Malignant hypertension and cigarette smoking

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Summary and conclusions

The smoking habits of 48 patients with malignant hypertension were compared with those of 92 consecutive patients with non-malignant hypertension. Thirty-three of the patients with malignant and 34 of the patients with non-malignant hypertension were smokers when first diagnosed. This difference was significant, and remained so when only men or black and white patients were considered separately. Results suggest that malignant hypertension is yet another disease related to cigarette smoking.

Introduction

Epidemiological and clinical studies have consistently failed to show any relation between cigarette smoking and hypertension.1-3

We thank Miss Ann Matheson and Miss Anne Glencross for secretarial help; Mrs W Lawrence for programming; Mrs Mary Smalls and Mrs Helen Watt for statistical advice; and Miss I M McBride and the staff in the records department for their efforts in locating case notes.

References

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these four patients, however, also had bilateral papilloedema, which is not normally a feature of diabetic retinopathy, and thus we thought that their inclusion would not invalidate our findings.

The control group of patients with non-malignant hypertension was taken from the first 92 cases attending the newly created blood-pressure clinic. All had had diastolic blood pressures greater than 100 mm Hg when first referred to the clinic. In both groups of patients we considered only the smoking habits at the time of diagnosis. In addition, data on the smoking habits of the general population were compared with our own data.

Statistical analysis using the chi-squared test was carried out for the group as a whole and for subgroups by race (white, black, and Asian) and sex.

### Results

Of the patients with malignant hypertension, 25 of the 33 men (76%) and eight of the 15 women (53%) were smokers. By contrast, of the patients with non-malignant hypertension, only 21 (44%) of the 48 men and 13 (30%) of the 44 women were smokers. Data from the General Household Survey showed intermediate figures for cigarette smoking in comparable age groups in the general population (51% of men and 41% of women; table I). This excess of cigarette smoking among patients with malignant as compared with those with non-malignant hypertension was highly significant (χ² = 13.84, P < 0.001). When the different sexes and racial groups were analysed separately (table II) the excess of smoking among patients with malignant hypertension was significant for all men (χ² = 6.91, P < 0.01), all white patients (χ² = 5.51, P < 0.05), and all black patients (χ² = 7.83, P < 0.01). Data from women when racial groups were compared together or separately did not reach significance.

The average age of the white patients with malignant-phase hypertension was 46 years and that of the white patients with benign hypertension 57 years (P < 0.001), but no significant difference was found in age between the two groups of black patients (average age 47 years). Further analysis including only the younger patients with non-malignant hypertension showed that age distribution was unlikely to account for the smoking association in the white population, which remained significant (P < 0.05).

### Discussion

Our results show that cigarette smoking is associated with the development of advanced retinopathy in hypertensive patients, although numbers were too small to determine whether any individual aspect—that is, haemorrhages, exudates, or papilloedema—was particularly prevalent. This contrasts sharply with the lack of association between cigarette smoking and non-malignant hypertension. The cases of malignant hypertension in this study were obtained over six years, whereas those with non-malignant hypertension were all current attenders. While there had been some decline in national cigarette consumption this is not enough to account for the present observation. Most epidemiological studies have shown no relation between smoking and the height of the blood pressure; indeed, as in the present study, the prevalence of smoking among patients with non-malignant hypertension is lower than that in the general population. It is unlikely that the presence of haemorrhagic retinopathy can be accounted for by the height of the blood pressure alone, and possibly cigarette smoking is a factor that makes patients with hypertension develop the malignant phase. The untreated blood-pressure levels among the attenders at the hypertension clinic were usually not available, as patients were referred to the clinic while receiving drug treatment, but in at least five cases pressures were considerably higher than those seen in the malignant group. An association between cigarette smoking and the malignant phase of hypertension is, because of its rarity, unlikely to be detected in population studies or analyses of outpatient blood-pressure clinics.

Paerkaud et al recently reported an association of smoking with the proliferative type of diabetic retinopathy, although this observation was later disputed. In considering a possible causative relation they noted the reported effects of smoking on blood carboxyhaemoglobin concentrations and the evidence that carbon monoxide may affect the separation of endothelial cells. Hawkins found that smoking increased platelet stickiness, a factor associated with the pathogenesis of diabetic retinopathy. All these mechanisms may be relevant to our findings, but in addition Pichon et al showed that inhaling cigarette smoke caused ophthalmic artery tension to rise in 60% of their subjects. They attributed this rise to catecholamines released by nicotine, but it may reflect the rise in systemic blood pressure noted in acute experiments on cigarette smoking.

Fundal exudates or haemorrhages are a characteristic of malignant hypertension with its attendant high mortality and morbidity rates from renal failure, heart failure, heart attack, and stroke. The identification of factors promoting their formation is valuable. As the risk of coronary heart disease and cerebrovascular accidents is much increased in smokers with non-malignant hypertension compared with non-smokers with hypertension of comparable severity, the added risk of developing the malignant phase makes the case for encouraging abstention from smoking even stronger. Our results suggest that at least this particular severe form of hypertension may be added to the list of diseases related to cigarette smoking.

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**TABLE I—Numbers (%) of male and female smokers in study group according to type of hypertension, and percentage in general population**

<table>
<thead>
<tr>
<th>Hypertension</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malignant (n = 48)</td>
<td>25 (76)</td>
<td>8 (53)</td>
</tr>
<tr>
<td>Non-malignant (n = 92)</td>
<td>21 (44)</td>
<td>13 (30)</td>
</tr>
<tr>
<td>%, in general population*</td>
<td>51</td>
<td>41</td>
</tr>
</tbody>
</table>

*Significance of difference: all white patients χ² = 5.31, P < 0.05; all black patients χ² = 7.83, P < 0.01; all men χ² = 6.91, P < 0.01; all women χ² = 1.62, P < 0.5.

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**TABLE II—Numbers of smokers and non-smokers with benign and malignant-phase hypertension according to racial group**

<table>
<thead>
<tr>
<th>Type of hypertension</th>
<th>White</th>
<th>Black</th>
<th>Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Smokers</td>
<td>Non-smokers</td>
<td>Smokers</td>
</tr>
<tr>
<td>Woman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>8</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Malignant</td>
<td>7</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Man</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>14</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Malignant</td>
<td>15</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Significance of difference: all white patients χ² = 5.31, P < 0.05; all black patients χ² = 7.83, P < 0.01; all men χ² = 6.91, P < 0.01; all women χ² = 1.62, P < 0.05.
Study of special-care baby services in North-west Thames region

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Summary and conclusions
During three months in 1975 admissions to 17 of the 21 special-care baby units in the North-west Thames region were analysed by birth weight and category of care. Of the 1718 babies admitted, one-third needed only observation. Neonatal intensive care formed only a small proportion of the work load in most units. Considerable variation in the pattern of admissions was found. There was some evidence of concentration, about 100 babies being transferred for urgent medical or surgical reasons, and the work load of one unit suggested that it was serving as a referral centre. It is concluded that the quality of care given to some infants needing intensive care might be improved by greater concentration, and that some units should review their admission policies in order to prevent unnecessary postpartum separation of mother and baby.

Introduction
There is good evidence in Britain\(^1\)\(^-\)\(^3\) of the beneficial effect of modern intensive neonatal care in improving the prognosis of infants of very low birth weight and those suffering from other serious conditions, but little information is available on the overall work load in special-care baby units (SCBUs). In 1974 the provision of special-care baby cots in England was 36/100 000 population aged 0-14 years, but this ranged between areas from seven to 99.\(^4\) Nationally\(^5\)\(^-\)\(^6\) about 15\(\%\) of all live-born infants are admitted to SCBUs, but little is known about the reasons for admission or the type of care given. Alberman et al\(^7\) reported the results of one-day censuses in three Thames health regions and showed that although there appeared to be some overall overprovision of cots, many SCBUs were smaller than recommended by the Expert Group on Special Care for Babies\(^8\) and had deficiencies of equipment and staffing. Alberman et al acknowledged the limitations of the "cross-sectional" approach in estimating work load, and we have attempted to overcome these by surveying all admissions to SCBUs in one Thames health region over three months. Since the one-day census reported was performed while our study was in progress, the data presented here are additional and complementary to those given for the North-west Thames health authority by Alberman et al.

Method
Each of the 21 SCBUs in the North-west Thames region was asked to complete a form on every baby admitted during January to March 1975. Information included birth weight, length of stay, reason for admission, reason for transfer (if applicable), investigations performed, and treatment given. The number of forms returned each month was compared with the number of recorded admissions. Twenty units agreed to participate, and 17 returned complete forms on 89\(\%\) or more of admissions. We classified infants by birth weight—namely, normal (>2500g), low (1501-2500 g), and very low (<1500 g) and type of care given—namely, transitional, special, and intensive. Transitional care—We included in this category babies who fulfilled all the following criteria: (a) were admitted at birth for observation; (b) had a birth weight exceeding 2500 g; (c) stayed in the unit for three days or less; and (d) had no special investigations or treatment. Special care—This group comprised babies not included in the transitional or intensive care category.

Results
There were 1718 admissions (including transfers from other SCBUs) to the 17 units. One unit had 36 admissions, 14 had between 50 and 150 admissions, and two had 230 and 280 admissions respectively. The mean proportion of babies admitted to the SCBUs as indicated by the total number of admissions, excluding babies transferred in, related to the total number of live births in the associated maternity departments was 24.7\(\%\), ranging from 14\(\%\) to 47\(\%\) in individual hospitals. Six units admitted 10-20\(\%\) of such infants, five units admitted 20-30\(\%\), and four units 30-40\(\%\); one unit admitted 47\(\%\) of its maternity department's live-born infants, and one SCBU had no associated maternity unit, so all of its admissions were "transfers in." Forms were returned on 1654 (96.3\(\%\)) of the 1718 babies admitted, and we estimate that this sample constituted 77\(\%\) of all admissions to the 21 units. Over two-thirds of the infants were of normal birth weight (table I).