

Anesthesiologists Role in the Operating Room

by Jerry A. Cohen, M.D.

The role of the anesthesiologist is to provide comprehensive medical care to the patient undergoing surgical and diagnostic procedures. They also manage the patient's medical care throughout the period of their recovery from anesthesia, including post operative intensive care, when needed. Sometimes anesthesiologists manage anesthesia directly and sometimes they medically direct anesthesia assistants or nurse anesthetists. Regardless, the anesthesiologist is responsible for the overall care of the patient throughout the anesthetic.

Before the operation can begin, the anesthesiologist evaluates the patient's medical history and performs a physical examination that focuses on the medical needs of the patient. This examination concentrates on the organ systems that are challenged during operations. The aim of this pre-operative evaluation is to discover risk factors that must be taken into account. These risk factors include allergies, chronic lung disease, heart disease, diabetes, thyroid disease, problems related to obesity, difficult access to the circulation or airway, and inherited traits that might cause problems such as malignant hyperthermia or increased sensitivity to muscle relaxants. Because of the variety of disorders that can have an impact on the safety of anesthesia, it is important to provide the anesthesiologist with an accurate report of allergies, past hospitalizations, surgical procedures, family-related problems with anesthesia, diagnostic tests, medications being taken and any concerns that may have been raised regarding previous anesthetics. The pre-operative evaluation also provides the anesthesiologist with the opportunity to let the patient know what to expect and to review the risks and benefits of available treatment options. This conversation is known as "informed consent." It is an opportunity to discuss what the likely challenges will be and how they will be addressed. Informed consent for anesthesia can only be obtained by a person who is trained to provide

anesthesia. It is not the form that is signed acknowledging that consent has been given.

After the pre-operative evaluation is complete, the patient is taken to the operating room and placed on the operating table. The anesthesiologist then attaches several devices to monitor the patient's physical well being, including electrocardiogram, blood pressure cuff, and blood oxygen saturation probe. Occasionally, for some heart operations or those where the regulation of blood pressure can be a problem, the anesthesiologist will insert a plastic vascular catheter into an artery in the wrist. This will be used to monitor blood pressure continuously and provide a source for obtaining blood for lab tests. During or shortly after placing the monitors, the patient will be asked to breathe 100% oxygen for several minutes. The exhaled gas will be analyzed to determine adequate ventilation, as indicated by the exhaled carbon dioxide level, and to carefully measure and control the level of inhaled oxygen and anesthetics. The exhaled gas will be measured throughout the operation. A monitoring device is often placed on the forehead to aid in evaluating the level of anesthesia during the operation.

When all of the monitors are in place, the anesthesiologist will check all of the vital signs, and then induce anesthesia, usually by injecting sodium pentothal or propofol intravenously. At this point, patients lose consciousness and usually stop breathing on their own. Then, the anesthesiologist will ventilate the patient using a face mask attached to a ventilation bag on the anesthesia machine. After giving a muscle relaxant to facilitate the examination of the oral airway and larynx, the anesthesiologist uses a laryngoscope to see the larynx and pass an endotracheal tube through which the patient will be ventilated during the operation. The end of this tube, about the diameter of the pinky finger sits in the upper trachea and has a balloon cuff surrounding it. The cuff is inflated to prevent anything that enters the mouth, such as acid from the stomach, from entering the lungs. If the anesthesiologist anticipates that placing the endotracheal tube may

be difficult or if it proves unexpectedly difficult, this tube may be placed under anesthesia or sedation using special techniques. These techniques include bronchoscopy and laryngoscopy with devices specially designed to help facilitate intubation of the difficult airway.

Before surgery begins, other invasive monitors may be inserted to continuously measure blood pressure and cardiac performance during the operation. For example, during liver and heart surgery, as well as other major operations, the anesthesiologist may place a large catheter into the internal jugular or subclavian vein. Another catheter can be placed through this large bore catheter and passed through the chambers of the right heart into the pulmonary artery to measure its pressure and also cardiac output. These measurements are useful in optimizing cardiac performance and intravenous fluid management. Occasionally, the anesthesiologist may need to evaluate cardiac function by examining the heart using a cardiac ultrasound probe. This probe is inserted into the esophagus and produces a picture of the beating heart and its valves.

During the operation, the anesthesiologist gives a variety of drugs to maintain anesthesia and preserve stable cardiac and lung function. Sometimes, this involves the used of a variety of drugs and fluids, especially when the operation is associated with major interruption of blood flow or with blood loss. If blood loss is substantial, the anesthesiologist will replace the lost blood and other blood components in order to normalize the ability of the blood to coagulate. These components may include fresh frozen plasma, platelets and other clotting factors. During some procedures, like vascular or open heart operations, anticoagulants may be needed to suspend coagulation. In this case, the anesthesiologist will administer and control the level of anticoagulants and later neutralize them when they are no longer needed. Low body temperature has been shown to interfere with normal coagulation, healing and recovery from

anesthesia. Therefore, temperature is maintained in a normal range by warming fluids and using warm forced-air devices.

After the operation is complete, if it is possible for the patient to breath without assistance, the anesthesiologist will reverse the effects of muscle relaxants and anesthetics, and remove the endotracheal tube. If the patient requires continued ventilatory support, the anesthesiologist will leave the tube in. In either event, depending of the intensity of post-operative care required, the anesthesiologist transports the patient to either the post-operative care unit or to an intensive care unit. During this recovery period, the anesthesiologist administers drugs to relieve pain, control blood pressure, and stabilize organ function.

In essence the anesthesiologist provides continuous medical care before, during and after operations to permit the surgeon to make anatomical changes, sometimes quite challenging, that could otherwise cause substantial threats to the patient's survival. Constant research and attention to safety has led to a ten-fold reduction in anesthesia-related deaths over the past few decades, despite the increase in more challenging operations and in the number of older and sicker patients.