Health problem addressed

Anesthesia units dispense a mixture of gases and vapors and vary the proportions to control a patient's level of consciousness and/or analgesia during surgical procedures.

Product description

An anesthesia system comprises a gas delivery platform, a data analysis and distribution system, and physiologic and multigas monitors (optional in most units), which indicate levels and variations of several physiologic variables and parameters associated with cardiopulmonary function and/or gas and agent concentrations in breathed-gas mixtures. Manufacturers typically offer a minimum combination of monitors, alarms, and other features that customers must purchase to meet standards and ensure patient safety.

Principles of operation

Because O2 and N2O are used in large quantities, they are usually drawn from the hospital's central gas supplies. Vaporizers add a controlled amount of anesthetic vapor to the gas mixture. An automatic ventilator is generally used to mechanically deliver breaths to the patient. The ventilator forces the anesthesia gas mixture into the patient's breathing circuit and lungs and, in a circle breathing system, receives exhaled breath from the patient as well as fresh gas. A scavenging system captures and exhausts waste gases to minimize the exposure of the operating room staff to harmful anesthetic agents. Scavenging systems remove gas by a vacuum, a passive exhaust system, or both.

Operating steps

A mask is placed over the nose and mouth. The anesthesia unit dispenses a mixture of gases and vapors and varies the proportions to control a patient's level of consciousness and/or analgesia during surgical procedures. The patient is anesthetized by inspiring a mixture of O2, the vapor of a volatile liquid halogenated hydrocarbon anesthetic, and, if necessary, N2O and other gases.

Reported problems

One of the greatest dangers of anesthesia is hypoxia, which can result in brain damage or death, though the administration of concentrated O2 (100%) may be toxic. Gas with excessive CO2 concentration, an inadequate amount of anesthetic agent, or dangerously high pressure may cause hypoventilation, compromised cardiac output, pneumothorax, and asphyxiation. Contamination of the anesthesia breathing circuit may lead to nosocomial infections.

Use and maintenance

User(s): Anesthesiologist, nurse anesthetist, medical staff

Maintenance: Biomedical or clinical engineer/technician, medical staff, manufacturer/servicer

Training: Initial training by manufacturer, operator's manuals, user's guide, some manufacturers offer offsite training or remote training

Environment of use

Settings of use: Hospital (surgery), ambulatory surgery centers

Requirements: Uninterruptible power source, O2 fail-safe and hypoxic mixture fail-safe systems, gas cylinder yokes for O2 if central supplies fail, internal battery (for units with automatic ventilators) capable of powering the unit for at least 30 minutes

Product specifications

Approx. dimensions (mm): 1,500 x 700 x 700
Approx. weight (kg): 130

Consumables: Anesthetic agents, tubing, masks

Price range (USD): 5,000 - 100,000

Typical product life time (years): 8-10

Shelf life (consumables): Variable

Types and variations

Cart mounted, ceiling mounted, wall mounted, mobile


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