

Effects of Cleaning an Epidural Catheter Hub with Alcohol and Determination of Neurotoxicity on Rat Astrocyte Cells

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Problem

Anesthesia practice varies on the cleansing of epidural catheter hubs with 70% isopropyl alcohol due to the potential of adhesive arachnoiditis and neurolysis/apoptosis; however, cleansing with alcohol provides asepsis for patient safety.

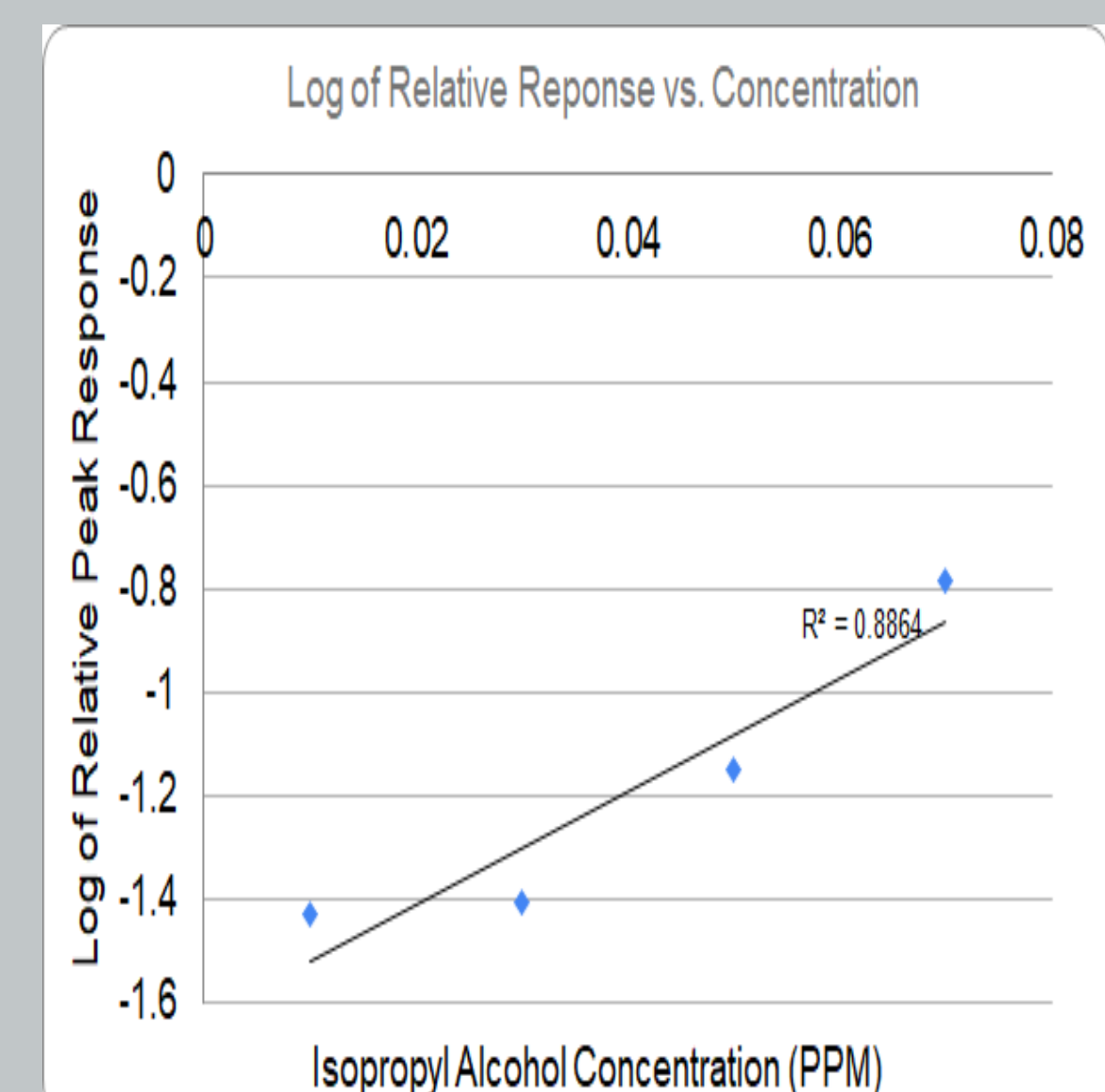
With such a diverse stance in practice, it is necessary to investigate if cleansing the epidural hub with alcohol can provide asepsis without introducing a measurable amount into the epidural space, negating the risk of neurological injury.

Methods

Establish a calibration curve with differing concentrations of isopropyl alcohol using the solid phase microextraction technique combined with gas chromatography and gas chromatography mass spectrometry.

Epidural catheter hubs were cleansed with 70% isopropyl alcohol allowing differing dry times (0, 5, 10, 15, and 20 seconds) prior to blousing through the catheter using the previous method technique for extraction. The presence of isopropyl alcohol was determined using the gas chromatography mass spectrometry.

Illustration



Discussion & Implications

Isopropyl alcohol was present after cleansing the epidural catheter hubs with a 70% isopropyl alcohol pad, but the concentration was undetermined due to not establishing calibration curve despite trialing multiple methods.

Inconsistencies of results were due to methodology limitations and confounding variables.

Literature Review

Alcohol has been purposely injected into the epidural space as a neurolytic epidural block. Despite concern for neurolysis, it was found that asepsis benefit of cleansing the skin with alcohol prior to neuraxial injection outweighed the neurotoxicity risk for neuraxial blocks.

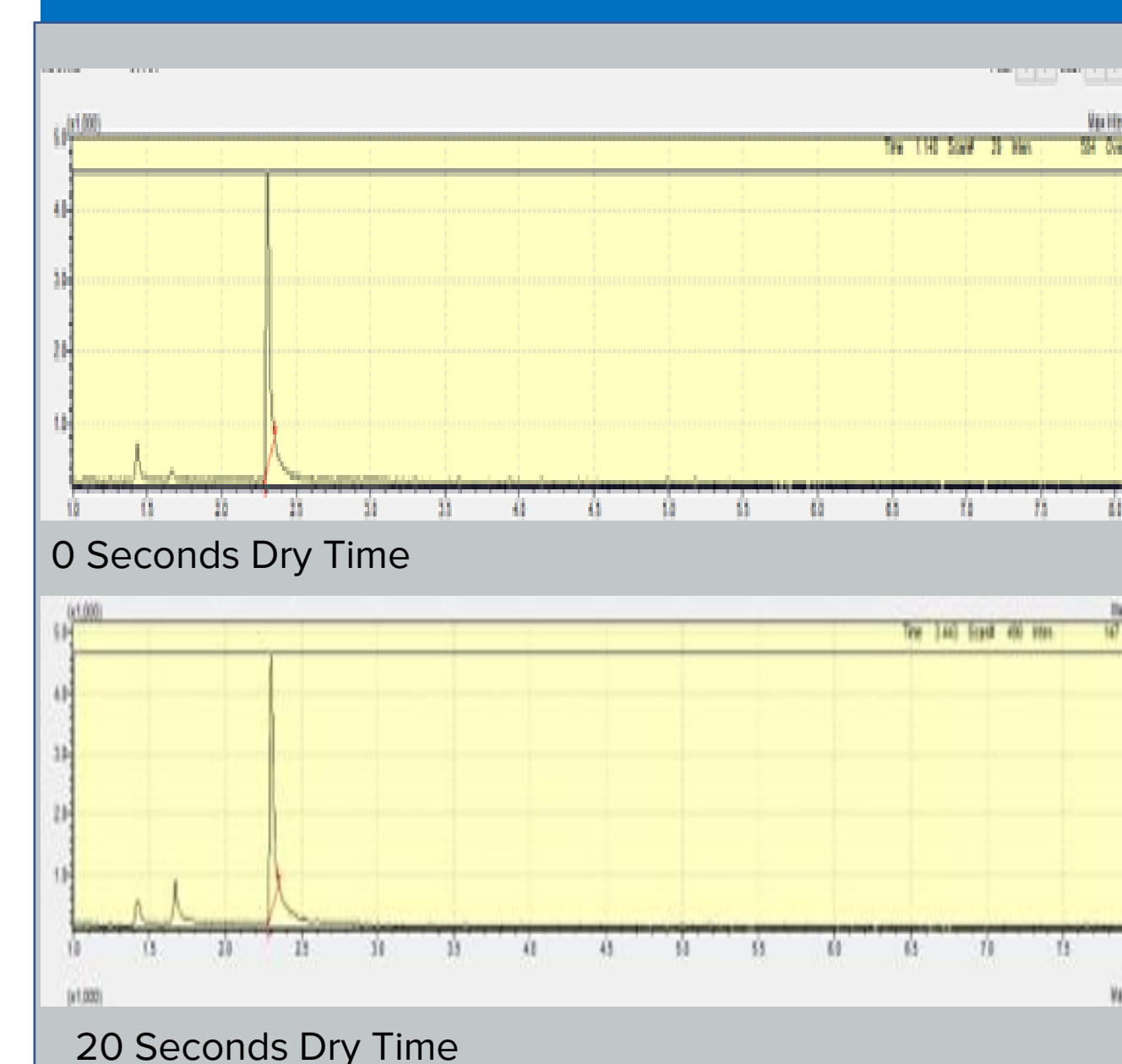
Aseptic technique for cleansing epidural catheter hubs is not specifically specified. Further research is needed to develop evidence-based practice.

Results

Unable to establish valid calibration curve; therefore, unable to determine isopropyl alcohol concentration of sample or progress to testing of rat astrocyte cell portion of scholarly project.

After cleansing the epidural catheter hub, isopropyl alcohol was noted at the end of the catheter regardless of dry time. Peak heights and presence of isopropyl alcohol varied with repeated sampling of differing dry times. Due to inconsistent results with the presence of isopropyl alcohol at the end of epidural catheters the concentration of could not be determined.

Illustration



Conclusions

Prior to making evidence-based practice recommendations, further research is needed.

To establishing a valid calibration curve, another technique would be to utilize a liquid chromatographer.

This scholarly project should be continued as a multigenerational study.

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