The Human Pineal Gland in Malignancy

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Summary

The weight and degree of calcification of 500 pineal glands has been measured. The degree of cellularity, the size of the pineocyte nuclei and the extent of degeneration has been estimated in histological examinations of the glands.

There are some differences in the weight of the gland in males and females of different ages and part of this is due to variations in the amount of calcium in the glands. There is only a minor decrease in the cellularity of the glands with increasing age, and this is accompanied in females by a slight increase in fibrosis and gliosis. The weight of the gland is high in patients dying from trauma and burns.

No statistical differences are found in the weight of the pineal glands from patients dying of malignant and non-malignant conditions, although in most age-groups the glands tend to be smaller in patients dying of malignancy. On the other hand patients dying from carcinoma of the breast and from melanoma have much larger glands than those dying from sarcoma.

Key words: Human pineal gland, malignancy.

Introduction

In general the pineal gland is the organ most neglected when autopsies are carried out on humans. As a result of this very inadequate information is available in the literature as to the normal range of variations in the size, weight and histological appearances of the gland.
Although there are reports in the literature on variations in the weight, degree of calcification and histological appearances of the pineal gland in malignancy, these are, on the whole, poorly controlled as far as comparisons with the normal gland are concerned (Kutcherenko, 1941; Hajdu, Porro, Lieberman, and Foote, 1972).

Material and Methods

A survey has been carried out on a series of 500 pineal glands from patients coming to autopsy in a single hospital during a two-year period. Of these glands 154 were from patients dying of malignant conditions. The glands were fixed in formol saline for one to two weeks and then blotted dry and weighed to the nearest milligram. Decalcification was then carried out in a formic acid-formaldehyde solution and when this was completed the glands were re-weighed. The difference in weight before and after decalcification has been accepted as the weight of the calcium contained within the gland.

Histological sections cut at 5μ were then prepared from the decalcified glands and stained with haematoxylin and eosin (H & E). Measurements of the degree of cellularity, the size of the nuclei and extent of degeneration were carried out on H and E sections in the following ways. The degree of cellularity was determined by projecting a medial histological section of the gland at a magnification of ×315, on paper divided into 1 cm squares. The outlines of the whole section together with those of the parts occupied by parenchymal cells were then drawn on the paper. The number of squares within the lines demarcating the cellular areas were counted and expressed as a percentage of the total number of squares within the gland outline. The mean diameter of the parenchymal-cell nuclei in the central part of the gland was calculated from 20 nuclei measured in two axes at right-angles. The extent of fibrosis, gliosis and lobulation together with the amount of pigment in the parenchymal cells was estimated subjectively and a score of 0—3 given for each feature. The mean score was then calculated for each age-group in both males and females.

Results and Discussion

Table 1 shows the weight of non-malignant gland in males and females of different ages. In males there is a gradual increase in the weight up to old age, whilst in females by far the highest weights are in the 30—59-year age-groups. The difference between males and females is statistically highly significant in the 45—59-year age-group. These findings certainly indicate that differences in the weight of the gland in males and females must be taken into account in comparisons of the gland from patients dying of different diseases.