
RSNA Press Release

Triple-Contrast CT Depicts Internal Injury from Gunshot and Stab Wounds

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OAK BROOK, Ill.—When a fast diagnosis is crucial, radiologists can use computed tomography (CT) with contrast to quickly and accurately identify and assess internal damage from gunshot wounds or other trauma to the torso, according to a study published in the June issue of the journal *Radiology*.

"Before contrast CT, it was difficult to detect violation of the peritoneum, which lines the entire abdominal cavity from the diaphragm to the pelvis. This cavity contains the liver, spleen and intestines," said the study's lead author, K. Shanmuganathan, M.D., a professor in the department of diagnostic radiology at the University of Maryland in Baltimore.

Penetrating trauma has always been a challenge to trauma surgeons. "A straight line cannot be drawn between a bullet entry site and resting site," Dr. Shanmuganathan said. "It is also hard to gauge how far a bullet can travel inside a body."

The researchers studied 200 patients, including 169 men and 31 women with penetrating torso trauma to evaluate the accuracy of triple-contrast CT in detecting the absence or presence of peritoneal damage. The study group included 111 patients with stab wounds, 86 with gunshot wounds and three impalements. CT depicted peritoneal injury in 68 (34 percent) of the patients and had an overall accuracy rate of 98 percent.

Until recently, CT had been used only for assessment of the retroperitoneum, which extends behind the peritoneum and includes the kidneys, pancreas and aorta, and was not considered reliable for demonstrating injuries within the peritoneum. Standard practice for diagnosing peritoneal injury is peritoneal lavage or observation. Observation requires the patient to be hospitalized for three days to watch for peritoneum inflammation from internal injuries.

"Now, contrast CT can be used to study both the peritoneum and the retroperitoneum," Dr. Shanmuganathan said. "It is available in most trauma centers and provides an excellent imaging modality for assessing torso trauma."

At A Glance

- Triple-contrast CT quickly and accurately identifies internal injuries from gunshot and stab wounds.
- Before contrast-enhanced CT it was difficult to detect violation of the peritoneum, which lines the entire abdominal cavity that contains the liver, spleen and intestines.
- In the study, CT had an overall accuracy rate of 98 percent in depicting peritoneal injury.

In addition to the Baltimore study site, CT also is being used to identify peritoneal injury in Miami and Philadelphia.

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"Penetrating Torso Trauma: Triple-Contrast Helical CT in Peritoneal Violation and Organ Injury-A Prospective Study in 200 Patients." Collaborating with Dr. Shanmuganathan on this study were Stuart E. Mirvis, M.D., William C. Chiu, M.D., Karen L. Killeen, M.D., Gerald J.F. Hogan, M.D., and Thomas M. Scalea, M.D.

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