High Performance Liquid Chromatography Method (HPLC) for the Determination of Ketamine and Lidocaine Concentrations in a Topical Cream Formulation

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**Purpose**
The goal of this study was to develop and validate a fast, simple and sensitive isocratic reverse-phase high performance liquid chromatography method (HPLC) for the determination of ketamine and lidocaine concentrations in a topical cream formulation.

**Methods**
The chromatographic separation of ketamine and lidocaine was achieved on a Cyano analytical reverse-phased column, using acetonitrile: ammonium acetate buffer (80:20, v/v) mobile phase. The column was equilibrated with the mobile phase flowing at 1.0 mL/min for about 30 mins prior to injection. The liquid chromatography behavior of ketamine and lidocaine was monitored with a photodiode-array UV detector at 200-400nm. For validation purpose ketamine and lidocaine was extracted from the compounded cream by treating with a mixture of acetonitrile and 0.1N HCl in water (90:10), samples were then filtered through a 0.22um syringe filter and injected (5 µL) into the HPLC for studying the stability of the drugs in the cream.

**Results**
A simple and sensitive isocratic reverse-phase high performance liquid chromatography method (HPLC) is developed. The signal was optimized at 254 nm. The standard calibration curves for ketamine and lidocaine were linear (R^2 value = 0.998 and 0.999 respectively) over the range of 0.25-10 mg/mL. Total run time was about 6 min. Retention times for ketamine and lidocaine were 5mins and 4.3 mins respectively. Both ketamine and lidocaine were found to be chemically stable for a period of 120 days. This method was validated and found to be more beneficial for the routine analysis of topical cream formulations involving ketamine and lidocaine.

**Conclusion**
This method is very simple, sensitive, fast and robust with short runtime (6 min) to enable the processing of various quality control samples.