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**Neuroradiology as a subspecialty.**

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## Neuroradiology as a Subspecialty

A recent report by the American College of Radiology (ACR) [1] indicated that there is probably no need to increase the number of trainees in neuroradiology since, at the present rate of growth, the number of neuroradiologists in the United States is sufficient for the country's needs. The College acquired this information through a questionnaire sent to a sample of board-certified radiologists, who were asked to name the type of practice that best described their major clinical activity. The report indicated that in 1980 there were about 17,000 radiologists, of whom 4.4% classified themselves as neuroradiologists. Comparison of the ACR data with the records of the American Society of Neuroradiology (ASNR) for the same year revealed that in 1980 there were more self-styled neuroradiologists (748) than senior members of the ASNR (472). The ACR report included data derived from a similar questionnaire circulated in 1975, at which time there were more than twice as many self-styled neuroradiologists (565) than members of the ASNR (257).

Membership in the ASNR requires a period of fellowship training or major practice in neuroradiology. It is certainly possible that some of the self-styled neuroradiologists are eligible but have declined membership in the Society. However, it is more likely that many radiologists in the United States whose major practice is neuroradiology still consider fellowship training in the subspecialty unnecessary (although the proportion of self-styled neuroradiologists decreased from 54% to 37% over the 5-year period 1975–1980).

The perception that a practicing neuroradiologist may not need specialized training is inferred also from the recent recommendations of the ACR and the American Board of Radiology (ABR). The ASNR requested that subspecialization in neuroradiology be approved by the ABR. The council of the ACR, at its September 1981 meeting, expressed disapproval of subspecialty certification by an overwhelming majority vote. The ABR similarly voted to deny subspecialization status for neuroradiology in the immediate future, tabling the request until the effect of the new 4-year residency training program can be assessed.

The convictions of the ACR and of the ABR echo the opinion of many board-certified radiologists. The technologic revolution in radiology, bringing with it the development of less invasive and safer diagnostic imaging methods, probably represents a major reason that radiologists see no

need for subspecialty training in neuroradiology. Computed tomography (CT), intravenous digital subtraction angiography and, more recently, nuclear magnetic resonance (NMR) imaging exemplify technologic advances that have achieved explicit images of the brain and its blood vessels, thus leading to the widespread belief that diagnostic neuroimaging is easier than ever.

The orientation toward technology-based specialization within radiology is strong, as evidenced by the trend toward the establishment of fellowship programs in CT, nuclear medicine, and sonography in many teaching hospitals and the concomitant establishment and growth of technology-based societies and journals, such as those in CT, sonography, and NMR.

Economic considerations may play a role in determining whether some radiologic services are willing to hire trained neuroradiologists. Faced with the technologic revolution, many radiologists in community hospitals now prefer to nominate one of their number to carry out neuroradiology. Attendance at major meetings, enrollment in special training courses, and keeping abreast of the current literature are considered sufficient for mastering the intricacies of the new body of knowledge.

Neuroradiology as a subspecialty is challenged not only from within general radiology, but also from outside the discipline: The "ease" of neuroimaging has encouraged many neurologists and neurosurgeons to acquire CT scanners, form their own neuroimaging societies, and present themselves to their colleagues and hospital administrators as being qualified to perform CT scanning. Technology-intensive styles of practice have high rewards, and there are those who advocate lower reimbursements for studies such as CT scanning [2, 3]. A more uniform monetary reimbursement structure for the neurologic and CT examinations would serve to remove the major incentive for neurologists and neurosurgeons to perform neuroradiologic procedures. However, until such financial restructuring occurs, given the present rate of increase in the number of neurologists and neurosurgeons and continued perception by many general radiologists that neuroradiologic specialty training is unnecessary, trained neuroradiologists will meet with a continuous and vigorous territorial challenge.

Although the ABR rejected the request of the ASNR for subspecialty status, the Board acknowledged that such specialization would improve patient care, advance medical

knowledge, improve the quality of training programs, give recognition to de facto subspecialization, and possibly protect the neuroradiologists' turf against inroads made by neurologists and neurosurgeons. Elkin [4], in a presidential address to the Radiological Society of North America, considered subspecialization in diagnostic radiology to be "an acute burning issue" that would have "great effects on the course of our discipline." Arguing cogently against technologic orientation and in favor of organ-system orientation, Elkin maintained that the latter best furthers our role as medical consultants. Being system-oriented, he claimed, "allows a more orderly and comprehensive approach to patient management, since a single radiologist or division within a department would be familiar with all imaging procedures involving a single system. . . ." As a result, overuse of radiologic examinations would be curtailed. Margulis [5] stated that general radiologists must realize that rapid change from technologic orientation toward organ orientation and subspecialization is a matter of fact, and that subspecialization must extend beyond the teaching universities and large medical centers into the community. Potts [6] believed similarly that both patients and referring physicians would be better served if they were advised by organ specialists.

To counter the critics within and those outside radiology who argue against subspecialization, we need to analyze the nature of specialization within medicine. Medical specialization in the United States has grown steadily in recent years. Moore and Lang [7] found that as of 1978, 78% of practicing physicians were board-certified. They predicted that by the year 2010, if the system of board certification remains unchanged and the number of residents is not diminished by war, virtually all practicing physicians in the United States will be board-certified in some field. Specialization in medicine, the two authors believe, represents a measure of postgraduate achievement. Board-certified radiologists would certainly agree. Similarly, stimulated by the new technologies and wishing to incorporate them into the neurosciences, neuroradiologists realize a need for postgraduate training in addition to that achieved by a residency in radiology. Such training prepares the fellow in neuroradiology for his/her role as a member of a team of neuroscientists whose combined expertise can result in better medical care. It appears that many board-certified radiologists disagree with this premise.

The rapid growth of scientific knowledge has provided more resources than any individual specialist can hope to master. Neuroradiology involves diagnostic skills based on experience and a basic knowledge of neurologic disease that goes beyond the radiologic image. As professionals, neuroradiologists recognize that a pooling of resources and a broad perspective are mandatory if they are to master the wealth of detail in their own field. Illness is best diagnosed when the data derived from several techniques are integrated and correlated. The creative juxtaposition of diverse, equally well established views of the same event by physicians in different specialties provides insights which the nonspecialist cannot acquire by focusing on any single perspective [8]. Neuroradiologists realize that their discipline necessitates a working familiarity and strong ideologic

bonds with neurosurgeons, neurologists, and neuropathologists. The interdisciplinary approach offers counterbalance and an opportunity for peer review while satisfying the desire for professional identity. Such identity is contingent on a demonstrable knowledge base. Neuroradiologists are impelled therefore to acquire a measure of competence in the several areas of expertise staked out as the preserves of their colleagues. At the same time, neuroradiologists are concerned about their role in the total diagnosis. They are primarily radiologists, but their responsibility to their patients is carried out as a member of an interdisciplinary team of neuroprofessionals.

The role of the radiologist as a consultant has recently received attention. Heilman [9] found that when a radiologist functions as a consultant, the radiologic workup is streamlined, leading to smooth and effective patient management. The neuroradiologist, to function effectively as a consultant, must gain the confidence of his or her colleagues. Confidence is developed through expertise—an expertise that is secured through training. It is easy for a trained neuroradiologist to communicate effectively with a neurosurgeon or neurologist, since confidence in the neuroradiologist's ability leads to an equal exchange of ideas. An equivalent communication and exchange of ideas may not take place with the general radiologist.

Specialization, like the division of labor, is an inevitable outgrowth of advancing knowledge. The emergence of neuroradiology as a subspecialty simply gives concrete expression to the requirement to limit one's focus when a domain of knowledge becomes intellectually complex. This is not to disparage the specialty of general radiology. The general radiologist is a specialist who commands a central core of knowledge with comfortable assurance. Neuroradiologists, by contrast, devote themselves to a discipline in which their expertise is presumably highly penetrating. Both activities are the natural products of the growth of biomedical science.

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