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NEWS

RSNA Press Release

MDCT Is More Accurate than X-Rays in Depicting Spine Fractures in Severe Trauma Patients

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OAK BROOK, Ill. - When every minute counts in assessing and treating injuries in patients who have sustained severe trauma, multidetector-row computed tomography (MDCT) is more effective than conventional radiographs (x-rays) in helping radiologists pinpoint spine fractures, according to a new study appearing in the June issue of the journal *Radiology*.

The study was conducted at Lausanne University Hospital in Switzerland, to determine if MDCT, an advanced CT scan that includes an intravenous contrast solution, could replace conventional x-rays in the diagnosis of thoracolumbar (thorax or lumbar) spine fractures. Researchers found that MDCT had an accuracy rate nearly three times that of conventional radiography.

Patients admitted to a hospital's emergency department for severe trauma often undergo both x-rays and MDCT. Physicians use MDCT, which provides many images of the body from different angles, to screen for traumatic lesions affecting the vessels, lungs, spleen and kidney, and for the presence of blood.

"We found that performing both tests on severe trauma patients does not improve diagnosis," said the study's lead author, Max Wintermark, M.D., clinical and research fellow in the department of diagnostic and interventional radiology at Lausanne University Hospital. "Results showed that MDCT depicted more spine fractures than were shown on plain film x-rays."

According to the National Spinal Cord Injury Association, approximately 7,800 spinal cord injuries occur in the United States each year, primarily caused by motor vehicle accidents, acts of violence and falls. Given the potential seriousness of this type of injury, all trauma patients must be screened and assessed within minutes after being admitted to the emergency department.

"Using MDCT alone provides an accurate and faster diagnosis," Dr. Wintermark said. "Physicians can start treatment more quickly, which will improve the outcome for the patient."

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Imaging is performed to provide an accurate screening to rule out unstable spine fractures, which are more serious and can lead to permanent spinal cord injuries or paralysis. In severe trauma cases, patients are often unconscious and cannot tell physicians where there is pain or provide any medical history. The physician must rely on imaging to take pictures of the injuries.

The study included 100 consecutive adults with a median age of 34 who had sustained severe trauma and underwent both conventional x-rays and MDCT at the hospital in 2001. The x-rays were reviewed independently by three radiologists and two orthopedic surgeons, and the MDCT findings were reviewed by the three radiologists. The reviewers documented the presence, location and stability of fractures and assessed the quality of the imaging methods. They also recorded the time it took to perform the procedures.

Out of the 100 patients, 26 had a total of 67 fractured vertebrae. Twelve patients had unstable spine fractures. The researchers found that MDCT exhibited 97.2 percent sensitivity in depicting the unstable spine fractures, while conventional x-rays had a sensitivity of only 33.3 percent. The average time to perform the x-ray exam was 33 minutes, compared with 40 minutes for the MDCT exam, or a total of 73 minutes for both procedures.

Using MDCT alone, physicians could potentially retain the same level of diagnostic accuracy and cut the total examination time nearly in half. In addition, foregoing the x-ray exam would result in cost savings to the patient and insurance provider. The cost of x-rays for each patient in the study averaged $145.

"Another benefit of eliminating x-rays as part of the screening in severe trauma patients is that it spares radiation to the patient," Dr. Wintermark said. This can be an issue with young female patients who are of childbearing age and would be exposed to unnecessary radiation in the thoracic, pelvic and spine areas.

Dr. Wintermark noted that these conclusions apply only to patients who have sustained severe trauma and are admitted to large university hospitals or level 1 trauma centers. Patients with back pain or lesser injuries can usually be effectively diagnosed using only conventional x-rays.

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"Thoracolumbar Spine Fractures in Patients Who Have Sustained Severe Trauma: Depiction with Multi-detector Row CT." Collaborating with Dr. Wintermark on this study were Elyazid Mouhsine, M.D., Nicolas Theumann, M.D., Philippe Mordasini, M.D., Guy van Melle, Ph.D., Pierre F. Leyvraz, M.D., and Pierre Schnyder, M.D.

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