



Pathology Biology Section – 2007

G13 Significance of Blood Neopterin Measurement in Forensic Autopsy Cases

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After attending this presentation, attendees will understand how increased neopterin levels in postmortem blood samples identified with immunohistochemistry indicate non-specific viral infection.

This presentation will impact the forensic community and/or humanity by demonstrating how correct interpretation of postmortem blood neopterin levels can direct the postmortem examination in a cost-effective and efficient manner.

Definitive and specific diagnoses regarding infection with fatal viral pathogens are often hampered by the significant cost and labor associated with immunohistochemical staining. However, examination of non-specific markers for viral infection through high-throughput laboratory methods serves to direct the postmortem examination in a cost-effective and efficient manner. Neopterin, a pteridine released by macrophages, is a well-established marker of immune system activation. This study analyzes postmortem blood neopterin levels from multiple anatomic sites in an attempt to elucidate their accuracy in diagnosis of fatal viral infection. Medicolegal autopsy cases (n=521, 1-96 years of age, 366 males and 155 females) were examined. Causes of death were blunt injury (n=118), sharp injury (n=27), poisoning (n=26), drowning (n=30), fire fatalities (n=85), hypothermia (n=10), asphyxiation (n=30), hyperthermia (n=7), and natural death (n=143). Blood samples were collected at the time of postmortem examination from the subclavian and femoral veins and from the left and right heart. Neopterin levels were measured by high performance liquid chromatography. Neopterin levels greater than 500 pmol/mL correlated with fatal viral infection. Viral infection was confirmed by histology and PCR. Levels of C-reactive protein, an additional marker of immune system activation, and neopterin were compared and a high correlation was observed in right heart blood. However, neopterin levels from all sites were significantly higher in cases of multiple organ failure that was not associated with viral infection than in other cases.

This study indicates that postmortem blood neopterin levels are both useful and cost-effective as a non-specific marker of viral infection. As the purpose of the postmortem examination is to provide the most specific information regarding cause of death possible, it is appropriate, though expensive, to elucidate the specific pathogen. Increased neopterin levels, in cases of possible viral infection, should trigger the immunohistochemical examination of tissue samples for specific viral antigens. However, neopterin levels may also be elevated in the face of drug use, chronic heart failure, and renal disease and caution should be used in interpreting blood neopterin content in the presence of these conditions.

Neopterin, C-reactive Protein, Viral Infection