A SIMPLE, UNIQUE FIELD VENTILATOR FOR LARGE UNGULATES: ANOTHER USE FOR YOUR LEAF BLOWER

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Abstract

Field anesthesia of wild ungulates commonly involves the use of opioid-based drug combinations. Hypoxemia, hypercarbia, and acidemia are common problems resulting from respiratory depression seen with opioid-based anesthesia. Oxygen supplementation and/or respiratory support are generally recommended when using opioids. Oxygen supplementation alone reduces hypoxemia but does not improve ventilation and gas exchange.[1] Intermittent, positive-pressure, field ventilation has generally been accomplished in large ungulates by the use of single or multiple, in-series, high flow demand valves using 100% oxygen as the driving gas.[3] These systems require pressurized oxygen tanks to be carried into the field which is cumbersome and can be dangerous. Bellows-type ventilators are large, difficult to transport, and also require pressurized driving gases. Blower- or fan-driven ventilators have been used in veterinary medicine to ventilate large domestic species,[4] including one using an electric vacuum cleaner as the drive source.[5] A simple, effective ventilator, utilizing either an electric or gas-powered leaf blower as the drive source, was designed to be used as an emergency field ventilator during a giraffe anesthesia study.[2] This ventilator is made of commonly available parts, has a pop-off valve and pressure gauge to prevent over-inflation, an expiratory valve to provide post-expiratory end pressure (PEEP), and is relatively compact and easy to carry into the field. This device was used to ventilate three captive, sub-adult giraffe ranging in estimated weight from 580 to 700 kg. Inspiratory pressures of 20 cm H_20 were reached quickly (< 2 sec), p_aO_2 values were significantly increased, and p_aCO_2 values were significantly decreased over pre-ventilation values, indicating adequate ventilation efficiency.

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