



H138 Comparative and Correlation Studies of Biochemical Substances in Vitreous Humor (VH) and Synovial Fluid (SF)

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Learning Overview: After attending this presentation, attendees will better understand the comparative study of certain biochemical substance levels between two eyes and two knees of the same subject, and between the two compartments, as well as the correlation study between such biochemical substance concentration in VH and SF of the same person, and the essential basic knowledge for forensic application and research when using biochemical substance level in either fluid as a substitute body fluid for unavailable or inadequate blood to solve any forensic issues in daily practice or further research.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by presenting critical information of biochemical substance investigation in VH and SF for forensic purposes as it can augment traditional means of forensic investigation.

In forensics, in the case of a lack of blood, the VH and SF become optional postmortem samples. However, few studies have explored SF as a potential source for postmortem biochemistry investigation, and there is still controversy around whether the biochemical concentrations in the VH in both eye compartments are the same. In this study, the concentrations of certain biochemical substances in both VH and SF were evaluated and determined to compare their concentrations: (1) between the VH and SF from both sides, and (2) between the VH and SF themselves. The concentrations of the biochemical substances in both fluids were also evaluated for their correlation. VH and SF samples were collected from 35 cadavers (28 males and 7 females) with the mean age of 47.3 ± 16.5 years (range 18–88 years); all subjects had died within 8h before their samples were collected. The samples were centrifuged, and the supernatant fluids were used for biochemical analysis.

The results indicated no statistically significant difference in the concentrations of all the biochemical substances studied between the VH and SF from both sides ($p > 0.05$). Sodium, potassium, chloride, and magnesium concentrations were significantly higher in the VH than those in the SF, whereas uric acid and creatinine concentrations were higher in the SF compared with the VH. The concentrations of sodium, potassium, glucose, lactate, urea, uric acid, and creatinine between the VH and SF showed statistically significant correlation ($p < 0.005$), but not chloride and magnesium concentrations. The results showed that VH or SF samples from either side can be used for postmortem biochemistry analysis. In addition, due to the significant relationships of the changing concentrations of all biochemical substances studied (except chloride and magnesium) between the VH and SF, the SF can be used as an optional postmortem sample for certain biochemical measurements in forensic applications and further research.

Postmortem Biochemistry, Postmortem Chemistry, Thanatochemistry