MALLEABLE FIBEROPTIC INTUBATING STYLET AND METHOD

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation in part of U.S. patent application Ser. No. 08/124,016 filed Sep. 21, 1993, now U.S. Pat. No. 5,431,152.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to medical instruments and fiberoptic intubating apparatus, and more particularly to a malleable fiberoptic intubating apparatus having a hollow, thin-walled stylet which removably carries an endotracheal tube around it and the fiberoptic bundle of a flexible fiberoptic bronchoscope within it, a handle, and a telescoping bronchoscope support arm that receives and carries a bronchoscope.

2. Brief Description of the Prior Art

Endotracheal intubation is a medical procedure which concerns placement of a tube in the trachea of a patient to facilitate breathing or to permit the controlled introduction of gasses through the tube by an anesthesiologist or other medical personnel. Endotracheal intubation is normally carried out after induction of anesthesia or in emergencies, and is usually accomplished without great difficulty under direct vision with a laryngoscope by the anesthesiologist. The laryngoscope is an instrument used to examine the larynx (the uppermost end of the trachea narrowed by two surrounding vocal cords and located below the root of the tongue).

With direct laryngoscopy, the patient's neck is flexed, the head is extended and the mouth is opened wide. A laryngoscope having a rigid straight blade (commonly known as a Miller-type blade), or a rigid curved blade (commonly known as a Macintosh-type blade) is placed along the right side of the tongue, and the tongue and soft tissues of the mouth are retracted anteriorly and inferiorly to enable the larynx to be seen directly through the mouth in a straight line, instead of the normal anatomic curve around the tongue from the mouth to the larynx. The endotracheal tube is then placed directly into the trachea, along this direct line of vision.

Occasionally, the anesthesiologist is unable to visualize the larynx using traditional direct laryngoscopy methods in a patient who has no history or signs by physical examination of being a difficult intubation. For example, many patients have decreased mobility of the head and neck, protruding upper teeth, limited mouth opening, abnormally large or small mandibles, large tongues, tumors in the oropharynx or larynx, or trauma to the face and neck, all of which prevent direct visualization for intubation of the larynx and trachea. These types of patients are usually intubated while awake and through the nose blindly or via fiberoptic endoscopy so that an open protected airway can be maintained by the patient until it is secured by the anesthesiologist. Blind endotracheal intubation has inherent disadvantages; for example, stylets, obturators, or other guides can injure the patient, and there is no visual evidence that the endotracheal tube has correctly entered the trachea.

Direct laryngoscopy requires mouth opening and head and neck positioning that may be impossible or injurious to a patient with head or neck trauma. The larynx may never be

able to be identified, or the endotracheal tube may not be able to be passed through it, even if it is identified. There is usually no means for oxygen delivery or suctioning during laryngoscopy.

Rigid fiberoptic laryngoscopy will aid in locating the larynx, but it is frequently difficult to guide the endotracheal tube into the trachea without rigid stylets or other guides, which may damage the soft tissues of the head and neck. Potential obstruction of the light source or field of view by the tube itself, secretions, blood, or soft tissues, and inability to confirm proper final tube position in the trachea are inherent drawbacks.

Flexible fiberoptic bronchoscopy faces difficulty in penetration through soft tissues in search of the larynx, because of its lack of stiffness, as well as obstruction of the field of view by soft tissues, secretions, or blood. Presently, oral intubation with a flexible fiberoptic bronchoscope requires a special hollow airway which is fixed in shape. Once the fiberoptic bronchoscope is passed beyond the tip and into the oropharynx in search of the larynx, it has no protection from secretions, and no support or retraction to allow it to easily pass through the soft tissues and into the larynx. The same problem exists for nasal flexible fiberoptic intubation. It is also impossible to use this instrument with just one hand.

While malleable fiberoptic intubating stylets have been around for quite some time (i.e., since the late 1970's), they have some distinct disadvantages. First, there is frequently no flexibility of the end portion, so the passage of the instrument deep into the trachea for inspection of final tube placement can result in stylet produced injury. Second, if the endotracheal tube and contained fiberoptic bundles cannot be passed through the vocal cords together (i.e., because the tube tip continues to abut against the right vocal cord), the safest and most effective way around this is to atraumatically pass a completely flexible fiberoptic bundle first into the trachea to act as a guide, and then pass the endotracheal tube in over it. Third, the malleable fiberoptic stylet offers no way to handle the tube with contained bronchoscope tubing independently from the viewing portion and then couple them together, as one unit, when desired for ease of use. Fourth, the conventional malleable fiberoptic stylets are prohibitive in cost, in the over $1,000 range. The present malleable fiberoptic intubating stylet overcomes the above described problems.

There are several patents which disclose various fiberoptic intubating stylets and instruments used for laryngoscopy and endotracheal intubation.

Rassoff, U.S. Pat. No. 5,183,031; Adair, U.S. Pat. No. 5,329,940; and Salerno, U.S. Pat. No. 5,337,735 disclose malleable fiberoptic intubating stylets with intrinsic endoscope portions that are fixed in place within the devices. They cannot be manipulated independently from the rest of the device, nor can they pass alone into the trachea. This severely limits their use.

Greene, U.S. Pat. No. 5,327,881 discloses another fiberoptic intubating stylet in which the endoscope is also intrinsic to the device. Although it does have a flexible portion, the other portions are more rigid, which may cause damage to the structure of the larynx and trachea.

Harvey, U.S. Pat. No. 5,279,281 discloses a flexible laryngoscope with a directing mechanism that positions the fiberoptic cable at a substantially 90° angle from the laryngoscope body and a guide mechanism for controlling the location of the free end of the fiberoptic cable. As with the the previously described stylets, the endoscope head (viewing portion) and device with the endotracheal tube cannot be