

A v-gel[®] Case study

Laryngeal tubes: Innovation in small animal anaesthetics

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Up till recently, only the classic orotracheal tubes were available for this purpose. Intubation is generally free of complications in dogs and usually requires a laryngoscope and a tube in the right size.

However, intubation is somewhat more difficult in cats and entails risks such as laryngospasms, tracheal ruptures and irritation of the tracheal mucous membranes if not applied correctly. These complications can still affect the patient after extubation. Intubation in rabbits is even more difficult due to the relatively long oral cavity and the deep position of the larynx in connection with the small opening of the mouth and the small diameter of the trachea as a result of that. Therefore intubation of rabbits is generally rarely applied in private practice situations. Because of this, it is often the case that not enough oxygen can be supplied in this way. As an alternative, veterinarians try to administer oxygen and anaesthetic gas via a mask, covering the mouth and nose of the animal. These masks do not seal properly, however, and as a result, inhalational anaesthetics often contaminate the air in the operation theatre and artificial respiration is not possible. In addition, rabbits react in a similar way to cats, if not more severely, to manipulation of their larynx, with laryngospasms, which makes intubation and often also artificial respiration more difficult.

A new development for airway management in cats and rabbits has been on the market since September 2012. These are so-called supraglottic airway devices (SGADs) or also

laryngeal tubes, going by the trade name v-gel[®]. These are especially adapted to larynxes of cats and rabbits based on anatomic studies. Thanks to their special design, they fit directly on top of the larynx and seal it off from the environment. Therefore, it is possible to lead air rich in oxygen with anaesthetic into the patient while the latter can still breathe spontaneously. Artificial respiration of the patient is possible too, up to a certain point, at least under little respiration pressure. The v-gel[®] devices are available in several sizes for rabbits and cats, so that rabbits weighing between 0.6 and 4.5+ kg and cats weighing between 1 and 5+ kg can be treated.

Area of application of v-gel[®] is airway management in cats and rabbits under anaesthetic and in intensive care, especially in animals whose intubation is more difficult due to anatomic circumstances (rabbits). Cats with irritation of the trachea can benefit from this minor invasive method of airway management. This also includes very young cats or cats who have to be put under anaesthetic repeatedly. V-gel[®] can also be employed in supplying oxygen to intensive care patients, but this requires permanent sedation.

The small animal medical clinic LMU in Munich has tried v-gel[®] tubes on a few patients in recent months. This has brought many positive properties to light. Putting the SGAD in place is very easy and each time it was used up till now, it was positioned correctly already at the first attempt. Assisting staff is only needed when anaesthetising

rabbits. Applying v-gel® can be done when the patient is lying in a prone, lateral or supine position.

The v-gel slides over the larynx into the direction of the oesophagus along the hard palate and is correctly in place once resistance presents itself. In rabbits it can be helpful to put the rabbit into a prone position and to ask an assistant to open the mouth using a band at the upper and lower jaws. Verifying the position of the mask is best done with a capnograph. If continuous capnographic curves appear, the mask is positioned correctly. Alternatively, the position can be verified by observing the animal's spontaneous breathing.

Beside standard patients, we also employed v-gel® for airway management in cats during bronchoscopies. When using the C5 size v-gel® (cats weighing over 4kg), a bronchoscopy can be done via a T-connector through the mask and oxygen can be administered to the patient at the same time. In smaller animals, the bronchoscope moves the lumen of the mask and administering oxygen is no longer possible.

Classic intubation irritates relatively severely and therefore requires relatively deep anaesthesia. Placing the v-gel potentially irritates relatively little and therefore requires potentially less deep anaesthesia and consequently less anaesthetic, which will reduce its adverse effects accordingly. As the SGAD doesn't irritate the trachea, the latter will also tolerate the tube potentially for a longer time than a tracheal tube and especially brachycephalic cats can therefore benefit from a longer supply of oxygen.

The v-gel® were designed to be used 40 times. After each use, they should be cleaned, disinfected and delicately sterilised.

According to previous findings, positioning the v-gel in spontaneously breathing patients is very easy. If patients are not breathing spontaneously, the position of the SGAD can



Positioning the v-gel® in a comatose cat for supply of oxygen and artificial respiration



Use of the v-gel® in a cat for a bronchoscopy

only be moderately assessed. Verification is only possible when the patient receives artificial respiration immediately after the tube is positioned. Unfortunately, the tube does not seal the larynx off totally, so that respiration is only possible up to ca. 10 cmH₂O

pressure. To provide artificial respiration, the larynx must be open. In the event of laryngospasms, it will only be partially possible to provide the patient with artificial respiration using v-gel®. After positioning, the v-gel SGAD must be fixed in place using the band supplied with it. Even if the tube is fixed accordingly, it is possible that the tube slides out of place and moves the larynx. A strong pull on the tube system or repositioning the patient, too, can lead to displacing the tube. Therefore, the position of the v-gel SGAD should be verified regularly during the anaesthetic with the aid of a capnography.

This form of airway management with laryngeal tubes does not protect against regurgitation with any certainty. Therefore, classic tubes should be employed further for interventions such as endoscopies.

In summary, the v-gel® is an effective method of airway management for cats and rabbits to ensure oxygen supply to anaesthetised patients, reduce laryngospasms and it may improve survival rates when correctly employed. Especially in smaller veterinary practices, where intubation of cats is not done, but also in practices and clinics with a large proportion of rabbits and cats, v-gel® can mean an improvement. Rabbits, with a high peri-anaesthetic mortality of up to 7.4% (ASA classes 3 to 5), can be adequately supplied with oxygen and if necessary receive artificial respiration with little respiration pressure. Consequently, it can be expected that their mortality can also be reduced.



Fig. 1 Placement of a v-gel® in a rabbit



Fig. 2 Capnographic curve of the intubated rabbit



Fig. 3 Use of the v-gel in a rabbit

Dr Martina Schmoock (Specialist veterinarian for small animals) in the small animal practice in Burgdorf (Germany) tested the v-gel® laryngeal tubes for us in rabbits:

The tubes were tested in nine rabbits weighing between 1.1 kg and 3.4 kg. Eight of them underwent an ovariohysterectomy, one a cystotomy. Inserting and positioning the tubes can only be done in animals who are deeply sedated or under anaesthetic, although it is then very easy to do. It is very important to position the tube absolutely in the middle and to insert it exactly in the middle between the incisors. We urgently advise to protect the area under the tongue in this case. We put a pad over the lower incisors and pulled the tongue over it (see fig. 1). Observation during the anaesthetic using these tubes was significantly more precise and more secure, as a capnograph can be connected (see fig. 2 and 3).

For example, in one particular case, we noticed during a neutering operation, that the breathing graph on the capnograph was flattening. This could not be seen from the animal's body, however. Measures were taken immediately which proved certainly useful, as a short time afterwards, the animal in question stopped breathing. Within 30 seconds, this incident was dealt with and the anaesthetic could be concluded in safety. We believe that we would not have noticed this in this short interval without the tube. Basically it could be said that the XS tube is too small or too short even for very small rabbits of about 1 kg. The epiglottis cannot be optimally sealed with this. Therefore, we only tested size S in the end, as in two attempts with size XS, we intubated again with size S.

We will henceforward only do inhalational anaesthetics for rabbits with v-gel tubes. Until now, we have employed size S.

Size XS is too small or too short for rabbits of ca. 1 kg in weight. In addition, we will obtain one or two more tubes somewhat larger and

longer in size than size S, for animals weighing more than 4 kg.



**Art. No. 92848 – 92853:
v-gel laryngeal tube cat**



**Art. No. 92842 – 92847:
v-gel laryngeal tube rabbit**