



B5 Carboxyhemoglobin Analysis in Gunshot Wounds

Hakan Kar, MD, The Council of Forensic Medicine of Turkey, Adli Tip Kurumu, Cerrahpasa, Istanbul, 34246, Turkey; Salih Cengiz, PhD, Institute of Forensic Sciences, Adli TIP Enstitüsü Cerrahpasa, Istanbul, Turkey; Bülent Üner, PhD, Institute of Forensic Sciences, Adli Tip Enstitüsü Cerrahpasa, Istanbul, 34300, Turkey; Harun Tugcu, MD, Gülhane Military Academy of Medicine, Department of Forensic Medicine, Gülhane askeri Tıp Akademisi, Ankara, Turkey; Necmi Cekin, MD, The Council of Forensic Medicine of Turkey, Adli Tip Kurumu, Cerrahpasa, Istanbul, 34246, Turkey*

After attending this presentation, attendees will understand the definition of the entrance and exit wounds together with estimation of the shooting range and the major criteria in determination of the origin of the gunshot wounds.

The goal of this Presentation is the definition of the entrance and exit wounds together with estimation of the shooting range and the major criteria in determination of the origin of the gunshot wounds.

Today, usage and ownership of firearms is rising rapidly over the world. As a result of this increasing demand, the rate of usage of firearms in crimes is also rising, even in countries where the ownership is strictly under the control of the government.

Determination of the origin in gunshot wounds is a process that starts with crime scene investigation and judicial investigation findings, developing with examination or autopsy together with laboratory tests and finalizing with jurisdiction. It's mentioned that the definition of the entrance and exit wounds together with estimation of the shooting range are the major criteria in order to determine the origin of the gunshot wounds. Crime scene investigation, collecting the evidences those are related to the case (like the guns, bullets, fingerprints, gunshot residues, clothes with gunshot holes, etc.), physical and morphological properties of the gunshot wounds, detection of the gun powder and soot on and under the dermis during the autopsy, analysis of the gunshot residues on the clothes and hands with chemical examinations, applying some advanced technological tests like "Neutron Activation Analysis," "Atomic Absorption Spectrophotometers," "Scanning Electron and Ion Microscopy," "Imaging Analysis" are enabling us to determine the entry-exit wounds and firing range.

Getting the clothes after washing and cleaning for the tests, clothes can mould and become useless because of the improper transportation and storage conditions. Even in some cases clothes that should be kept as evidences are being lost at crime scenes or hospitals during first aid.

In some cases gunshot wounds become impossible to examine when the body has been washed or embalmed, operated medically or cleaned to hide the remains. There may be indeterminate results in cases when the epidermis is decayed, scar tissue has formed, or insect activities occur around the gunshot wounds.

Determination of shooting range and entry-exit wounds cannot always be possible with classical and advanced methods mentioned above. In such cases carboxyhemoglobin (COHb) analysis in the blood samples obtained from the muscle tissues right under the gunshot wound will be a helpful criteria to determine entry-exit wounds.

The aim of this study is to compare the carboxyhemoglobin levels in blood samples obtained from the muscle tissues and veins in contact, near contact and close range gunshot wound cases; and with this method to distinguish the gunshot wounds from other types of wounds, to differentiate the entry and exit wounds and to define if the firing range is contact or not.

Material and Method: 52 contact, near contact and close range gunshot wound autopsy cases examined at the State Institute of Forensic Medicine between May 2001 and May 2002 were included. COHb levels of blood expressed from the muscle tissues at the entry and exit sites and veins were analyzed. The blood samples were filtered with the "Cloth Catcher" and analyzed with "Co-Oximeter."

Findings: 39 of the cases were shot with handguns, 13 with shotguns; and 47 of the cases were shot from contact range, 2 from near contact range and 3 from close range. The difference between the average COHb levels of the entry wounds (handgun: 8,673, shotgun: 23,000) and the exit wounds (handgun: 4,655, shotgun: 15,871) were statistically significant in both handgun and shotgun wounds. And differences between the average COHb levels of the entry, exit wounds and venous blood samples (handgun: 1,545, shotgun: 5,729) were also statistically significant.

Discussion and Conclusion: As a result; in suspected gunshot wound cases, a significant difference between the COHb levels of the venous blood and the blood expressed from the muscle tissues at the wound sites suggests that the lesion is a gunshot wound and is a result of a contact range shot. Therefore this method will be helpful criteria in differential diagnosis of the suspected or controversial gunshot wound cases when used with other diagnostic criteria.

Carboxyhemoglobin, Gun Shot, Wounds