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Hyperostosis Frontalis Interna and Mental Morbidity

By JAN WÅLINDER

Forty-six mentally ill women with radiologically verified hyperostosis frontalis interna (HFI) were compared with 46 matched mentally ill women without HFI in respect of mental morbidity among the full siblings of the two groups. It was found that mental morbidity was lower among the siblings of mentally ill women with HFI than among those of similar mentally ill women without HFI. A reasonable interpretation of these findings is that the combination mental illness-HFI is more often exogenously determined than other forms of mental illness.

Introduction

Hyperostosis frontalis interna (HFI) in its typical form implies a thickening of the tabula interna of the frontal bone. It is easily identified radiologically (Moore, 1935; 1936; 1955). Despite the fairly extensive literature so far published, there is still comparatively little known about its causes and its prevalence in different populations.

As regards frequency and sex distribution, there exist certain data based on radiologic investigation of persons admitted to general hospitals for various somatic conditions. Five investigations giving information of this type are set out in Table I. It appears from this table that HFI is considerably less common in men than in women. The frequency of HFI also rises with increasing age.

TABLE I

Frequency and sex distribution of HFI in various groups of patients treated in general hospitals, all age groups included

	Number of skull X-rays Men	% HFI	Number of skull X-rays Women	% HFI
Oldberg (1945)	319	0	323	4·3
Moore (1955)	4,876	1·08	5,188	12·29
Salmi *et al* (1962)	334	0·59	648	6·8
Hawkins and Martin (1965)	449	0·45	869	5·85
Marlet (1974)	300	2·0	300	20·6

The frequency of HFI in autopsy material has been recorded among others by Henschen (1936). In a post-mortem series of 1,000 women he found a frequency of 40 per cent in those who had passed the menopause. Similar figures have been published by Calame (1941).

The frequency of HFI in the general population is to a large extent unknown, though it seems clear that the frequency is considerably higher in the female population (Henschen, 1936, 1944; Moore, 1935, 1955).

Frequency determinations on psychiatric patients have revealed figures ranging from 25 per cent (Eldridge and Holm, 1940) to 8·6 per cent (Steinbach, 1966).

HFI has come to be associated in particular with two clinical syndromes. The one, Morgagni's Syndrome, consists of the combination of HFI, obesity and virilism (Morgagni, 1765), while the other, Stewart-Morel Syndrome, is characterized by HFI, obesity and diverse neuropsychiatric symptoms (Stewart, 1928; Morel, 1930). It is, however, clear that symptoms of varying type, both somatic and mental, can appear in combination with HFI. The mental symptoms often display the picture of an organic psycho-syndrome (for reviews see, for example Solomon, 1954; Moore, 1955).

The earlier discussions on aetiology were dominated by a purely mechanistic approach. In later days, attention has been devoted to the many endocrine disorders which appear to be associated with HFI, and the aetiological

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theories have therefore concerned themselves in increasing degree with the role of a pituitary dysfunction (Mortimer *et al*, 1937; Bartelheimer, 1939; Henschen, 1944; Oldberg, 1945; 1973). However, we must at present conclude that the mechanism of origin of HFI is incompletely understood.

The Present Investigation

On the basis of the observation that the prevalence of HFI is higher in mentally ill subjects than in patients under care at a 'general hospital' (Hawkins and Martin, 1965; Putman, 1974) and that neuro-psychiatric manifestations constitute the most prevalent symptoms observed in patients with HFI (Grollman and Rosseau, 1944; Šilinková-Málková and Málek, 1965/66), the present study was planned with the aim of analysing the nature of the association between HFI and mental disease. One observation about 15 years ago of the presence of HFI in a number of relatively young epileptic women (not included in the present paper) led me to formulate the hypothesis that, at least in many cases, HFI might be an expression of exogenous cerebral lesions. The present investigation was undertaken to test this hypothesis. If HFI is the consequence of an exogenous cerebral lesion, and if in its turn this lesion is the cause of mental disorder, then the siblings of patients with HFI ought to show a lower frequency of mental illness than the siblings of similar mental patients who do not show HFI. If the hypothesis is confirmed, this should make at least some contribution to the discussion on the mechanism of origin of the so-called endocrine psychosyndrome.

Material and Methods

During the period 1.3.1965–30.9.1968 a series of women were subjected to skull radiography with the aim of demonstrating HFI. The population of women examined comprised those admitted for treatment at the Psychiatric Research Centre, St Jörgen's Hospital. Radiography was carried out by a method standardized for this type of examination, and the final assessment was made by a single radiologist, using the criteria laid down by Moore (1955). In this assessment, no gradation was made of the intensity of the HFI; it was held to be simpler, and therefore more reliable, to classify the cases as HFI 'present' or 'absent'.

In view of the rising frequency of HFI with increasing age, it was decided to include only women under the age of 60 years. Control cases were provided by female patients under care at the same clinic who corresponded most closely to the probands in age at the time of the skull radiography and who showed negative X-ray findings.

The proband and control materials obtained in this way were then analysed for the occurrence of mental illness among their full siblings. For practical reasons, mental illness was defined as admission for psychiatric institutional care after reaching the age of 15 years.

From parish birth and residence registers, information was obtained on the number of full siblings and also on the respective places of residence of these. By circularizing the respective psychiatric institutions in those regions within which a proband-sibling or a control patient-sibling had been resident, information was obtained on possible in-patient care. All case records were borrowed for perusal.

Results

During the period of this investigation, a total of 416 women were admitted to our clinic. Of these, it was possible to carry out radiological examination in 376 cases. Forty patients were thus missed, representing 10 per cent; this was due mainly to occasional breakdowns in the operation of the hospital's X-ray department. In a few cases the patients were too ill for X-ray examination.

Of the 376 women examined in this way, 95 were considered to show definite HFI, representing a prevalence of 26 per cent. Forty-nine of these 95 X-ray-positive women were over the age of 60 years. Excluding these, there remained 46 women for the actual investigation. Comparison between siblings of the probands and controls is presented in Table II. Statistical testing by means of χ^2-analysis revealed that more control-siblings than proband-siblings had received in-patient care for mental illness ($\chi^2 = 5{\cdot}05$; $P < 0{\cdot}05$).

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TABLE II

Comparison between siblings of the proband ($N = 46$) and control ($N = 46$) group (statistical analysis by means of χ^2-test)

	Probands	Controls	Significance
No. of siblings ..	129	164	NS
Males	68	86	NS
Females	61	78	NS
Observation period (years)			
Males	3,468	4,245	NS
Females	3,079	3,789	NS
Died before the age of 16	17	9	NS
Total number of deceased siblings	32	27	NS
No. of siblings admitted as psychiatric in-patients ..	19	43	$<0{\cdot}05$ ($\chi^2 = 5{\cdot}05$)

TABLE III

Comparison of the frequency of various mental symptoms in the proband group ($N = 46$) and the control group ($N = 46$) (statistical analysis by means of the χ^2-test)

Symptom	Proband group	Control group	Significance
Depressive reaction	26/46	34/46	NS
Anankasms ..	7/46	7/46	NS
Anxiety	10/46	8/46	NS
Dementia	7/46	0/46	$<0{\cdot}02$ ($\chi^2 = 5{\cdot}57$)
Other cerebrolesional symptoms* ..	16/46	13/46	NS
Paranoid symptoms	1/46	7/46	NS
Psychotic reaction	18/46	18/46	NS
Headache	8/46	7/46	NS
Giddiness	4/46	3/46	NS
Epilepsy	1/46	2/46	NS

* Including: concentration difficulties, rapid tiring, sensitivity to light or sound, emotional lability, irritability.

To reveal possible difference between the symptom-pictures of the probands and those of the controls, I searched all their case records for evidence of certain psychiatric symptoms. Only such symptoms as allowed clear recognition were taken into account. They were classified as present or absent. The results are set out in Table III. It is seen that among the symptoms recorded only dementia occurred significantly more often in the proband group ($P < 0{\cdot}02$).

In the same way, I examined the case records which had been obtained for the hospital admissions of the proband-siblings and the control-siblings. Analysis for 12 different symptom-categories revealed no significant differences between the symptom-pictures of the two groups.

Discussion

The population investigated amounted to 376 women. The fall-out of 10 per cent is regarded as acceptable and there appears no reason to anticipate any selection factor which might affect the study.

The mean age of the proband group was 43·2 years and that of the control group 43·9 years. The lack of material age difference between the two groups is of importance in view of the rising prevalence of HFI with increasing age. Table II also shows that the matching of the proband and control group is satisfactory.

The total prevalence of HFI in the proband group was over 25 per cent. This figure is considerably higher than those reported in many previous studies, but it equals the one given by Eldridge and Holm (1940). In view of the findings previously reported in the literature as to correlation between HFI and various neuro-psychiatric symptoms the prevalence figure does not appear to be unduly high.

Study of the case records of the proband and control groups enabled certain psychiatric symptoms to be evaluated. Among these only dementia was more common in the proband group. On the other hand, no statistically significant differences in psychiatric symptoms could be demonstrated between the proband-siblings and the control-siblings.

The present investigation has therefore shown that mental morbidity (defined as need for psychiatric hospital in-patient care after the age of 15 years) is lower among the siblings of mentally ill women *with* HFI than among the siblings of similar mentally ill women who at

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corresponding age are *free* from HFI. The probable interpretation of this finding is that the combination of mental illness and HFI is more often exogenously determined than is other mental illness. The same conclusion is suggested by the observation that organic psycho-syndrome occur more frequently in the group with HFI than among any random selection of psychiatric control cases.

This finding does not, of course, rule out the possibility that the HFI group is not uniformly constituted. Some sporadic observations (Knies and Le Fever, 1941; de Montmollin, 1941; Appel, 1949; Marlet, 1972; Rosatti, 1972; Klein *et al*, 1973) of familially grouped cases suggest that HFI can also be a genetically conditioned phenomenon. However, the observations made in this study appear to show that the group with HFI must also contain cases in which the exogenous lesional factors are of greater importance.

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