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Technical Note

Place of Portable Computed Tomography in Neurosurgery Practice

Nöroşirürji Pratiğinde Portable Bilgisayarlı Tomografinin Yeri

Turan Kandemir

Yunus Emre State Hospital, Department of Neurosurgery, Eskisehir, Turkey

Abstract: Portable computed tomography is mostly used in operating rooms, intensive care units, emergency service and interventional operation units. It provides a good diagnosis method in intensive care unit patients. It determines bleeding, hydrocephaly, cerebral edema which may occur in cranial cases. As a result, it gives early patient intervention chance. Radiation exposure is the greatest factor decreasing usage indication. It is predicted that the use would increase by minimalizing radiation ratio with technological developments.
Keywords: Portable computed tomography, neurosurgery, diagnosis

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Özet: Portable bilgisayarlı tomografi daha çok ameliyathanelerde, yoğun bakım ünitelerinde, acil servis ve girişimsel işlem ünitelerinde kullanılmaktadır. Portable bilgisayarlı tomografi yoğun bakım hastalarında iyi bir tanı yöntemi olanağı sağlamaktadır. Portable bilgisayarlı tomografi kranial vakalarda meydana gelebilecek kanama, hidrosefali, beyin ödemini belirlemektedir. Bunların sonucunda hastaya erken müdahale şansı vermektedir. Radyasyon maruziyeti kullanım endikasyonunu azaltan en büyük etkendir. Gelişen teknolojiyle birlikte radyasyon oranının minimalize edilmesi ile kullanımının daha çok artacağı öngörülmektedir.
Anahtar Kelimeler: Portable bilgisayarlı tomografi, nöroşirürji, tanı

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ORCID ID of the author: T.K. 0000-0002-6230-0645

Yazışma Adresi / Correspondence Address
Turan KANDEMİR
mail: turankandemir26@gmail.com

1. Introduction

Brain imaging with computed tomography (CT) was performed in 1979 for the first time. Then its clinical usage areas increased with technological developments (1). Computed tomography is superior to magnetic resonance imaging (MRI) in the evaluation of bone structure and acute bleeding. Also computed tomography lasts shorter than MRI.

A fast development has occurred in CT systems in years. Its use before, during and after surgical operations increased. Portable computed tomographies were developed to provide easier patient access to this device. Okudera et al reported that sliding mobile ct has been used in the operating room in important cases since 1988 (2). Then portable tomography devices were started to be designed for being used in most suitable ways both inside the operating room and other departments. Portable ct is mostly used in operating rooms, intensive care units, emergency service and interventional operation units(Figure 1).

Intraoperative portable CT use during spinal operations (vertebral biopsy, vertebroplasty, khyphoplasty and stabilization, etc.) in brain surgery practice minimizes the complications which may occur during the operation. Portable CT is used to observe complications which may occur in early period in cranial surgery. It is also a good option for intensive care unit patients in critical condition and cannot go to the imaging center.

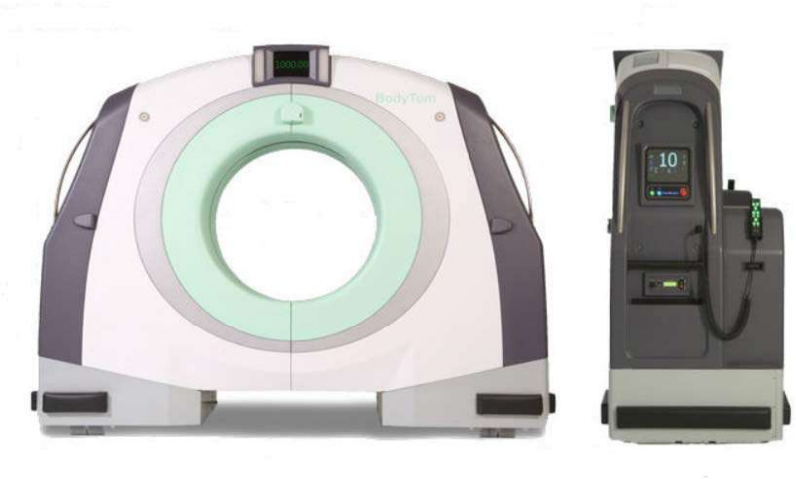


Figure 1.
Portable computed tomography

2. Dıscussıon

Computed tomography is frequently used in neurosurgery practice. Portable CT provides a good diagnosis method in intensive care unit patients (3). While transferring the patient to the tomography room, intracranial pressure increase, hypotension and hypoxia incidences may occur (4). This increases mortality and morbidity rate. Thus Portable CT use is both economic and provides medical advantage. Portable CT also provides fast diagnosis in intensive care and emergency service units. Fast diagnosis and treatment has a positive effect on disease prognosis.

Portable CT determines bleeding, hydrocephaly, cerebral edema which may occur in cranial cases. As a result, it gives early patient intervention chance. In tumor cases, it shows the resection border of the surgeon. It provides an important advantage to the patient especially in cases where tumor size affects survival ratio. In spinal cases, revision rates of

patients who were applied intraoperative CT guided posterior stabilization in spinal cases were found lower than those who were applied with fluoroscopy (5).

While easy transfer of portable CT between rooms provides convenience for both the doctors and the patients, it may also cause more radiation exposure for the patients and the staff. Radiation protection is more difficult especially in interventional operations and operating room. Although radiation exposure is higher especially when it is compared to intraoperative MRI use, it is preferred due to its superiority in bone structure (6). Its shorter application time compared to MRI is also an advantage.

Since CT is more expensive, it is purchased and used less compared to stationary tomography (7).

3. Result

Being a very important diagnosis method especially for intensive care unit patients who are difficult to transfer, it is also used in emergency services. It provides the surgeon great convenience during and after the operation. Its use gradually increases thanks to these characteristics. Radiation exposure is the greatest factor decreasing usage indication. It is predicted that the use would increase by minimalizing radiation ratio with technological developments.

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