Anesthesia

Item 3 – Use of Tribromoethanol (TBE, formerly Avertin®)

Background:

Tribromoethanol is an injectable anesthetic agent that was used commonly in mice and occasionally in rats for many years. It was previously manufactured as an anesthetic under the trade name Avertin®, but this product is no longer available so investigators needing to use it are required to make up their own solutions from non-pharmaceutical grade TBE purchased from a chemical supply company.

TBE is commonly injected IP for anesthesia, but has been associated with inflammation in the abdomen and gastrointestinal complications, particularly if solutions are not prepared properly, stored properly, or are maintained for too long. For this reason, the use of TBE has decreased in favor of safer, pharmaceutical-grade anesthetics such as injectable ketamine/xylazine combinations or inhalants such as isoflurane.

Policy:

TBE, being a non-pharmaceutical grade compound, will only be approved by the IACUC if the following two conditions are met:

1. Specific scientific justification for the use of TBE has been provided. This justification must take into consideration why other anesthetics are not appropriate to meet the scientific aims of the project. Cost savings alone will not be considered an adequate justification.

2. The investigator will use the IACUC-approved formula below for the preparation and storage of TBE. If deviations from this formula are required, they must be specifically described and approved by the IACUC.

IACUC Considerations:

The primary concern with TBE use is the potential inflammatory changes, which may result in pain or distress and could possibly alter research results. As this is a consequence that occurs due to the animal's immune system responding to the compound, it takes some time to develop. Therefore, using TBE for anesthesia just prior to euthanasia is preferable to using it for procedures where the animal recovers. And, since the potential for this complication increases the more times an animal is injected, single recovery procedures would be preferable to multiple recovery procedures. The IACUC will be more inclined to approve TBE use for terminal procedures than survival procedures and will require very specific scientific justification for the use of TBE for multiple survival procedures.

IACUC Approved Procedure for Preparation and Storage of TBE

1. Stock solution (1.61 g/ml)

    a. Glassware is washed with 10% HCL and rinsed in distilled water before use.
    b. Add 10 g 222-tribromoethanol to 6.2 ml tert-amyl alcohol.
    c. Cover bottle with aluminum foil to prevent light degradation.
    d. Cap tightly and shake on shaker at room temperature overnight.

2. Store stock solution in the dark at room temperature. Solution is stable up to 12 months maximum. If solution turns yellow, discard.

3. Working solution (2%)

    a. Glassware is washed with 10% HCL and rinsed in distilled water before use.
    b. While stirring, add 0.5 ml of TBE stock solution to 39.5 ml pre-warmed saline in a glass vessel with a stirring bar.
    c. Seal container and wrap with foil to exclude light.
    d. Stir slowly on low heat overnight.
    e. Filter-sterilize working solution through 0.2 μm filter into a dark or foil-covered bottle.

4. Store working solution in the dark at $4^{O}C$. Solution is stable up to 6 months maximum. If solution turns yellow, discard.

5. Standard dosage is 0.2 ml working solution / 10 g body weight (0.4 g/kg) IP.

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