

SURGICAL INSTRUMENT ILLUMINATING ENDOTRACHEAL TUBE INSERTER

BACKGROUND OF THE INVENTION

The present invention relates to an improvement in surgical instruments and more particularly to an endotracheal tube introducer. In modern surgery, it is common procedure to provide the patient with a tube extending into the trachea for various purposes, particularly prior to the administration of an anesthetic. With a majority of patients, little difficulty is experienced, and intubation into the trachea is accomplished in a routine manner. In a small percentage of patients there are abnormalities in the structure of the throat which interfere with intubation, sometimes making it very difficult and in some instances creating an apparently impossible situation. Presently, there is no surgical instrument that provides a satisfactory and safe means for intubation in such anatomically difficult situations where the surgeon cannot visualize the entire route through which the tube must pass. Without the means for visual inspection, there is danger that the vocal cords would be damaged by endeavoring to force the tube past the obstructions.

SUMMARY OF THE INVENTION

The present invention provides a new surgical instrument which enables the surgeon to complete the insertion of the tube even when the anatomy is such that no direct line of sight can be provided. This is accomplished by providing a tube-introducing instrument with means for visualizing in a curved line, so that when the instrument meets with an obstruction it can be pointed in different direction and probing continued until the operator can visually determine a new path other than a straight line through which the tube can bypass the obstruction.

The new instrument of the present invention consists of a tubular casing projecting in a generally straight line from a handle and having at the distal end a laterally bent portion extending at an angle thereto. Centrally within the casing is a fiberoptic viewing bundle extending from an eyepiece in the handle to the open end of the casing. The viewing bundle follows the contour of the casing being straight from the eyepiece for the greater part of its length and then being curved and laterally bent at the distal end to the same degree as the distal end of the casing. Surrounding the central fiberoptic viewing bundle is a tubular fiberoptic light bearing bundle which leads from a light source in the handle. When the instrument is inserted in the throat of a patient, light is conducted through the tubular bundle and illuminates the area distally of the instrument. This enables the operator to see the illuminated area since the view is transmitted back to the eyepiece through the central optic bundle. The operator can twist the instrument to cause the distal end to move in various directions and can then determine by observation a path avoiding obstructions through which the instrument can safely be moved and can insert the instrument through that path. The tube to be inserted is sleeved over the casing and when the instrument reaches its destination the tube can be detached and left in that position while the instrument can be withdrawn.

DRAWINGS

FIG. 1 is a side view of the instrument with the endotracheal tube sleeved thereon

FIG. 2 is a longitudinal section.

FIG. 3 is a transverse section on line 3—3 of FIG. 2.

Referring to the drawings, the surgical instrument consists of an outer tubular casing 10 containing a central fiberoptic bundle 11, a surrounding tubular fiberoptic bundle 12, and an opaque layer 13 between the bundles. The central fiberoptic bundle is a standard type of device which transmits the image from the scanning end to the observation end. The tubular fiberoptic bundle 12 is a standard type of device which transmits light from a suitable light source and projects it into the space surrounding the image to be viewed. The instrument

casing has a straight portion 14 for the greater part of its length and at the distal end the casing and the fiberoptic bundles contained therein are laterally bent forming a distal portion 15 extending at an angle to the straight portion. The proximal end of the casing 10 is attached to a suitable handle 16 which, as shown, is in the form of pistol grip. The free end of the handle has attached thereto by means of conduit 17 the standard fiberoptic light source. Conduit 17 continues through the pistol grip handle by means of fiberoptic bundle 18 having a curved portion 19 which merges with tubular bundle 12 within the handle 16. The central viewing bundle 11 from the straight portion 14 of the casing projects through the curved portion 19 and continues through the handle 16 as shown at 20 to a suitable eyepiece 21. The endotracheal tube 22 to be placed in the patient, may be sleeved onto the casing 10 with one end 23 in alignment with the distal end of the casing and the other end abutting the handle. 24 is a standard yoke fitting for the tube. This is retained in position by a suitable catch 25 that can be released when the instrument is withdrawn.

The purpose of the instrument as described is to facilitate the placement of an endotracheal tube in the anatomically difficult situation. Usually it will be used for intubation for anesthesia. It can be used alone like a bronchoscope or with aid of a Magill type laryngoscope to expose the epiglottis. It is unique in that it provides a curved line of vision so that the vocal cords can be viewed behind the epiglottis when they are highly situated and cannot be viewed in the straight line of vision normal endotracheal procedure entails.

The usage of the instrument as above described is as follows: the patient is positioned in the normal supine attitude with the head hyperextended. The mouth is opened and the tip of the instrument with the endotracheal tube in place is introduced under direct vision into the pharynx. The epiglottis is bypassed by swinging the handle to the left thereby placing the curved tip of the instrument to the right and under the epiglottis. As the vocal cords lie just beyond the epiglottis the field may then be scanned laterally by swinging the handle to the right and left. When the cords are identified the entire instrument is advanced beyond them into the trachea. As soon as engagement is made the catch on the instrument is released and the endotracheal tube is slid off the instrument and deeper into the trachea. An alternate method of use is to expose the epiglottis with a Magill type laryngoscope and work as above from this reference point.

In using the instrument of this invention, it is preferable to employ a wire wound latex endotracheal tube because a thin walled tube with no danger of kinking is thus provided. A thicker walled plastic endotracheal tube can be used if the subject is large. A No. 8 tube diameter is specified only because this is a compromise in size which will fit all adults. Intubation is seldom a problem in children so that the instrument may only be produced in an adult size. It will be necessary to apply a coat of surgical lubricant on the outer wall of the instrument before the tube is applied to insure easy movement once the intubation is accomplished and the tube must be moved down. A variation of the handle might provide a trigger mechanism to release the catch and start the tube moving down the shaft.

It will be understood that the invention can be embodied in modified forms, and is not limited to the exact details as shown and described. Instead of supplying the standard fiberoptic light source by means of the conduit 17, it can be provided within the handle 16 by means of a rechargeable battery.

WHAT I CLAIM AS MY INVENTION IS:

1. A surgical instrument for facilitating the introduction into a human patient of an endotracheal tube comprising an elongated casing non-flexible and rigid for its entire length, a central fiberoptic bundle adapted to transmit an image, a surrounding tubular fiberoptic bundle for transmitting light, an opaque layer between said bundles, said casing with bundles therein having its rigid distal end curved to extend at a fixed angle to the main portion for insertion into the throat of a