Neurosurgical Classic—XXIX

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In 1895 Wilhelm Konrad von Röntgen revolutionized medical diagnosis by the introduction of roentgenography.13,14 Two years later the hope was expressed that brain tumors might cast shadows in roentgenograms of the skull,9 but it was soon found that no differentiation could be made between noncalcified tumors and the surrounding tissues.3 Furthermore, calcification could be demonstrated in only a small proportion of intracranial tumors.7 For these reasons, despite the occasional demonstration of bony erosion from intracranial neoplasms (such as Oppenheim’s observation of changes in the sella turcica19), roentgenography had little use in the diagnosis of neurological diseases until the second decade of the twentieth century.

This lag was followed by the rapid introduction of ventriculography,21 pneumoencephalography,22 myelography,23 angiography,24 and a variety of special techniques for the demonstration of the cranial orifices.2,4,11 Also during this period it was predicted by Arthur Schüller,16 and verified by Howard Naffziger4 that the pineal gland frequently is displaced laterally by an expanding mass in the opposite cerebral hemisphere.1,3,4,11,12,15,17 Each of these two men was outstanding in his field, and working independently in different countries, they contributed an important sign for the diagnosis of intracranial disease.

"Without any shadow of doubt Arthur Schüller . . . was the father of neuroradiology. He was born in Brünn, the capital of Moravia in the old Austria, in 1874. . . . Schüller, qualifying in medicine in Vienna just after Röntgen’s discovery, graduated with the highest honours—sub summis auspicis imperatoris Francisci Josephi. This was a prize awarded by the Emperor Franz Joseph and was only given twice during his long reign of 68 years (1848–1916). Schüller immediately became interested in the radiology of the skull and in 1912 published a text-book on the subject: Röntgendiagnostik der Erkrankungen des Kopfes. This work was translated into English in 1918 by an American, F. F. Stocking . . . One has only to glance at this text-book to see how far in advance of others was Schüller . . . He differentiated many types of normal and pathological intracranial calcifications, but perhaps his greatest contribution was his work on the pituitary fossa . . ."

"More than 300 publications—books, monographs and papers—came from his pen, mostly while he was in Vienna. They covered not only the radiology of the skull but various aspects of neurology, surgery and psychiatry. He described three diseases and devised three operations, though he was not a surgeon. . . ."13

The ideas of Schüller about pineal displacement, which he thought should be evaluated routinely on anteroposterior roentgenograms of the skull, were expressed in the 1918 translation of his text-book as follows:

". . . One can also, for example, in case of a displacement of the shadow of a pineal gland to the right or left of the median line, in symmetrically formed skulls, conclude the cause of its displacement to be pressure on the part of a tumor or traction on the part of a brain scar, as the following case shows:

"R.F., male, thirty-six years old. Trauma to the skull two years previously. At the time of examination he was suffering from hemiplegia of the right side following an apoplectic stroke. Internal organs normal. Wasmann negative. Suspicion of cerebral tumor.

"The roentgenogram showed that the pineal gland, the shadow of which was plainly recognizable, was displaced several millimeters to the left from the middle line, from which fact one was able to draw the conclusion that no large tumor of the left hemisphere could be the cause of the hemiplegia, but, rather, that there was probably a contraction present, perhaps in consequence of an area of softening."16

Howard C. Naffziger, an outstanding neurosurgeon, was born and educated in California. His surgical training was received under William S. Halsted and Harvey Cushing at the Johns Hopkins Hospital, and in 1929 he became Chairman of the Department of Surgery at the University of California. During the following quarter of a century he contributed many original concepts and useful techniques. Among other things, Naffziger emphasized the role of the anterior
scalenus in compression of the brachial plexus, and devised a method of orbital de-compression for exophthalmos.\textsuperscript{18}

The recognition of pineal displacement by Schiller and by Naffziger was followed by the more detailed studies of others on the charting of the normal position of the pineal gland.\textsuperscript{5,6,19} As an indication of the importance of this sign, pineal position has for many years been evaluated routinely in patients with suspected intracranial lesions.

References


A METHOD FOR THE LOCALIZATION OF BRAIN TUMORS—THE PINEAL SHIFT*†

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THE pineal shift as determined by X-ray examination will frequently localize a brain tumor. This method has been of great value in confirming opinions based on neurological examination, and it alone has frequently made the diagnosis possible. It has also resulted in widening the range of diagnosis by X-ray examination. Formerly the minority of cases of intracranial pressure yielded X-ray evidence of the location of the lesion. Diagnostic information of a localizing character can now be obtained in the majority.

The percentage of brain tumors and of other gross intracranial lesions which cannot be localized by clinical methods of examination alone is considerable. It varies greatly if one considers the length of time the case is studied. It has been estimated at various figures. Dandy has made the statement that only 50 per cent of the tumors could be located with accuracy sufficient to guide the surgeon. This is probably a low figure for the clinical neurologist. Others have given much smaller percentages, but it seems reasonable to suppose that in a short period of observation there will remain something like 20 per cent which cannot be localized. In these, additional diagnos-

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