Low dose computed tomography

The implementation of a low-dose head CT protocol substantially reduced the amount of ionizing radiation exposure in a preselected population of pediatric neurosurgical patients. Image quality and diagnostic utility were not significantly compromised [1].

In a cohort of patients in the neurosurgical intensive care unit, dedicated ultra-low-dose CT for surveillance head CT imaging led to a significant dose reduction while maintaining adequate image quality [2].

Although replacing a CT with magnetic resonance imaging is ideal to completely avoid ionizing radiation, this is not always practical or preferred. Therefore, it is important to have CT protocols in place that minimize radiation dose without sacrificing diagnostic quality [3].

The evaluation of children with suspected ventriculoperitoneal shunt malfunction has evolved into a diagnostic dilemma. This patient population is vulnerable not only to the medical risks of hydrocephalus and surgical complications but also to silent but harmful effects of ionizing radiation secondary to imaging used to evaluate shunt efficacy and patency. The combination of increased medical awareness regarding ionizing radiation and public concern has generated desire to reduce the reliance on head computed tomography (CT) for the evaluation of VPS malfunction. Many centers have started to investigate the utility of low dose computed tomography and alternatives, such as fast magnetic resonance imaging for the investigation of VP shunt malfunction in order to keep radiation exposure as low as reasonably achievable.

A pilot study demonstrates that utilization of limited head CT scan in the evaluation of children with suspected VP shunt malfunction is a feasible strategy for the evaluation of the ventricular size [4].

In the study of Afat et al., low-dose computed tomography (LD-CT) provides excellent sensitivity and higher diagnostic confidence with lower radiation exposure compared with radiographic shunt series (SS) [5].

1)
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