



## **ACC&D Statement and Recommendations Regarding Calcium Chloride-Ethyl Alcohol Injection for Chemical Castration**

ACC&D has been contacted by organizations and researchers interested in using Calcium Chloride ( $\text{CaCl}_2$ ) for chemical castration of male cats and/or dogs. To best be able to provide useful and objective information, we commissioned a review of available literature on intratesticular administration of  $\text{CaCl}_2$  for sterilization, which was subsequently evaluated by members of our Board of Directors and Scientific Advisory Board. It can be downloaded [here](#).

Research on calcium chloride dihydrate ( $\text{CaCl}_2$ ) as a sterilant for male animals goes back to the 1970s, although a majority of published research is from the 2000s. Support from the nonprofit [Parsemus Foundation](#) revived interest in and research on calcium chloride-based neutering for male dogs and cats, and studies on dosing and diluent (the substance used to create the  $\text{CaCl}_2$  solution) for dogs were published in 2014. Findings that 20%  $\text{CaCl}_2$ -in-ethyl alcohol yielded better results in terms of efficacy and swelling than lidocaine diluent led the Parsemus Foundation to refer to this particular formulation as “Calchlorin” and initiate the “Timmy Prize,” which incentivizes sharing and transparency of data regarding the  $\text{CaCl}_2$ /ethanol formulation. As of this writing, the Oklahoma (US)-based nonprofit [SpayFIRST!](#) has had experience with over 1,000 injections in dogs. Canadian company [Calcium Chloride Castration](#) is selling sterile vials of 4g  $\text{CaCl}_2$  to veterinarians. The veterinarian is instructed to add 20ml of 95% pharmaceutical grade ethanol to create the 20%  $\text{CaCl}_2$ -in-ethyl alcohol solution.

$\text{CaCl}_2$  has garnered interest from those working on dog and cat population control methods because of its low cost, ease of administration, and availability in countries where no other non-surgical sterilant is available. (Approved intratesticular injectable non-surgical sterilants include Zeuterin™, whose formulation is approved in the U.S., Mexico, Colombia, Bolivia, Panama, Ecuador, and Turkey, and Infertile®, approved in Brazil. These two products are zinc gluconate-based formulations. While no direct comparison has been performed, the available evidence suggests that  $\text{CaCl}_2$  sterilization of male dogs may reduce testosterone concentrations more than Zeuterin; this is a feature of interest to those who desire greater testosterone reduction. However, several key variables (including dog breed and age and methodology for measuring testosterone) differed between the studies that evaluated testosterone following treatment with each sterilant. To our knowledge,  $\text{CaCl}_2$  has not been reviewed or approved by any regulatory agencies for use as an animal sterilant.

Although new clinical and field data are certainly expanding the resources available on  $\text{CaCl}_2$ , published reports on the efficacy of intratesticular  $\text{CaCl}_2$  injections for inducing sterility in a variety of species are conflicting and incomplete, leaving many key questions unanswered. Recent clinical studies and field work have attempted to define and validate a single formulation, dosage, and administration protocol. A small study comparing 21 dogs each treated with  $\text{CaCl}_2$  in alcohol and lidocaine study found that the alcohol base was most effective (all dogs remained azoospermic at 1 year; testosterone had dropped by 63.6% after one year and remained at the low end of the physiological range throughout the study). No adverse effects were noted in dogs treated with the alcohol-based solution. Although these data are valuable, there is insufficient data at this point to definitely conclude optimal formulation, dosage, or administration technique, as well as measures of permanent sterility, safety, and testosterone reduction. Although sedation is recommended by Parsemus Foundation, SpayFIRST!, and Calcium Chloride Castration, to our knowledge there is no standard operating procedure for use of sedation or post-treatment analgesia, anti-inflammatory, and monitoring.



Scrotal abscesses are the primary adverse event observed to date, and are likely to be more frequent in typical field use than in a controlled study setting.

In light of these considerations, ACC&D believes that the current use of intratesticular CaCl<sub>2</sub> as a sterilant should be considered experimental.

We offer the following recommendations to veterinary practitioners considering experimental use of CaCl<sub>2</sub>:

- Study ACC&D's summary of CaCl<sub>2</sub> literature (available [here](#)) and consult original research referenced in that review for further information.
- Use CaCl<sub>2</sub>-based neutering only by or under supervision of a trained veterinarian.
- Consult the appropriate regulatory authorities in your country, state, and/or region regarding legal requirements for experimental use of a new animal drug. These rules can vary widely from country to country, and, in some instances, between governing agencies even within a country, state, or region.
- Evaluate the legal regulations and risk-benefit balance of a compounded sterilant in your particular context.
- Give careful thought to experimental design (e.g. proper use of controls, clearly stated endpoints) to ensure useful results. (ACC&D advisors may be available to consult on experimental design.)
- Develop a standard operating procedure for use of sedation and post-treatment analgesia and anti-inflammatory treatment that ensures maximum comfort and welfare of dogs.
- Ensure good welfare of animals involved. Animal welfare standards should be overseen by an Institutional Animal Care and Use Committee ([IACUC](#)) or similar committee or standard. (ACC&D's position statement on animal use in research is available [here](#).)
- Arrange for veterinarians to provide animal examination/monitoring pre- and post-treatment; to alleviate any discomfort in treated animals; and to treat any adverse reactions that may occur. Although the reported incidences of complications thus far have been relatively low, veterinary care may be required. Without resources to monitor and provide treatment if necessary, an animal should not be sterilized using CaCl<sub>2</sub>.
- Obtain informed consent from owners/caregivers of any animals treated.
- Have the formulation produced by a compounding pharmacy under sterile conditions to ensure consistent product formulation.

ACC&D will continue to monitor work in this field and will share information on our website and through our e-newsletters as appropriate. Please contact us at [info@acc-d.org](mailto:info@acc-d.org) with questions or comments.