KEY STUDIES


- Long-term, 12-month studies to determine the best CaCl$_2$ dosage and solution for dog sterilization. The first study compared different concentrations of CaCl$_2$ (10%-60%). A 20% concentration was determined to be most effective with the fewest side effects. The second study compared a 20% concentration of CaCl in saline, alcohol or lidocaine. Alcohol was determined to be the most effective solvent. Calcium chloride in alcohol resulted in complete azoospermia over the entire 12-month study, while CaCl in lidocaine was 100% effective for 6 months but saw return of a few sperm in 4 of 21 dogs by 12 months. Testosterone levels remained low for the alcohol solution but began to increase by the end of the study for the lidocaine solution. Sexual behavior disappeared with CaCl treatment. Conclusion: 20% CaCl in alcohol is the most effective formulation for permanent effect.

PUBLISHED LITERATURE AND PROFESSIONAL PRESENTATIONS

Farm Animals:


- The very first known publication on calcium chloride, explaining how the Washington State University researchers got the idea, the results of their first pilot studies, and why they found an alcohol base to be better than a water/saline base.


- Further details on the genesis of the idea and pilot studies in 45 bull calves.


- Study in bulls and dogs with photos.


- Intrepididymal injections (as opposed to into the testicular tissue) resulted in sterilization without hormonal neuter.
- 18 goats plus controls

- Poor results (scrotal abscesses and longer-lasting scrotal swelling, with inconsistent necrosis and minimal impact on serum testosterone) of calcium chloride in aqueous solution in 12 young bulls, in fact poorer than ethanol alone. Includes photos. Concludes that calcium chloride injection in saline is not effective in bulls.

- 6 donkeys plus controls: 20% CaCl₂ in alcohol. 60 day study measuring testosterone and testicular measurements. No change in testosterone, significant swelling and fistulas in 4/6 donkeys.

Dogs and Cats:

- Key study: First report of pilot results in dogs (in addition to more bull calves); photos. Fascinating, plain-English report of pilot studies.

Samanta and Jana: Published a number of dose-finding studies with extensive physiological measurements, including: testosterone, cortisol, LH/FSH, testicular function measurements, blood values and histology. Results support use of CaCl₂ for chemical sterilization.

- First controlled study of CaCl₂- 48 dogs plus controls

- 24 dogs plus controls, 5-20 mg/kg CaCl dosages evaluated

- Good safety and efficacy results at higher doses in 3 cats.

- In 6 cats each at 5%, 10%, or 20% CaCl in lidocaine, 20% was determined to be the optimal concentration, and had effects on behavior.

- Key cat study: 18 cats plus controls. Dose-finding, testosterone, cortisol, testicular function measures; castration and histology at 2 months. 20% CaCl optimal in cats.


Paranzini, Souza, et al., 2017. Effects of chemical castration using 20% CaCl2 with 0.5% DMSO in tomcats: Evaluation of inflammatory reaction by infrared thermography and effectiveness of treatment. Theriogenology

- 6 cats: 20% CaCl2 with 0.5% DMSO, 80-day study using infrared thermography to evaluate inflammation. Method was effective with minimal adverse reactions.


- 6 dogs: 7.5% CaCl2 with 0.5% DMSO, 60-day study measuring testosterone, semen characteristics, testicular size. Dogs became azoospermic at 15 or 30 days post injection, with no difference in testosterone.


- Comparison of 20%, 30% NaCl to 20% CaCl in 15 tomcats with 5 controls. The 30% NaCl and 20% CaCl caused necrosis of the testicular tissue by 4 weeks post injection. All experimental groups had significant reductions in testosterone.

Small animals:


- 48 rats plus controls

Jana, Samanta, 2006. Evaluation of single intratesticular injection of calcium chloride for nonsurgical sterilization in adult albino rats. Contraception

- 48 rats plus controls. These two studies (2002, 2006) concluded that 10-20 mg of CaCl2 in saline produced infertility, measured by epididymal sperm count and mating studies


- A study of intratesticular injection of guinea pigs with 15 mg/100g weight of CaCl2 in lidocaine, provided as one injection or three daily doses, resulted in significantly decreased testosterone and sperm count, but not azoospermia. No fertility assessment was completed.


- A large-scale study of intratesticular injection of 20% CaCl2 in 0.5% dimethyl sulfoxide (DMSO) in 96 rats was completed by researchers in Brazil. One hundred days after the injection, rats were azoospermic, infertile, and evidenced testicular atrophy. Only one rat had complications.
Collagross-Schouten, Allison. The use of calcium chloride dihydrate in ethyl alcohol to nonsurgically sterilize adult male African pygmy goats (*Capra hircus*).

- The first study to evaluate serial injections of CaCl$_2$ in an effort to determine an effective dose in adult goats. No residual effect of the repeated lower volume solutions (4 ml). Higher dose (10 ml) was effective at sterilizing the male goats, but not without complications.

Parsemus Foundation, 2019. Calcium chloride chemical castration in the rat: A possible solution for pocket pets?

- A pet rat was injected with 20% CaCl$_2$ in 95% ethyl alcohol without complications. Significant reduction in testicular volume resulted although fertility was not assessed.

For more information on Calcium Chloride Nonsurgical Neuter, please visit our website Parsemus.org

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