

ANESTHESIA OF FREE RANGING AFRICAN ELEPHANTS (*Loxodonta africana*) DURING LAPAROSCOPIC VASECTOMY

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Abstract

A successful method to vasectomize free ranging African bull elephants (*Loxodonta africana*), as an alternative to controversial culling in areas of overpopulation, has been developed by the authors. Patients are anesthetized, intubated, placed into a modified standing position with a sling and crane/capture truck, ventilated as needed, clinically monitored and vasectomized using specialized laparoscopic equipment and protocols. To provide safe anesthesia for elephants undergoing prolonged field procedures, unique anesthetic protocols and equipment were developed. Elephants are anesthetized by dart injection from a helicopter with a combination of etorphine (Novartis Ltd., Isando, 1600, South Africa) and azaperone (Stresnil, Janssens Pharmaceutica, 1685, South Africa) and reversed with i.v. injections of diprenorphine (Novartis Ltd.) and naltrexone (Kyron Laboratories, Benrose, 2011, South Africa). A portable venturi-jet ventilator, powered by compressed oxygen, was designed to provide energy and flow characteristics capable of controlling ventilation of elephants up to 7000 kg. Elephant-sized endotracheal tubes were produced with internal diameters of 35-45 mm and lengths of 1.8 m. All patients were monitored at various intervals for temperature, pulse, respiration, blood gas analysis, end tidal CO₂, pulse oximetry, direct and indirect blood pressure. Anesthetic related complications noted prior to surgery included severe lactic acidosis and hypertension. During surgery, complications included hypertension; opioid-induced hypoventilation; and iatrogenic hypoventilation due to significantly elevated intra-abdominal pressures needed for surgical visualization during laparoscopy. Once reversed and standing, brief neuropraxia and mild lameness was noted in some animals due to pressure exerted by axillary and inguinal positioning of the support sling during surgery. The ability to control ventilation in the field on mega-vertebrates during prolonged surgery greatly contributed to the success of anesthesia.

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