
Abstract

We evaluated the potential for different types of remote drug-delivery systems (RDDS) to injure target animals. We recorded dart velocity, time, and distance from projector muzzle at 8.5-millisecond intervals by Doppler radar chronograph for 4 types of RDDS. We used darts of different volume and unique combinations of charges, power settings, and distances in accordance to manufacturer's recommendations. Variation in the drop of repeated shots was >10 cm for 28 of 90 trials (5 replicates per trial) with heavy-mass darts having the lowest precision. Impact velocities were high (>50 m/sec) in many trials using heavy darts and some trials using light-mass, rapid-injection darts. We evaluated the permanent wound cavity (PWC) formed by firing dye-filled darts into ordnance gelatin covered tightly by a fresh elk hide and into the thighs of calf carcasses. Rapid-injection darts fitted with end-ported needles consistently 1) forced hair and skin beneath the hide; 2) formed a PWC that was 2–3X the needle length; and 3) pulled the hide away from the gelatin before the dye was completely ejected into the gelatin. We conclude injury to target animals is minimized in RDDS that use lightweight, slow-injection darts, fitted with side-ported needles and broad-diameter needle seals, and that impact target animals at moderate velocity (40–50 m/sec) with high precision. We recommend against using darts with rapid-injection mechanisms and end-ported needles because of their potential to cause deep, chronic wounds.

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