



Vetamac Vapors has a new look! We've updated and improved the format of Vapors but the main content and focus will remain educational. As always, we welcome your comments and suggestions for future topics or improvements.

This issue of Vapors will begin a discussion on the various breathing circuits that can be used for anesthesia of the veterinary patient.

Circle Rebreathing System

A circle rebreathing system requires two tubes to carry gas to and from the patient. Each tube connects to a port on the absorber at one end and to a Y piece on the other end. The length of these tubes does not affect the amount of dead space because of the unidirectional flow of gas through the tubes. There are even expandable tubes that can be expanded to a length of 72". The only mechanical dead space in these tubes is from the Y piece to the patient. The length of the tubes, however, will affect the volume of the system and this will be discussed later.

Coaxial circuits are also available and are variously referred to as uni-limb, universal, or F-circuits. There are still two tubes to and from the patient with the inner tube carrying the inspired gas and the outer tube carrying the expired gas. Advantages of this type of circuit include compactness at the patient end and moderately increased inspired heat and humidity since the expired gas is flowing around the tube that carries the inspired gas. There is a small increase in resistance to inspiration because the inner tube is smaller. The inner tube can also become disconnected at the absorber end and in some brands the patient end can be retracted if the tube is stretched. (See figures 1, 2, 3)

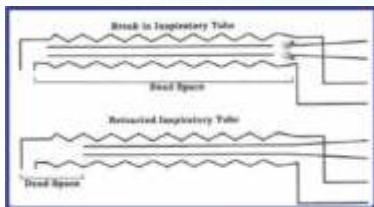


Figure 1



Figure 2



Figure 3

The coaxial rebreathing circuit is sometimes confused with a Bain non-rebreathing circuit. A coaxial rebreathing circuit functions the same as a traditional Y tube. It does not function as a Bain circuit. Non-rebreathing circuits will be discussed in the next issue of Vapors.

Coaxial and Y tube circuits are both available in adult and pediatric sizes. The adult size Y tubes are 22mm in diameter and the pediatric size is 15mm. There are some distributors that even offer a 12mm size. The adult coaxial circuit has a 19mm inner tube and a 30mm outer tube and the pediatric has a 15mm inner and a 25mm outer. The different size circuits affect two aspects of the system: 1) the resistance to breathing, and 2) the volume of the system. Practically, this means that if a pediatric circuit is used on too large an animal the increased resistance may compromise ventilation in the patient. If an adult circuit is used on a patient that is very small, the volume of the circuit is increased and will increase the time it takes to change the depth of anesthesia (the time constant-see Vapors Volume II Issue 3 October 2006 available at www.vetamac.com). The change in volume is illustrated in figure 4 using Y tube circuits that have marks at 10cm intervals. Not only is the adult Y larger in diameter, but it is also longer. The volume of 10cm in the adult tube is approximately 40cc and the volume of 10cm in the pediatric is approximately 20cc. Assuming a 4.5kg patient that has a tidal volume of 15cc/kg, each breath would be 68cc (15 x 4.5). The gas in the adult circuit would move approximately 1.75 marks and in the pediatric it would move approximately 3.4 marks. If this 4.5kg patient was on the adult circuit it would take almost six breaths to move gas from the machine connection to the patient, but on the pediatric circuit it would take only two breaths to move gas from the machine to the patient. This illustrates how the increased volume will increase the time to change the depth of anesthesia. Choosing the size of circuit is ultimately based on what will accommodate the best anesthesia technique.



Figure 4

The next issue of Vapors will discuss different non-rebreathing circuits.

VETAMAC



VAPORS

Product of the Quarter



Breathing Circuits & Bags

20% Off

Prices good thru 6/30/13

Includes Universal F-Circuits
Y Circuits

Expandable Circuits

SafeSigh Non-Rebreathing Systems
and all breathing bags.



would like to introduce and welcome Cynthia Burns!

Cynthia is a Registered Veterinary Technician with over 20 years of animal clinical care and veterinary sales experience. Besides working in several small hospitals, she also worked with Midwest Vet Supply, Columbus Serum, and The Butler Company. Cynthia joined Vetamac in November 2012 as a service technician/sales associate for southeast Michigan, northwest Ohio, and northeast Indiana. She attended Purdue University and graduated in 1989.

Cynthia resides in Leo, Indiana with her husband, Rob, two teenagers, Heather and Garrett, her dog, Bailey, and two cats, Tori and Mushi. Her interests include landscaping, gardening, scrapbooking, wine making, and cooking.

www.vetamac.com • 1 (800) 334-1583