

[54] **INTUBATION DEVICE AND METHOD OF ADVANCING A TUBE PAST THE PYLORUS**

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[56] **References Cited**

UNITED STATES PATENTS

1,736,182	11/1929	Wilkins	128/350 R
1,899,781	2/1933	Twiss	128/350 R
2,356,659	8/1944	Aguiar	128/276
3,189,031	6/1965	Andersen	128/350 R

Primary Examiner—Dalton L. Truluck

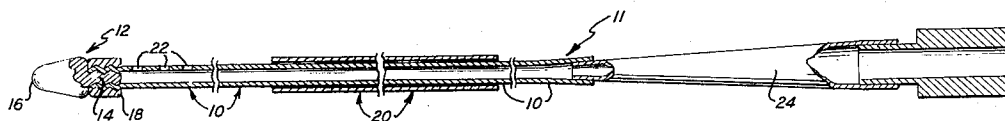
Attorney—D. Paul Weaver et al.

[57]

ABSTRACT

An intubation device providing communication into a patient's intestine. The device is formed of a soft flexible tube having a weighted front end, a soft flexible sleeve slidably mounted on the tube, and a collar mounted on the front end of the tube in registry with the sleeve. The front end of the device is inserted through a nasal passage of the patient and is advanced, by the coaction of the weighted plug and the advancement of the sleeve against the collar, to bring the plug and the front of the tube into the patient's stomach up to the pylorus. The sleeve is then withdrawn with respect to the collar and tube, then readvanced carrying the tube so as to provide slack in the front of the tube so that the coaction of peristalsis and the weighted plug will effect a transpyloric passage of the plug and the leading end of the tube. A passage extends between the interior and exterior of the tube at or near the front of the tube to permit fluid to flow between the tube and the intestine.

7 Claims, 4 Drawing Figures



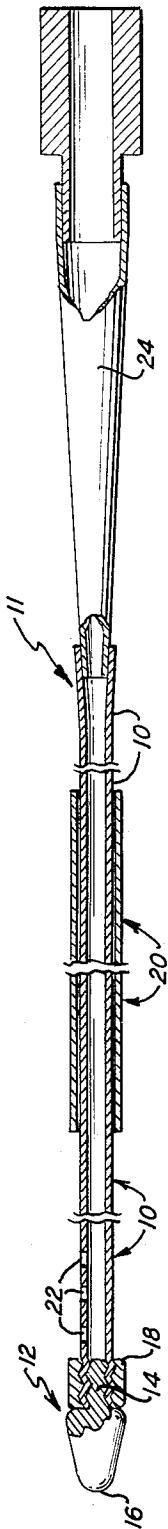


FIG. 1

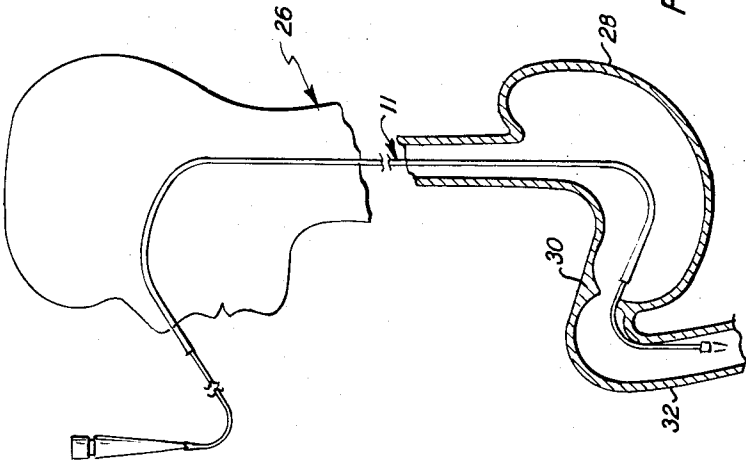


FIG. 2

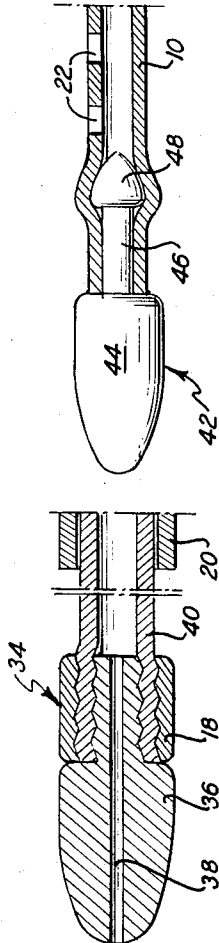


FIG. 3

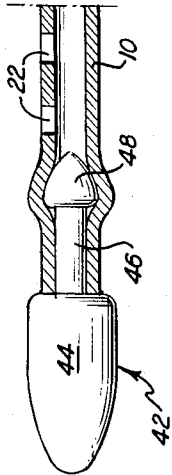


FIG. 4

INTUBATION DEVICE AND METHOD OF ADVANCING A TUBE PAST THE PYLORUS

BACKGROUND OF THE INVENTION

U. S. Pat. Nos. 1,736,182, 2,356,659, 2,596,947, and 3,189,031 show tubes which can be inserted into a patient's stomach or intestine to provide communication with the stomach or intestine for feeding or aspirating purposes. However, particularly with infants, difficulties arise in enabling the tube to be placed in the duodenum or jejunum, such placement being desirable for the following reasons:

a. Liquid deposited in the stomachs of certain infants is likely to be vomited or regurgitated which puts the infant at risk of aspirating or inhaling the liquid, such aspiration having a tendency to cause choking, asphyxia, pneumonia or other disease in a weak or ill infant;

b. The pyloric valve between the stomach and the duodenum provides a substantial barrier to reflux of liquid delivered transpylorically into the duodenum or the jejunum;

c. The jejunum is capable of rapidly absorbing certain liquids in contrast to the stomach which acts more as a reservoir and absorbs very little except alcohol.

SUMMARY OF THE INVENTION

This invention is concerned with an intubation device which enables a feeding or aspirating tube to be readily inserted past the pyloric valve into the intestine and with a method of advancing the leading end of the tube into the intestine. The tube, which is made of a soft flexible material, has a weighted leading end and a sleeve, also made of a soft flexible material, is slidably mounted on the tube. A collar is mounted on the front of the tube in registry with the sleeve. At least one passage extends between the interior and exterior of the tube at or near the front of the tube to provide communication between the tube and the lumen of the intestine. The leading ends of the tube and the sleeve, and the plug, are inserted into a patient's body passage, such as a nasal passage, and the sleeve is advanced against the collar to thus, in coaction with the weight of the plug, bring the plug and the front of the tube into the patient's stomach up to the pylorus. The sleeve is then withdrawn with respect to the collar and tube, and then is readvanced carrying the tube to provide slack at the front of the tube so that the coaction of the weighted plug and peristalsis will effect a transpyloric passage of the plug and the leading end of the tube into the intestine.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a section of the intubation device;

FIG. 2 is a representation of the intubation device in a patient;

FIG. 3 is a section of a portion of a variant of the intubation device; and

FIG. 4 is a view of a variant of a plug of the intubation device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Number 10 of the intubation device 11 designates a soft, flexible limp tube that may be made of silicone rubber or plastic. A plug 12 is secured to the front end of the tube 10 by means of a tapered threaded tail 14

on the back end of the plug that is inserted into and distends the front end of the tube 10. The plug 12 has a tapered blunt nose 16 and is made of a relatively dense non-toxic material such as gold or platinum. A collar 18, which may be made of the same material as the plug 12 or, alternatively, may be made of a plastic similar to that of the sleeve 20 described below, is fitted over the front end of the tube 10 so as to extend about the periphery of the front end of the tube 10 outwardly of the back end 14 of the plug 12. A plurality of radial passages 22 extend through the tube 10 near the front end of the tube. The sleeve 20, which is made of soft flexible material such as silicone rubber or plastic, is of shorter length than, and extends about the periphery of the tube 10 so as to be slidable on the tube 10 and so as to be registry with the collar 18. A removable plastic funnel-shaped connector 24 is mounted to the back end of the tube 10.

In use, the tube 10 is dusted with a suitable lubricant, such as powdered baking soda, to provide lubrication between the tube and the sleeve. The sleeve 20 is moved along the tube 10 so that the front end of the sleeve abuts the collar 18. A suitable lubricant, such as lubricating jelly is applied externally of the plug 12, the collar 18 and the sleeve 20 to facilitate their movement internally of the patient and the intubation device 11 is advanced, plug first, into a nasal passage of a patient 26 (FIG. 2), who is, if possible, in a 60° sitting position. The intubation device 11 is advanced through the patient's nose, throat and esophagus until the plug 12 reaches the entrance to the stomach 28, at which point the patient is put in a horizontal position and turned on his right side. The intubation device is then further advanced until the front end 16 of the plug 12 approaches the pylorus 30. This advance of the intubation device 11 up to the pylorus 30 is effected due to the weight of the plug 12 at the front end of the intubation device 11 and also due to the operator manipulating the portion of the sleeve 20 that projects from the nasal passage by advancing the sleeve 20 in abutment with the collar 18 which advances the collar, together with the plug 12 and the tube 10 further into the patient's body.

When the plug 12 has reached a position near the pylorus 30, the operator alternatively withdraws the sleeve 20 with respect to the tube 10 and the collar 18 and advances the sleeve 20 and the tube 10 to provide slack at the front end of the tube to thereby enable the weight of the plug 12 and peristalsis to effect passage of the plug 12 and the front portion of the tube 10 past the pylorus and into the duodenum 32.

The passage of the intubation device from the nasal passage up to the pylorus is facilitated by the tapered blunt end 16 of the weighted plug 12 and the soft, flexible nature of the tube 10 and the collar 20. The transpyloric passage of the plug 12 and the front end of the tube 10 is facilitated by the tapered blunt end 16 of the weighted plug 12 and the soft, flexible nature of the tube 10.

When the intubation device 11 is in position in the body with the plug 12 and the front end of the tube 10 past the pylorus in either the duodenum 32 or beyond the duodenum in the jejunum, the intubation device may be used as a feeding tube for delivering nutrient liquids and/or gases through the tube 10 and then out of the tube 10 through the passage 22 into the duodenum or jejunum. The intubation device 11 may also be used as an aspirator to extract fluids such as duodenal

jucies from the duodenum through the passage 22 and the tube 10 for diagnostic studies.

Regardless of whether the intubation device 11 is used as a feeding device or as an aspirator, the removable connector 24 may be used to connect the tube 10 to either a source of nutrients or to a receptacle for delivery of the aspirated fluid. After the intubation device 11 has been inserted in the patient, the connector 24 may be removed, the sleeve 20 may be completely withdrawn and the connector may be mounted again to the back end of the tube 10.

FIG. 3 shows a variant intubation device 34 having a plug 36 identical to the plug 12 except for an axial passage 38 extending therethrough that is in communication with a tube 40. The tube 40 is identical to the tube 10 except for the omission of the radial passages 22. The intubation device 34 functions in the same manner as the intubation device 11 except for the fact that the fluid flows out of or into the front of the tube 40 by way of the axial passage 38 in the plug 36 instead of, or in addition to, by way of the radial passages 22.

FIG. 4 shows a variant plug 42 having a tapered blunt front end 44, a shank 46 extending rearwardly of the front end 44 and a bill 48 projecting rearwardly of the shank 46 that receives the tube 10.

I claim:

1. An intubation device comprising:

a soft flexible tube having a weighted plug secured to its front end; a soft, flexible sleeve, of shorter length than the tube, slidably mounted on the tube; passage means between the interior of the tube proximate to its front end and the exterior of the tube; and a collar mounted on the front end of the tube in registry with the sleeve.

2. The device of claim 1 wherein said passage means

comprises:

at least one radial passage extending through the tube.

3. The device of claim 1 wherein said passage means comprises:

an axial passage extending through the plug and communicating with the interior of the tube.

4. The device of claim 1 wherein the plug has a rearwardly extending threaded tail that is received in the front of the tube.

5. The device of claim 4 wherein said collar extends about the threaded tail.

6. The device of claim 1 further comprising:

a funnel-shaped connector mounted to the back end of the tube.

7. A method of advancing the leading end of a soft, flexible tube having a weighted plug at its front end past the pylorus of a patient comprising:

slidably mounting a soft, flexible sleeve on the tube; providing a collar, mounted on the front end of the tube, that is in registry with the sleeve; inserting the front end of the tube, together with the plug and the front end of the sleeve, into a body passage of the patient; advancing the sleeve against the collar so that this advancement, in conjunction with the effect of the weighted plug, will cause the plug and the front of the tube to advance into the patient's stomach up to the pylorus; and withdrawing the sleeve with respect to the collar so as to provide slack in the front of the tube; whereby the coaction of the weighted plug and persistalsis will effect passage of the plug and the front of the tube past the pylorus.

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