



### H194 Postmortem Computed Tomography (PMCT) in Shooting Fatalities

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**Learning Overview:** After attending this presentation, attendees will understand the accuracy of PMCT compared with autopsy and PMCT in fatal cases of firearm injuries.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by providing guidance concerning the use of PMCT in fatal cases of firearm injury.

PMCT has become integrated into the evaluation of decedents in some United States medical examiner offices and in medicolegal offices in several other countries. This study investigated the value of a total-body PMCT scans in firearm injury-related deaths.

This retrospective medicolegal autopsy case series was performed using data from a statewide, centralized, academically based, United States medical examiner's office. Firearm injury deaths that occurred between January 1, 2016, and December 31, 2016, were reviewed. Only cases with a total-body PMCT and a total-body autopsy were included.

Autopsies were performed and documented by unblinded board-certified forensic pathologists acquainted with the PMCT results. PMCT results were reevaluated by a forensic radiologist, blinded for autopsy results, and scored by body region (head-neck, thoracoabdominal, and extremities). Injuries for these body regions were scored as absent, minor, or major. The PMCT injury scores per body region were compared to autopsy results with McNemar's test. An exemplary Bayesian network was built with HUGIN® to help visualize the determinative value of these results.

Out of the annual 7,000 cases investigated at the Office of the Medical Investigator (OMI), 376 had firearm injuries. From these identified cases, 247 cases were excluded due to a lack of a total-body PMCT and/or a total-body autopsy, or the presence of disruptive surgery, an old firearm injury, or a long postmortem interval with the resulting decomposition.

Based on the final autopsy reports, a total of 129 cases with firearm injuries remained, of which 47 were suicides, 80 homicides, 1 case was undetermined, and 1 case was determined as accidental. The decedents consisted of 104 males and 25 females, aged 3-83 years old (median age 35 years). Based on PMCT results, 102 (79.1%) cases had injuries relevant to the cause of death in a single body region, with 51 cases having injuries in the head-neck region, 50 cases in the thoracoabdominal region, and 1 case having a single injury of the leg. The remaining 27 cases had injuries in more than one region. Additionally, in 96 of the cases, the bullet or fragments of the bullet were retained.

When comparing the total-body autopsy results with the total-body PMCT results, for those 102 cases with single body-region injuries relevant to the cause of death (thus based on PMCT), 12 potentially relevant injuries (cardiac and major vessel diseases and arm injuries) outside the particular body region, were additionally identified by autopsy. These 12 injuries were in 12 different cases, of which 5 were in the head-neck region group and 7 in the thoracoabdominal group. Yet, in all 12 of these cases with missed injuries, there was evident firearm injury to the body, also noted by PMCT. It is believed that it is unlikely these additionally identified abnormalities by autopsy contributed to the death. In cases where more than one region were injured, autopsy performed better in identifying injuries. Per this study, it is believed that PMCT can accurately identify the key injuries in fresh decedents with firearm injuries, but without surgery, for nearly all cases in which a single body region was injured.

### Autopsy, Computed Tomography, Gunshot Wound