

Vetamac Vapors

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Welcome to the first quarterly edition of "Vetamac Vapors". The purpose of this newsletter is to educate your staff with a goal of the best possible patient care. We also would like to inform you of services and products that Vetamac has to offer and to provide support for all of your anesthesia needs. Future editions will cover topics on machines as well as different techniques. Please send comments to the e-mail link at www.vetamac.com.

Basic Function of the Anesthetic Machine, Part I

This newsletter will focus on the first basic function of an anesthetic machine which is to deliver oxygen.

Oxygen is most often provided as a compressed gas in cylinders that have a valve in the neck. Cylinders vary in capacity with the most common two being the small "E" cylinder which usually attaches to the machine and a much larger "H" cylinder which is located remotely from the machine. Oxygen cylinders are considered full when the tank pressure is 2000 pounds per square inch (psi). If a cylinder in use is at 1000 psi, it is 50% full; at 200 psi, it is 10% full. "E" cylinders contain 650 liters and "H" tanks contain 6900 liters at 2000 psi.

The valves on O2 cylinders should be opened very slowly until the pressure on the regulator gauge stops rising. Then the valve can be opened completely. Under no circumstance should a wrench or pliers be used to open the valve.

A regulator with the proper fittings must be attached to the tank. The regulator should have two gauges - one that reads the remaining pressure in the tank and one that reads the line pressure. The regulator reduces the pressure to a point that is safe for all components of the oxygen system. For most applications this pressure is 40-50 psi.

Oxygen for the patient breathing circuit is delivered to the anesthetic machine either by the flowmeter or the flush valve. The flowmeter delivers oxygen to the breathing circuit at a specific rate measured in liters per minute (lpm). The flush valve is used to deliver a "burst" of oxygen to the breathing circuit. The flush valve should be used when the patient needs only oxygen and not oxygen combined with anesthesia.

Flowmeters are operated with a knob attached to a needle valve. When the needle valve is opened, oxygen flows through a vertical tube that is labeled in milliliters or liters per minute. The flow of oxygen causes an indicator in the tube to rise and the flow rate is read at the appropriate label. The indicators have various shapes but the most common is a ball. The flow rate is read at the point on the indicator where there is the greatest resistance to flow. If a ball is the indicator, this point would be the center of the ball.

When operating the flowmeter, the control knob should not be over-tightened. Doing so may result in damage or breakage to the needle valve. Always turn the flowmeter off when oxygen is no longer needed. If the flowmeter is on when the oxygen supply is turned on for the next procedure, the sudden pressure on the open flowmeter may cause the indicator to lodge at the top of the tube and possibly break the tube.

Caution should be exercised when the flush valve is used to deliver oxygen to the breathing circuit. Always operate the flush valve with the pop off (APL) valve open. Stop the oxygen flush before the rebreathing bag is completely filled. Failure to do so will result in high pressure in the circuit which in turn could cause damage to the patient's airway. The flush valve should also be used cautiously when using a non-rebreathing system because the oxygen is delivered directly to the patient connection on the system. It should be noted that some anesthetic machines have flush valves that are either restricted or do not have a high volume flush. This increases the margin of safety when using these flush valves. To assess the volume of oxygen being flushed, occlude the patient connection on the breathing tube, then operate the flush valve and observe how quickly the rebreathing bag fills.

At the end of the day, the oxygen supply should be shut off or the machine disconnected if a central oxygen system is in use. This will prevent needless oxygen consumption if a flowmeter is not off or if there are small leaks in any of the connections on the machine.

Following these guidelines to operate the machine will result in the safe and efficient use of oxygen.

By Harry Latshaw
MS, RVT, VTS (Anesthesia)

Vetamac's business is servicing anesthetic machines and building relationships. We believe that building relationships builds our business. Vetamac has been providing quality service, with integrity, for 15 years. Our service technicians combine a total of 53 years experience in anesthesia. Vetamac has been a distributor of VAD machines for 8 years. VAD machines are designed by Harry Latshaw, MS, RVT, VTS(Anesthesia), and are manufactured and assembled at our facility.