G12 Ephemeral Petechial-Like Spots in a Victim of a House Fire

Russell T. Alexander, MD, and David R. Fowler, MD, Office of the Chief Medical Examiner, 111 Penn Street, Baltimore, MD 21201*

After attending this presentation, attendees will be familiar with a case of short-lived petechial-like spots on a woman who died due to inhalation of soot and smoke in a house fire.

This presentation will impact the forensic community by discussing the occurrence of transient petechial-like spots in fire related deaths.

A 33-year-old black female was found deceased within her apartment after a house fire. Per report, she had been drinking alcohol that evening with a girlfriend. At approximately 3:25 a.m., her daughter heard the fire detector within their apartment go off. She opened her bedroom door, saw thick black smoke, and then exited the apartment through her bedroom window. The fire department responded and was informed by the daughter that no one else was in the apartment because she thought her mother was still out drinking. The fire department extinguished a "small" fire in a loveseat located on the east end of the living room. Extensive soot was deposited throughout the residence except for the daughter's bedroom. The decedent was found "hiding" behind a chair in the northwest corner of the living room. Her keys were found underneath the burned loveseat. An ashtray with four cigarette butts was on an end table within the living room. An investigation of the fire revealed no evidence of foul play.

At autopsy, soot was densely deposited on the face, within the nares and on the tongue. Less dense soot was deposited over much of the body. Partial thickness burns involved approximately a third of the body surface area. Internally, dense soot was deposited in the airways. No thermal fixation was noted to the airways. The level of carboxyhemoglobin in iliac blood was 62.2%. The iliac blood alcohol content was 0.14 mg/dl. No other drugs were detected on a comprehensive drug screen.

Washing of the body revealed a petechial-like rash on the eyelids, face, shoulders, and back in areas where the epidermis was wiped away during cleaning. The spots appeared to have a follicular or peri-adnexal distribution. A similar though quite subtle pattern of spots was on adjacent areas where the epidermis was intact. Reexamination of the body two hours later revealed that the petechial-like rash had often faded to a blotchy red-purple area of drying skin, though some faint spots remained. When intact epidermis along the edges of denuded skin was wiped away at this time, a new crop of petechial-like spots emerged. Two hours later, the second set of spots had faded similar to the first. Wiping away more epidermis made a third round of spots apparent. A histologic section of skin showed congested dermal blood vessels, particularly adjacent to hair follicles.

Conjunctival and facial petechiae are thought to be due to increased cephalic venous pressure resulting in rupture of small blood vessels and extravasation of blood; morphologically similar "Tardieu Spots" are formed in areas of livor mortis when engorged blood vessels in dependent portions of the body rupture (Ely and Hirsch, 1999). A literature review found only a single reference to petechiae in a fire victim (Rao and Wetli, 1988). The petechial-like spots in the present case are not related to lividity since they were equally prominent along the anterior and posterior surfaces of the body. The fading of the spots demonstrates that they are due to a congestive process and not vasculature rupture; a finding confirmed by histologic examination. It is possible that rubbing the skin created physical traction that drew blood into the vasculature further accentuating the pattern. Blood flow out of intact vessels into surrounding tissues caused the spots to fade.

This case demonstrates that inhalation of soot and smoke in a house fire can be associated with congestion of peri-follicular and adnexal blood vessels resulting in a subtle petechial-like rash that will be accentuated by wiping away of the epidermis. Furthermore, rupture of capillaries and venules with extravasation of blood is not necessary for the formation of petechial-like spots.

Fire, Petechiae, Autopsy

 ** Presenting Author*