



H24 Forensic Analysis in Mass Disasters: Were Gunpowder Explosions in a Fireworks Factory an Accident or a Terrorist Bombing?

Francesca Tarantino, MD, Bari 70124, ITALY; Maricla Marrone, MD, Bari 70124, ITALY; Valentina Ronco, MD, Section of Legal Medicine D.I.M., Bari 70124, ITALY; Paola Corsignano Carrieri, Section of Legal Medicine D.I.M., Ballistic Centre, Bari 70124, ITALY; Stefania Lonero Baldassarra, Bari 70124, ITALY; Alessandro Dell'Erba, PhD, Risk Management Unit, Bari 70124, ITALY; Francesco Vinci, MD, Bari 70124, ITALY*

Learning Overview: After attending this presentation, attendees will understand more about the relevant role of forensic investigation and genetic analysis for the reconstruction of prior and consequential events in mass disasters.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing through an unfortunate event that explosions and/or bombings remain the most common deliberate cause of disasters involving large numbers of casualties, especially as an instrument of terrorism.

To address the problem to the maximum benefit of mass disaster victims, organization must be developed in classifying corpses, obtaining biological samples, and identifying people. The goal of this study is to evaluate the impact of different approaches to victims and to fulfill a valid protocol for their identification, which may gain importance in the resolution of forensic cases.

Reported here is the case of a fireworks factory in which combustible chemicals caused explosions and fires with consequent destruction of the factory and the death of all the workers. Four of ten victims had a meaningful Total Burn Surface Area (TBSA) of 99% and the last ones died in the hospital from cardiovascular collapse resulting from severe hypovolemic shock and sepsis. Two victims died from carbonization and the other four workers had carbonization associated with fractures of limbs (lower > upper), lacerations, amputations, decapitation, and massive body trauma resulting from explosions. The bodies of seven victims showed prominent traumatic changes that made it impossible to do individual identification, particularly for the mangled corpses and some that had extensive limb amputations and/or decapitation. A team performed autopsies and created a protocol to obtain biological samples (bones, blood, teeth, muscles). The forensic pathologists contacted the families of the alleged victims and each of them gave a blood sample collected for comparing DNA. The geneticist, using the method of extraction and gene amplification, obtained the DNA from bones, teeth, muscles, or blood samples taken from the victims, then compared with the those extracted from blood samples of the relatives; electropherograms showed at least one allele for each genetic marker of the Combined DNA Index System in common between the victims and the families, thus allowing the certain identity of everyone involved in the event. Therefore, it was possible to correlate the human remains to a specific person, then recompose the extensively traumatized body. After establishing the identity of all workers, it was possible to determine their position in the environment at the time of the occurrence of fires and explosions and, in this way, also identify the exact place of the first explosive event, which then, as a chain reaction, involved all the factory buildings containing gunpowder.

The results of the different forensic analyses (autopsies, genetic investigations, and traumatological ones) have made it possible to validate a scientific method useful in all mass disasters, even when it is difficult to do any type of anthropological investigation or forensic odontology. The reported case demonstrates how an accidental catastrophic event can be easily confused with a terrorist attack, the latter event not difficult to achieve especially, in the wake of current international events. Therefore, it is essential that in all events involving a large number of people, there is a highly specialized team in forensic fields that can easily recognize the nature of the traumatic event and direct further investigations useful to understanding the detrimental dynamics of mass disasters.

Mass Disasters, Genetic Analysis, Forensic Investigation