A. Introduction

Until well into the twentieth century, neurologic signs and symptoms were the only means available for the detection and localization of intracranial tumors. Diagnostic neuroradiology traces its origin to Dandy, who in 1918 *injected air into the cerebral ventricles* by the direct puncture of a fontanelle or through a bur hole as a means of outlining the ventricles on X-ray films. In 1919 he additionally described lumbar puncture as a means of introducing air into the ventricular system.

Cerebral angiography was developed by Moniz in 1927. This was the first procedure that permitted brain tumors to be directly visualized on the basis of their pathologic blood supply. In 1929 Berger introduced *electroencephalography* for the diagnosis of intracranial lesions. This method continues to play a major role, especially in evaluating functional disorders of the brain. The *radionuclide imaging* of brain tumors was first performed in the late 1940s (Moore 1948; Selverstone and Solomon 1948).

In 1955 Leksell introduced *echoencephalography*, which permits the accurate measurement of midline shifts and ventricular distension with relatively simple apparatus.

A new era in the diagnosis of intracranial space-occupying lesions began in 1972, when Godfrey N. Hounsfield announced at a London press conference his initial results with *computed tomography*, which he had developed for the firm EMI. In 1979 Hounsfield and Allan M. Cormack received the Nobel Prize for Medicine for their revolutionary advance of the roentgenographic technique.

In the past 15 years computed tomography (CT) has become *the* standard imaging modality for intracranial tumors. Its essential features have changed little during that period, and the study still relies on differences in the relative densities of tumor and normal brain tissue before and after the intravenous injection of contrast medium. However, significant improvements in spatial resolution and more modest improvements in density resolution have further enhanced the ability of CT to delineate and identify lesions of the brain, orbit, and skull base. Today CT permits a direct or indirect examination of the skull on multiple planes, and modern scanners can construct images from available data in a matter of seconds. In many cases, however, the image quality is inadequate for a definitive diagnosis. Dynamic CT has proved advantageous only in certain types of investigation.

The physicists Bloch, Purcell and colleagues described the phenomenon of "nuclear magnetic resonance" in 1946 (Bloch et al. 1946; Purcell et al. 1946) and 6 years later received the Nobel Prize for Physics. In 1973 Lauterbur utilized this phenomenon to make an image. Magnetic resonance (MR) scanners have been undergoing clinical trials since 1981/82, and the results have been most encouraging. The technical investment involved with this imaging modality is high, and a single examination is correspondingly cost-intensive, but the quality of the MR image has surpassed all expectations. Major advantages of magnetic resonance imaging (MRI) are the lack of ionizing radiation, the ability to acquire images in three planes, and the ability to define normal intracranial structures and their relations to pathologic processes with no artifacts emanating from bone.

C. Claussen et al., *Computed Tomography and Magnetic Resonance Tomography of Intracranial Tumors*