Best practice in

Endotracheal tube lubrication

The importance and benefit of lubricating ET tubes prior to placement is well documented.[1,2]

However there is wide variation amongst UK veterinary practices in type of tube used and methods of lubrication.

Endotracheal tubes are usually made from silicone, PVC or (red) rubber. The silicone tubes are the most expensive, but the silicone resists deterioration better than PVC or red rubber. PVC plastic tubes are much stiffer than the silicone tubes. Silicone tubes easily bend to conform to the trachea, while PVC tubes are made with a curve in them. Once the PVC tubes have been warmed in the trachea, the plastic softens and becomes pliable.

All types of tube are theoretically manufactured and designed to be single-use. However practices tend to reuse by washing, rinsing and drying tubes.

Red rubber tubes in particular are prone to significant deterioration with this method. Becoming cracked due to flexing and brittle due to chemical degradation of relatively harsh cleaning chemicals.

Regardless of the material construction of the tube, lubrication prior to intubation has several advantages[3]. Primarily it improves insertion of the tube. Additionally it reduces risk of tracheal damage, improves the "seal" of the tube to reduce leak past by anaesthetic gases and prevents adhesion of the tube to tissues.

Therefore the ideal lubricant needs to be non-irritant, of the correct viscosity to form a seal without causing obstruction[6], be non-drying to maintain lubrication and viscosity until extubation and be individually applied to avoid cross-contamination.

> "A tube lubricated with water did not reduce airway injury after tracheal intubation compared to the tube without lubrication[1]"

Water is a common lubricant used due to the belief that it poses little risk of contamination or adverse reaction. With a viscosity of 1.0016 mPa-s there is little to no risk of increased tube obstruction. However evidence suggests there is little benefit in terms of patient outcome[4].

Lubricant Jelly Has a viscosity 1000 to 9000mPa-s depending on room temperature. This variation poses the risk of tube obstruction at low temperatures. Depending on brand, the jelly is

usually comprised of glycerin with parabens and chlorhexidine. There is the documented potential for adverse irritation of the trachea with parabens[7]. Many are not designed for and are contra-indicated for oral cavity. Unless single-use sachets are used, there is significant risk of cross-contamination from patient to patient.

Aerosol Lubricant sprays are

marketed for use on ET tubes. Viscosity on application is near to water but the propellant quickly dries limiting viscosity significantly. Many contain silicone which is contraindicated for use in the trachea. Whilst posing little risk of contamination during application there is limited benefit of the composition for intubation.

Sodium Hyaluronate exhibits a

viscosity 800-1000 mPa-s (at 2% solution). This is therefore less affected by room temperature and unable to pose risk of obstruction. Sodium hyaluronate is a naturally occurring substance in connective tissue and is therefore at very low risk of causing adverse reaction. Indeed the substance actually displays significant benefit by being hygroscopic[8] and is believed to be able to bind up to 1000 times its weight in water. This enables maintenance of hydration in the trachea in the presence of significant drying effects of anaesthetic gases. Additionally high molecular weight (HMW) sodium hyaluronate has documented anti-inflammatory properties[8] which mediates the inflammatory response to ET tube placement.

HMW sodium hyaluronate reduces production of pro-inflammatory mediators

The recent advent of single-use “straw” applicator bottles has significantly minimised cross-contamination risk.

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Lubricant	Drying	Viscous	Irritant	Anti-inflammatory
Water	Yes	Yes	No	No
Jelly	No	No	Slight	No
Aerosol	Yes	No	Yes	No
Sodium Hyaluronate	No	Yes	No	Yes