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Sclerosing substances, when injected into the testicles, can work as chemical castration for population control, being a faster, more cost-effective and safer option than orchietomy. However, it may cause an undesirable inflammatory reaction that can be evaluated through infrared thermography. The aim of this study was to evaluate the inflammatory reaction, through infrared thermography, caused by intratesticular injection of calcium chloride (CaCl₂) 20% with dimethyl sulfoxide (DMSO) 0.5%, used as a chemical castration method in tomcats. Furthermore, its effects on the reproductive system were evaluated through andrologic examination and testicular histology. Six stray male cats were used after approval by the local ethics committee (CEUA/UEL). The research was divided into two phases. In the first phase, the animals were subjected to thermographic imaging, testicular measurement, electroejaculation, seminal analysis and an injection of 0.25 mL CaCl₂ 20% with 0.5% DMSO into each testis. In the second phase, which was held 80 days after the first, the cats were again submitted to thermography, testicular measurement, electroejaculation, seminal analysis, orchietomy and histology. Testicular thermographic imaging was performed using an infrared camera, Flir® model T440. Room temperature was controlled at 23°C. Thermography photos were taken before (M0) and after anesthesia (M1), after electroejaculation (M2), 10 minutes (M3), 1 hour (M4) and 6 hours (M5) after application, for 7 consecutive days (M6-12), on the 15th (M13), 30th (M14) and 80th day before anesthesia (M15), after anesthesia (M16) and after electroejaculation (M17). The first thermographic measure (M0) was used as a control. The images were analyzed by Flir Quick Report Software® and the results expressed in means. The general attitude, appetite and scrotal skin were observed as part of the clinical routine. For statistical analysis, the Student t test with a significance level p <0.05 was used. Histological changes were described according to the frequency of findings. The average temperatures, in Celsius, of the testicular area were: M0 30.1; M1 29.9; M2 29.3; M3 27.5; M4 27.9; M5 29.8; M6 30.1; M7 30.8; M8 29.6; M9 30.4; M10 31.0; M11 29.8; M12 30.7; M13 30.3; M14 30.1; M15 30.1; M16 29.8; M17 29.1. None of the cats presented significant testicular temperature increases or behavioral changes. A slight increase in firmness on palpation of the testis was noted on the first day due to the volume injected. The temperature decrease at M3 was probably due to the drug injection temperature (room temperature 23°C), and at M4, due to the peripheral vasoconstriction caused by the irritant property potentiation of CaCl₂ with DMSO. Eighty days after the intratesticular injection, all animals were azoospermic, testosterone dependent penile spines were absent and total testicular volume (TTV) had reduced 50% (1.4 vs 0.7 cm³). Testicular histological analysis demonstrated different degrees of tissue degeneration, necrosis, calcification and replacement by connective tissue. Leydig cell hyperplasia was present in 7 of the 12 tissues analyzed. It can be concluded that thermography is an easy, fast, objective, non-invasive and effective technique to detect and monitor changes in testicular temperature in cats; a single intratesticular injection of CaCl₂ 20% with DMSO 0.5% solution caused azoospermia 80 days after injection, with minimal adverse reactions, and did not interfere in the animal welfare.