H50 Mass Disaster Management and Disaster Victim Identification (DVI) Activities in the 2016 Central Italy Earthquake

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Learning Overview: After attending this presentation, attendees will better understand the management and identification process of victims after the 6.0 earthquake that struck Amatrice, Italy, on August 24, 2016.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing an effective protocol based on the elaboration of an algorithm for the management of dead bodies and on the systematic acquisition of data during corpse processing.

The management of a mass disaster requires a series of fundamental steps concerning the designation of a collection area, transfer, examination, and storage of dead bodies, *in situ* identification, and the return of bodies to relatives for burial. On August 24, 2016, following the earthquake that struck central Italy, a team of forensic pathologists from Sapienza University of Rome were entrusted with managing the disaster.

Upon arrival in Amatrice, a suitable site for the establishment of a collection center was identified. The collection center was divided into an acceptance area, an examination area, and an information center comprising the antemortem section, postmortem data entry, and administrative support. Subsequently, the forensic team developed a cadaver management algorithm based on the World Health Organization guidelines and coordinated, with the local authorities, the transfer of the bodies to the designated center. Upon acceptance, each corpse was attributed an identification number using pre-numbered tags attached to the body and body bag. Each body was then assigned to examiners for data collection. The examiner's team was composed of forensic pathologists and police officers from the Carabinieri scientific investigation division and the scientific police. At least four examiners were assigned to each body to conduct a systematic examination. Findings were documented through compiling data collection forms and taking photos of the body, clothing, accessories, and other personal items. Only identified bodies were sent to be buried in Amatrice cemetery or in other places for non-residents. The bodies without identification were momentarily placed in refrigerated tents awaiting identification. In cases in which identification did not occur within a reasonable time, burial was ordered for hygienic and health reasons after fingerprints collection and DNA sampling.

From August 24–28, 2016, 244 bodies were received at the collection center. Most of the 244 bodies examined were complete bodies (235, 96.3%), while in a few cases, the bodies were dismembered (9, 3, 7%), with the loss of anatomic parts such as the head, ears, limbs, feet, and fingers. Sex was recognizable in all 244 bodies with a male- (98, 40%) to-female (146, 60%) ratio of 1.48.

The causes of death of the 244 subjects examined were classified, according to the *International Classification of Disease, 10th Edition* (*ICD-10*) Lists for Tabulating Mortality Statistics, into crushed chest (124, 51%), confinement or entrapment in a low-oxygen environment (66, 27%), fractures involving multiple body regions (27, 11%), fractures of the skull and facial bones (20, 8%), and fractures of the cervical spine (7, 3%).

Most of the bodies (227, 93%) were directly identified through clothes, personal effects, marks, photographs, and comparison between antemortem and postmortem data. In a minority of cases (17, 7%) it was necessary to take samples for DNA analysis. At the end of the operations, all the deceased had been identified and returned to relatives.

Identification of mass disasters victims is a complex activity because of the emergency conditions in which the operations take place and the conditions of conservation in which the bodies are found. In this context, the role of forensic pathologist assumes extreme importance in the coordination of the multidisciplinary team involved in the post-disaster management of victims. The experience proposed demonstrates, albeit in a small-scale context, that a standardized protocol focused on identification is highly effective, reducing the use of more advanced methods.

Mass Disaster, Earthquake, Identification