K36 Correlation Study Between Blood Concentrations and Vitreous Concentrations: Case of Meprobamate and Some Benzodiazepines (Bromazepam, Nordazepam, Oxazepam)

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The goal of this presentation is to show that, for the studied population, there is a positive correlation between blood and vitreous concentrations of meprobamate. There is no positive correlation for bromazepam, nordazepam and oxazepam. For all the molecules studied, concentrations measured in the vitreous, collected in the right and left eye, are not different.

This presentation will impact the forensic science community by confirming that vitreous concentrations of benzodiazepines cannot be used to extrapolate blood concentrations. For meprobamate, the results of this study show that the vitreous concentrations may be used to calculate blood concentration. The forensic toxicologist can provide a reliable result of quantitative analysis even if only one of the two vitreous is available.

Blood sample is the gold standard for most of the drugs in forensic toxicology. However the blood sample could be damaged or inexistent. In those cases, vitreous could be an alternative sample. It is thus important to know the relationship between blood and vitreous concentrations. This study has been performed on molecules often involved in forensic toxicology: meprobamate and some benzodiazepines (bromazepam, nordazepam, oxazepam).

Blood and vitreous samples were collected during forensic autopsies. Included in this study were the cases where one or many of the studied molecules (bromazepam (n=31), nordazepam (n=58), oxazepam (n=28) and meprobamate (n=43)) were detected in blood or urine during routine toxicology investigations. Benzodiazepines were quantified in blood by HPLC/DAD and in vitreous by Ultra Performance Liquid Chromatography with UV detection (UPLC/DAD). Meprobamate was quantified in blood and vitreous by GC/MS.

No difference has been highlighted, for all the molecules studied, between the vitreous collected in the right and left eye. A significant corre- lation (r^2=0.86) has been highlighted for the meprobamate. No correlation has been found for bromazepam (r^2=0.32), nordazepam (r^2=0.45), oxazepam (r^2=0.52). The [Blood] / [Vitreous] ratios (± SD) were 4.75 (±4.85), 35.71 (±23.28), 33.18 (±28.78), 1.56 (±0.77) for bromazepam, nordazepam, oxazepam, and meprobamate respectively.

The correlation between blood and vitreous concentrations is positive for the meprobamate in the studied population, which is not the case for the three studied benzodiazepines. The [Blood] / [Vitreous] ratio is much more important for the nordazepam and the oxazepam, than for the bromazepam and the meprobamate. To explain this behavioral difference, further studies are necessary.

Benzodiazepine, Meprobamate, Vitreous

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