On government-regulated access to diagnostic imaging in neurosurgery

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Received: 18 January 2018 / Accepted: 25 January 2018 / Published online: 5 February 2018
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The authors of “The role of computed tomography in the screening of patients presenting with symptoms of an intracranial tumor” [1] present their study investigating a government-regulated diagnostic pathway to detect brain tumors in patients who are referred to radiology services by mostly primary caretakers. Because of limited availability of MRI time, Danish government regulations seem to stipulate that patients in whom a brain tumor is suspected may undergo a contrast-enhanced CT scan within 7 days of referral to a radiology service if an MRI is not available within that 7-day period. In that context, the authors investigate if the sensitivity and specificity of contrast-enhanced CT scans is sufficient to detect intracranial tumors in such patients.

While the study’s question is interesting, there are a number of issues that need to be addressed. Is this really the way to go ahead for the health care system of a developed country? From a neurosurgical point of view, one of the great advantages of health care in developed countries is the chance of early detection of intracranial space-occupying lesions (SOL). A good number of SOL are detected by MRI when patients are still oligosymptomatic or even before the lesions lead to focal deficits. In the present study, many of those tumors such as small meningiomas have been designated to the non-tumor patient group. Is that really appropriate?

CT imaging for skull base and posterior fossa tumors is undoubtedly less than optimal. Therefore, many of such tumors may be missed on CT scans. Typically, such tumors tend to be small in comparison to supratentorial lesions and they are best treated at an early stage. Good examples are meningiomas of the cavernous sinus, of the tuberculum sellae, and of the sphenoid wing. We all have seen patients in whom

meningiomas of the cavernous sinus have been missed on earlier MRIs. How are they to be detected on CT scans? All of those tumors may be treated at an early stage invasively or non-invasively with optimal long-term results sparing the patients subsequent focal deficits such as blindness, ophthalmoplegia, or worse. Small vestibular schwannomas and schwannomas of other cranial nerves are another group of tumors which may easily be missed on a CT scan. The same is true for pituitary adenomas, cerebellar hemangioblastomas, ependymoma of the posterior fossa, chordomas, chondrosarcomas, cavernomas, and small brain metastases. All patients with one or more lesions mentioned above would be designated to the study’s non-tumor patient group and the lesions would most probably be missed on CT scans.

Will all of those patients with false-negative CT scans receive an MRI follow-up or an adequate clinical follow-up? This is most doubtful. It is more likely that those patients will return to their primary caretaker who will then manage their further medical care. Based on the current study [1], the primary caretaker will rightly argue that the patients did undergo sufficient imaging and that no tumor or other relevant intracranial lesion had been detected. While this government-regulated diagnostic pathway may be appropriate for larger and less benign supratentorial tumors, it will inevitably lead to less involvement of neurosurgeons at an early stage in an entire set of important intracranial lesions. In addition, one may question if it is really appropriate to submit pediatric patients to CT scanning just because an MRI is not readily available as it was the case in the present study.

A great deal of improved outcomes in neurosurgery is owed to early detection of intracranial lesions and early intervention. The deeper the lesions are located, the less they are likely to be detected on CT scans and the worse is the outcome for patients if they are missed at an early stage. Should we really forgo the advantages of early tumor detection and treatment for plain regulatory reasons of a given health care system? Should pediatric patients really be exposed to radiation

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in CT scanners for plain logistic reasons when an MRI would be more adequate and when health authorities of other countries such as the USA try to restrict the use of CT scans for reasons of radiation protection? Are there no other ways to secure timely patient access to adequate diagnostic measures in health care systems of developed countries? Although well intended, the current study [1] paths the way to a decline in health care quality and patient safety.

Reference

1. Mortensen SJ, Bjerrum SN, Hedegaard SF, Tietze A, Gottrup H, von Oettingen G (2018) The role of computed tomography in the screening of patients presenting with symptoms of an intracranial tumor. *Acta Neurochir*. <https://doi.org/10.1007/s00701-018-3478-z>