

ENDOTRACHEAL TUBE INTUBATION ASSIST DEVICE

This is a continuation of U.S. application Ser. No. 07/479,833 filed Feb. 14, 1990, now abandoned.

TECHNICAL FIELD

This invention relates to endotracheal tubes and more particularly to an endotracheal tube intubation assist device wherein a fiber optic endoscope is utilized to provide a visual image of the interior of the trachea as an aid in manipulating the assist device for performing the insertion of an endotracheal tube.

BACKGROUND ART

Fiber optic endoscopes are utilized in a variety of medical procedures. In general, a fiber optic endoscope is an instrument which can be inserted into a body cavity to provide a remote image of the body cavity. An endoscope typically includes an insertion section and an external control section. The insertion section is adapted to be inserted into a body cavity. The insertion section typically includes a light carrying bundle of optical fibers, an optical objective lens and a fiber optic coherent cable which carries an optical image to the control section. The control section includes a light source and processing means for processing the image received from the optical bundle. The control section also includes displaying means, such as an eyepiece or television monitor, for displaying a visual image of the body cavity. U.S. Pat. No. 4,754,328 to Barath is representative of these type of endoscopes.

In some types of endoscopes, the insertion section of the endoscope can be shaped or bent in a controlled manner by external manipulation to guide the endoscope through a body cavity. This allows the insertion section to be maneuvered through the body cavity without causing harm to the patient. These types of endoscopes are typically utilized for examination of the digestive tract. U.S. Pat. No. 4,688,554 to Habib, U.S. Pat. No. 4,755,873 to Kobayaski, and U.S. Pat. No. 4,714,075 to Krauter, are representative of these types of endoscopes.

One area of medicine in which an endoscope has heretofore not been generally utilized, is in the insertion of an endotracheal tube within the trachea of a patient. This is a common medical procedure in which an endotracheal tube is located within the trachea and then connected to a supply conduit to supply oxygen or anesthetic gases to the lungs. Prior to insertion of the endotracheal tube, the trachea must often be evacuated to clear mucous, blood, or other debris from the trachea.

In some cases, endotracheal intubation may be difficult to accomplish. This may be due to the fact that the patient is severely injured or because different patients, depending on their body size, age, and sex have differently shaped pathways into the trachea. The intubation process if incorrectly done may cause injuries to the patient, such as tears and damage to the larynx, trachea, nasopharynx and bronchi. Additionally, improper placement of the endotracheal tube, such as in the esophagus, (swallowing tube leading to the stomach) or in only one bronchus, (left or right) of the lung, may provide serious complications for a patient.

It is apparent then that an external visual image of the trachea would be helpful for use in this medical intuba-

tion process. In other cases such as in the training of medical personnel or when used by relatively inexperienced medical personnel, an external visual image of the trachea would also be quite helpful in the intubation process.

DISCLOSURE OF THE INVENTION

Accordingly, this invention relates to an assist device for performing an endotracheal tube intubation in a medical patient, in which an endoscope is utilized to provide a visual image as an aid in the insertion and intubation process. Additionally, the assist device is constructed with a malleable insertion section which may be bent to a shape which is most accommodating to a particular patient.

The endotracheal intubation assist device of the invention, generally stated, comprises, a handle, a malleable metal insertion section attached to the handle, and an endoscope having a viewing end mounted within the insertion section to provide a visual image of the trachea and related body structures while the intubation is being accomplished.

In general, an endotracheal tube is a breathing conduit formed of a soft flexible plastic medical tubing material adapted to be placed into a patient's trachea. The endotracheal tube is open at a distal end where oxygen or other gases are directed into the lungs. The proximate end of the endotracheal tube is typically formed with a tube fitting adapted to be connected to a source of pressurized gas such as oxygen or gases for anesthesia. The endotracheal tube may also include an inflatable bladder or balloon at a distal end which can be inflated by air pressure to contact the trachea and seal the endotracheal tube within the trachea just above the bronchi of the lungs. In use, an endotracheal tube must be centered between the two opposite bronchi (right and left) of the lungs and sealed within the trachea such that the lungs are equally supplied by gas flow through the open distal end of the endotracheal tube into the bronchi.

During the intubation process the flexible endotracheal tube must be traversed through the mouth, the nasopharynx, the larynx and the trachea of the patient and placed in a proper position within the trachea without causing damage to any body structures. The assist device of the invention functions as an aid in effecting this intubation process.

The handle and insertion section of the assist device are constructed such that a standard endotracheal tube may be placed around the insertion section and attached to the handle. The insertion section is formed of a malleable material such as malleable stainless steel or silver tubing and may be bent by an operator to accommodate the shape of the trachea of the patient at hand. It is contemplated that different insertion sections may be sized for use with the different standard sizes of endotracheal tubes used for adults, children, or for smaller or larger people. The assist device may thus be customized by an operator to suit a particular patient.

As previously stated, the viewing end of the endoscope is mounted within the insertion section and provides a visual image of the trachea during the intubation process. In use, the handle can be manipulated using this visual image for guiding the insertion section and endotracheal tube into the trachea.

The endoscope of the assist device includes a viewing end with an optic objective lens and a light carrying bundle of optical fibers located at the open distal end of