Number and distribution of computed tomographic head scanners (June 1987)

Health region	Population[1] (millions)	No of health districts	No of head scanners	Ratio of population to head scanner (thousands)	No of health districts with no head scanner
			Health authorities		
North East Thames*	3·77	16	11 (2)	290	9
North West Thames*	3·49	14	8 (4)	291	8
South West Thames*	2·97	13	7† (1)	371	7
South East Thames*	3·62	15	8‡ (1)	402	8
Special health authorities§			8 (8)		
East Anglia	1·99	8	7	284	2
South Western	3·18	11	11	289	2
West Midlands	5·18	22	15‖	345	13
North Western	3·99	19	9	443	13
Trent	4·63	12	9	514	5
Yorkshire	3·6	17	6	600	11
Mersey	2·41	10	4	603	7
Northern	3·08	16	5	616	13
Wessex	2·88	10	4	720	7
Oxford	2·48	8	3	827	5
Wales	2·82	9	7	403	4
Total	50·09	200	122	411	114 (57%)
			Health boards		
Scotland	5·13	15	11	466	10
Northern Ireland	1·56	4	2	780	3
United Kingdom total	56·78		135	421	

*Calculations for Thames regions include scanners at special health authorities, given in parentheses.
†Includes one in private hospital.
‡Includes one mobile scanner, providing a one day a week service to Hastings Health District.
§London postgraduate teaching hospitals were established as special health authorities under section 11 of the NHS Act 1977.
‖Includes one mobile scanner, which served six health districts; was counted as only one scanner (in East Birmingham Health District).

population of the United Kingdom—lived in health districts and boards with no head scanning facility.

Comment

This study showed a considerable variation in the provision of computed tomography of the brain across the United Kingdom. The ratio of the number of scanners to the population varied by a factor of 2·9 from the best to the least well provided region, and more than half of the health districts and boards in the United Kingdom did not have their own head scanner. Does it matter that many health districts do not have their own head scanner?

Epidemiological studies have shown that a health district of 250 000 people will generate about 38 patients with subarachnoid haemorrhage, 500 with head injury, 550 with stroke, and 25 with bacterial meningitis yearly.[4] In addition, many other patients will have possible, but undifferentiated, intracranial disease—for example, prolonged unconsciousness after an epileptic fit in a patient who also has a minor head injury. Other subacute neurological disorders include subdural haematoma, cerebral tumour, epilepsy, and dementia. In many instances it would not be appropriate for these patients to travel long distances to have brain scanning.

Overall, present evidence suggests that there is a case for having a head scanner in every large district general hospital. This was suggested as long ago as 1978[5]; in 1987 we were still far from accomplishing this goal. At present only a small number of health districts have magnetic resonance image scanners, and it seems unlikely that computed tomography will be superseded in the foreseeable future.

This report is based on a paper given to the Association of British Neurologists at St Bartholomew's Hospital, November 1987.

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Allergic contact dermatitis caused by transdermal hyoscine

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Hyoscine (scopolamine) given transdermally is widely used to prevent motion sickness. To our knowledge only three cases of delayed hypersensitivity to transdermal hyoscine have been reported.[1,2] We report the clinical features of 16 cases of allergic contact dermatitis caused by transdermal hyoscine.

Patients, methods, and results

A total of 164 male naval crew members were treated for seasickness with transdermal hyoscine for several months (range 1·5 to 15 months). Allergic contact dermatitis caused by the drug was diagnosed in 16 men. The table summarises these patients' clinical characteristics. In all 164 cases transdermal hyoscine was applied as a patch to glabrous skin behind the ear. None of the patients had previously handled or had contact with hyoscine.

All 16 patients had pruritus and erythema at the site of the patch. The pruritus started after several hours and lasted for a few days, whereas erythema was clearly evident within 24 to 48 hours after the patch was applied. Placing the patch behind the other ear produced an identical local reaction. Removal of the patch was followed by regression of the lesion. Total resolution took up to 14 days, depending on the severity of the lesion. In all cases the allergic reaction reappeared when a new patch was applied. All lesions were confined to the site of application.

Clinical examination of the lesions showed circular areas of erythema, oedema, and vesiculobullous or eczematous response in various stages of resolution. They were clearly demarcated from the surrounding skin, reproducing the circular shape, 1·5 cm in diameter, of the patch. No other local or general allergic reactions were present in any patient.

Samples of hyoscine patches from the batch used by

Clinical data on 16 men with allergic contact dermatitis caused by transdermal hyoscine

Case No	Age (years)	Duration of treatment before allergic response (months)	No of patches applied/week	History of allergies
1	19	1·5	1-2	
2	20	2	2-3	
3	21	2	2	
4	19	2	2	
5	19	2	2	
6	21	3	1	Hay fever
7	21	3	1-2	
8	21	3	2	Asthma
9	20	3	2	
10	20	5	1-2	
11	20	6	2	
12	20	7	2	
13	22	9	2	Milk
14	20	13	2	Penicillin
15	21	15	1	
16	20	15	1-2	

our patients were examined at the manufacturer's laboratory and were found to be in perfect condition. Placebo patches containing all the components of the patches apart from hyoscine were applied in all of the men; no local skin reactions were observed.

Comment

This study showed an unexpectedly high rate (10%) of allergic contact dermatitis to transdermal hyoscine in healthy men treated for several months. Allergic contact dermatitis (type IV delayed hypersensitivity) was diagnosed by well established clinical criteria and was further confirmed by the absence of any reaction to a placebo patch.

Our results contrast with those of studies conducted by the manufacturer (Alza Corporation, California, United States), in which no delayed contact sensitisation occurred. In those studies 203 subjects were examined according to a protocol that included the consecutive application of nine hyoscine patches and the application of a tenth patch after two weeks' rest. The design of these studies, however, does not rule out the possibility of delayed type IV hypersensitivity occurring as a result of more prolonged use of transdermal hyoscine. Studies of the long term use of transdermal clonidine showed an incidence of allergic contact dermatitis of 10-38% after three to 12 months of continuous treatment.[3] On the other hand, delayed hypersensitivity to transdermal glyceryltrinitrate, which is commonly used in long term and repeated regimens, is rare.[4]

We conclude that delayed hypersensitivity may be a serious disadvantage of giving drugs transdermally. Evaluation of new transdermal treatments should exclude the possibility of delayed hypersensitivity, which in our experience may develop even after several months of repeated application.

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Atrial natriuretic peptide in the fetus

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Atrial natriuretic peptide has diuretic, natriuretic, and vasodilator properties, counterregulating the renin-angiotensin-aldosterone system.[1] We investigated whether it is present in the fetal circulation by using cordocentesis to obtain fetal blood samples, in some cases before and after transfusions for rhesus isoimmunisation.

Methods and results

Blood samples (0·5 ml) were collected on 15 occasions from nine fetuses (from the umbilical vein in 14 and the heart in one) undergoing treatment for rhesus isoimmunisation. The mean gestational age was 28 weeks (range 20-32) and the mean packed cell volume 0·29 (range 0·22-0·39). Samples were obtained before and after transfusion from eight fetuses and after transfusion alone in one case. A sample of donor blood was collected at each transfusion.

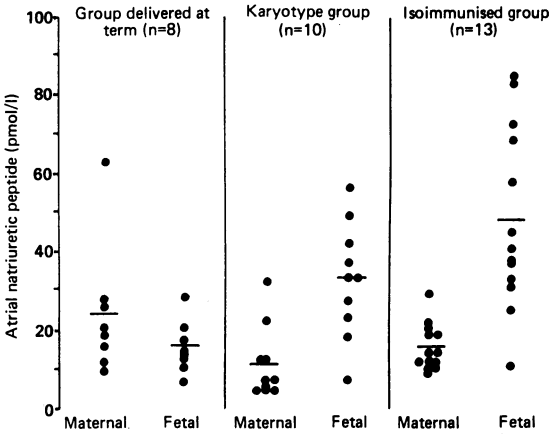
Blood samples were also obtained from 12 fetuses (from the umbilical vein in 10 and the heart in two) undergoing cordocentesis to determine the karyotype. In seven cases this was because of a structural anomaly (gastroschisis (one), urinary tract obstruction (three), duodenal atresia (one), and diaphragmatic hernia (two)). In 10 cases the karyotype was normal, but one fetus had triploidy and another trisomy 21. The mean gestational age of this group was 23 weeks (range 17-34).

In each case samples of maternal blood were collected before the procedure. Umbilical cord and maternal venous blood samples were also obtained in eight normal term deliveries.

Atrial natriuretic peptide was measured by pre-extracted radioimmuoassay,[2] the results being expressed in pmol/l (10 pg/ml=3·2 pmol/l). The figure shows the results for the paired maternal and fetal umbilical samples in each group, the one unpaired and three intracardiac samples being excluded. Statistical analysis was by Wilcoxon rank sum test or coefficient of correlation as indicated.

Before transfusion the fetal atrial natriuretic peptide concentrations in the isoimmunised group were significantly higher (mean 49 (range 12-86) pmol/l) than in those in the karyotype group (34 (8-57) pmol/l; $p<0·05$) and in the group delivered at term (16 (7-29) pmol/l; $<0·01$). Fetal concentrations in the karyotype group were also significantly higher than those in the group delivered at term ($p<0·05$). Taken together, the fetal concentrations in the isoimmunised and karyotype groups showed no significant correlations with fetal packed cell volume, fetal albumin concentration, gestational age, or maternal atrial natriuretic peptide concentration. In both the isoimmunised group and the karyotype group fetal concentrations of atrial natriuretic peptide were significantly higher than corresponding maternal values ($p<0·01$). The concentrations in the three intracardiac samples were 73, 100, and 124 pmol/l.

After intravascular transfusion the atrial natriuretic peptide concentration rose in seven cases. The concentrations before and after transfusion were 42 and 50 pmol/l; 12 and 77 pmol/l; 34 and 42 pmol/l; 84 and 98 pmol/l; 59 and 48 pmol/l; 70 and 149 pmol/l; 86 and 167 pmol/l; 73 and 114 pmol/l (intracardiac measurement); and not measured and 120 pmol/l. The mean



Maternal and fetal (umbilical vein) concentrations of atrial natriuretic peptide. Bars indicate mean values