

INTRACRANIAL CALCIFICATION

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Based on a large personal material, it shows the
main roentgenological aspects which can lead to
the exact diagnosis of certain intracranial lesions,
when a calcifying process occurs.

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Intracranial Calcification

Dedicated to all physicians and particularly to those radiologists who, while working away from specialized institutes and often with inadequate means, devote themselves to the purpose of alleviating, through attainment of exact diagnosis, the suffering of others.

FOREWORD

There has long been need for an English language monograph concerning intracranial calcification. It is not that the subject has been neglected. It is that the information is scattered widely in journals and text books and that there is not general agreement on all aspects of the subject.

This monograph fills the need very well. The references are extensive and are culled from both European and American sources. The illustrations are numerous so that the work has almost the quality of an atlas. The text is concise, yet the authors have expressed their opinions and criticisms freely.

I think Drs. Mascherpa and Valentino have performed a real service for neurologists, neurosurgeons, and radiologists by collecting this material.

Montreal

DONALD L. McRAE, M.D.

INTRODUCTION

The roentgen evidence of intracranial patterns of calcium is often of real diagnostic value, whether calcification occurs in nervous structures themselves as the result of some pathological condition or is found without any pathologic significance in certain intracranial elements, such as the falx cerebri, pineal body, choroid plexuses and so on. Roentgenographic shadows of calcium in some of the latter give information about their site which, if abnormal, may be the first localizing criterion in roentgen diagnosis of cerebral processes, chiefly space-occupying lesions. On the other hand, pathologic calcification occurring in nervous structures may be greatly helpful in identifying the exact nature of the lesion and in recognizing the entity of anatomical changes as well. Moreover, calcification has proved to be in some instances the sole pathologic change when other neuroradiological methods of examination are scarcely able to provide valuable diagnostic criteria.

In order to recognize exactly any peculiar character of the calcium shadows, a perfectly correct technique is always required in the roentgen examination of the skull. There is no doubt, in fact, that sometimes, especially in some cerebral processes of non-tumoural origin occurring in early childhood, the very thin density of small deposits can be difficult to identify on the films and a dangerous misinterpretation of the roentgen picture might be possible. Of late some complementary methods, such as stereoscopy and tomography, have been introduced in the neuroradiological field. In our opinion, stereoscopic films may be useful in these subjects only if calcium shadows are so faint as to be recognizable in one radiological view alone and not others. Concerning tomography we believe that practically it will not provide better information about the site and morphology of intracranial calcification than the ordinary methods of direct examination, if properly used.

In the following report non-pathologic intracranial calcifications have been first examined, chiefly in relationship to their displacement as the result of space-occupying lesions. Subsequently, pathologic deposits of calcium occurring both in non-tumoural and tumoural lesions have been considered.

This work is based upon the study of 153 cases which have been collected among the material of the Milan Neurological Institute in the following way:

Congenital diseases	cases n.	11
Parasitic diseases	" "	11
Inflammatory diseases	" "	12
Vascular diseases	" "	21
Endocrine disorders	" "	4
Tumors	" "	94
Total.....		cases n. 153

The cases were collected from the admissions to the Milan Neurological Institute since its foundation in 1936 to the present time. Of the 153 cases, 108, or 70.6%, have been surgically or pathologically verified; in the other 45 cases clinical and laboratory corroboration has been carried out and strictly valued in order to establish a sure diagnosis.

Non-verified cases, as well as those in which the various data did not provide an accurate diagnosis have not been included in the present monograph.

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Intracranial Calcification

Part I

NON-PATHOLOGIC CALCIFICATION

RATHER frequently calcium deposits are radiologically observed in certain intracranial structures, such as (1) the pineal body; (2) the choroid plexuses; (3) the falx cerebri; (4) the tentorium cerebelli; (5) the region of the sella turcica; (6) the walls of the longitudinal superior sinus; (7) the Pacchionan bodies, and (8) the hypophysis. As the calcifying process is retained to be in these instances an expression of physiologic conditions, calcifications occurring in the above mentioned structures are not suggestive of any intracranial disease. Nevertheless, some of them, i.e., calcifications occurring in pineal body and choroid plexuses, may be of diagnostic value because of their displacement pointing to intracranial space-occupying lesions or more rarely to cerebral hemiatrophy. Moreover, when they appear in childhood their physiologic character is not generally accepted; in the latter occurrence metabolic or endocrine disorders as well as vitamin deficiency have been postulated.

PINEAL CALCIFICATION

The frequency of calcium deposits in the pineal body increases with age, after puberty. Since earliest infancy, in fact, the pineal gland contains some calcareous nodules, named corpora amylacea, which usually are not visible on the films because of their very small size and light density. After puberty, however, in consequence of the physiologic involutive process of the gland, corpora amylacea increase considerably in density and size so that they may be seen on radiographs. Therefore the radiological evidence of calcium in the pineal body is an almost common oc-

currence and it is encountered in about 60% of normal individuals past twenty years of age. On the contrary, such calcifications are seldom observed in children, especially under ten years. Physiologic calcification occurring at birth, however, has been reported by Pendergrass (55). Metzger (45) called attention to the fact that the early appearance of lime salts in the pineal body may be connected with metabolic disorders. In our material there is a single case of pineal calcification occurring in early infancy. In this case, concerning a three-years-old child, clinical and laboratory studies did not show any abnormal change. It is our belief on this subject that punctate shadows of calcium, even if revealed in children under ten years, are without any pathologic significance, corpora amylacea being able to appear on the radiographs since birth. Obviously, when calcification precociously occurring involves extensively the pineal some pathologic condition, either of metabolic or endocrine origin as well as certain tumoural lesions must be considered.

The calcified pineal appears on radiographs as an irregular amorphous deposit or as small granular shadows grouped in a rounded, rather homogeneous and well-defined area a few millimeters in diameter (Fig. 1). In the lateral view of the skull, the pineal shadow is located about 3 cms. above the upper outline of the petrous bones and, more exactly, its normal position is about 5 cms. above the orbito-meatal line and 1 cm. behind a line drawn perpendicularly to the former and crossing the external auditory meatus (Fig. 2). In the frontal view it is seen in the mid-



Fig. 1. Normal case; calcified pineal body on the lateral view.