cut down their intake, this advice may not always be followed. We looked at the relation between alcohol intake and the response to treatment of gout.

Patients, methods, and results

Thirty eight patients with gout who had attended this centre in 1987 were identified by our diagnostic index. A history of alcohol intake had been taken at the first visit to the clinic in all cases, and at subsequent visits those patients who were suspected on the basis of their history or laboratory abnormalities (abnormal liver enzyme activities or increased mean cell volume) to be consuming excessive amounts of alcohol were routinely asked about their intake. Twenty one patients were heavy drinkers (30 or more units of alcohol a week), eight were moderate drinkers (less than 20 units weekly), and nine seldom or never took alcohol. Information on current alcohol intake, drug treatment, episodes of gout in the preceding six months, and (when available) the results of biochemical and haematological investigations was taken from the case notes for the patients' most recent attendance at the clinic. The data were analysed by the Mann-Whitney U test and the χ^2 test.

The table shows clinical details and laboratory findings for patients who used alcohol heavily compared with patients who used it moderately or not at all. Patients with a heavy alcohol intake had significantly higher transaminase and γ -glutamyltransferase activities, uric acid concentrations, and mean cell volumes than the patients who used alcohol moderately or not at all. Some of the moderate users and non-users had increased γ -glutamyltransferase activity, which suggested that the stated alcohol intake was not always the true intake. Twenty (95%) of the heavy drinkers had continued to have acute attacks of gout despite