What's your diagnosis?

Intraoperative Deaths in Rats Undergoing Experimental Ocular Surgery

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An investigator performing corneal angiogenesis assays in a rat model at our institution consulted with the clinical laboratory animal veterinarian after experiencing a high mortality rate during his first five surgeries. Three of the rats had died either intraoperatively or in the immediate postoperative period. The rats were naive, young adult Long-Evans males obtained from a commercial vendor and conventionally housed.

The anesthesia and surgery protocol was as follows. The investigator administered an anesthetic cocktail consisting of 76 mg/kg ketamine, 4 mg/kg xylazine, and 0.08 mg/kg atropine intraperitoneally to a rat. He assessed the anesthetic plane with a toe pinch and a corneal reflex check before applying 0.5% proparacaine topically to an eye (**Fig. 1**). Working with a dissection microscope, the investigator gently displaced the proparacaine-treated globe by clamping the upper eyelid with a nontraumatic hemostat. Using a #11 blade, he made a 1.5-mm corneal incision to a depth of 1.0 mm, and then created a pocket approximately 2.5 mm long in the corneal stroma by blunt dissection with a curved iris spatula (**Fig. 2**). After successfully creating the corneal pocket, the investigator implanted a pellet that contained the experimental drugs of interest in the pocket. The surgery took approximately 30–40 min per eye. After completion of the surgery, the animals recovered on a warm water mattress. The investigator or a technician observed the rats until they were fully sternal.

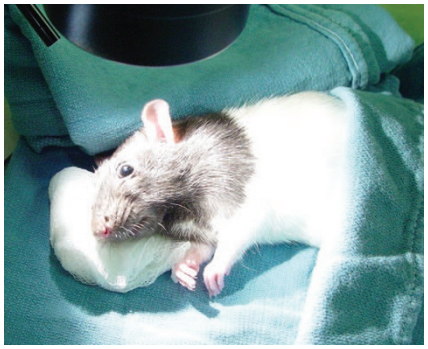

FIGURE 1. Surgically prepared young male Long-Evans rat about to undergo corneal surgery.

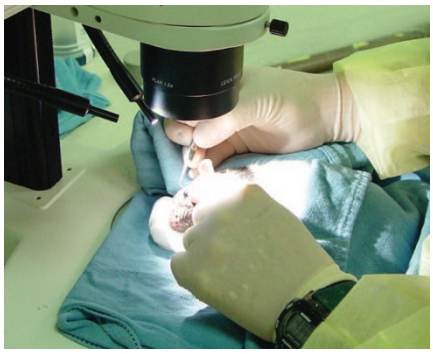

FIGURE 2. Same rat as in Fig. 1, under dissecting microscope, as surgeon performs corneal incision.

The investigator found that the anesthetic plane often became too 'light' during the surgery, and to complete the procedure he needed to administer an additional dose of the anesthetic cocktail. However, his complaint was that after completing the surgery he would discover the animal had died sometime during the procedure. The investigator had recently completed a training course in this surgical technique at another institution and said that he had not lost any animals during training. He did not know the type or dosage of anesthetic used in that course.

What do you think the mechanism of death was in these rats? What advice or assistance would you give this investigator? How would you manage and/or prevent this problem?

What's your diagnosis?

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