CURRENT COMMENT AND CASE REPORTS

CURRENT COMMENT is a section in Anesthesiology in which will appear invited and unsolicited professional and scientific correspondence, abbreviated reports of interesting cases, material of interest to anesthesiologists reprinted from varied sources, brief descriptions of apparatus and appliances, technical suggestions, and short citations of experiences with drugs and methods in anesthesia. Contributions are urgently solicited. Editorial discretion is reserved in selecting and preparing those published. The author’s name or initials will appear with all items included.

AN AID IN PLACING ENDOTRACHEAL TUBES A MEASURED DISTANCE BELOW THE VOCAL CORDS

With endotracheal anesthesia, intubation of the right bronchus has been done (1) accidentally a number of times with an occasional severe or fatal complication resulting therefrom. Because of this possibility as a cause of an anesthetic accident, I was led to a consideration of the length of the trachea and endotracheal tubes used in anesthesia.

Several suggestions have been made for determining the distance that the tracheal catheter has been inserted, but the exact distance of the tip of the tube below the vocal cords is difficult to determine by these methods. Lundy (2) suggested that when a tube is passed with the aid of a laryngoscope the length of the tube remaining external to the upper incisors should be noted as the tip passes the cords and then 2 or 3 inches more of the tube should be inserted. Often the exposed length of the tube may not be noticed and an excessive length is thereby introduced into the trachea.

DESCRIPTION

While seeking a means to determine the exact location of the tip of the tube, the idea was suggested of making a mark on the tube such as those put on a Levin tube or a ureteral catheter. With only one mark on the tip end, however, it was found that the mark was lost to view when it passed the vocal cords, and a variable length of the tube was inserted. However, by placing a second mark \( \frac{1}{2} \) inch above the first mark it was possible to know the exact depth of the first mark. In addition to the two marks on the tip end of the tube, other marks were placed on the external end at 18 and 20 cm. from the tip of the tube (fig. 1). These marks were necessary to learn the relative position of the tube in relation to the upper central incisor teeth or upper gums. After placing the tube by direct vision, the distance from the tip to the upper incisors was noted and from this it was possible to know the exact distance of the tip of the tube below the vocal cords at all times.

Various methods of marking the tracheal tube have been tried in an effort to find a simple and effective method. A quick drying lacquer soon cracked and peeled off from squeezing and bending the tube. A

![Fig. 1. The tracheal tube is inserted into the trachea by direct vision until the vocal cords rest between the two marks on the tip end of the tube. The other marks are used to determine the relative position of the tube in relation to the upper teeth.](image)

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very flexible paint such as that used in painting golf balls lasted longer but took more than a week to dry. A piece of Penrose drain slipped over the tube did not prove satisfactory. The most successful method of marking the tubes so far has been with laundry marking ink. This is quick drying and easily applied. Repeated cleaning will gradually remove the ink, but it can easily be replaced again.

**DISCUSSION**

The reason for intubation of the right bronchus rather than the left bronchus is apparent from a consideration of the anatomical arrangement. It is well known that the right bronchus is in nearly a straight line with the trachea while the left bronchus leaves the trachea at more of an angle, making it more difficult to enter.

The 2 inch level was chosen arbitrarily since the length of the trachea as given by Gray (3) is 11 cm., or 4 1/2 inches. We felt that placing the tube half way down the trachea would give a safe margin of error and yet make it fairly easy to prevent accidental removal of the tube from the trachea. Furthermore, it is not essential to have the tip of the tube at the bifurcation of the trachea as is necessary with insufflation anesthesia. I believe that a 3 inch level below the cords would be as satisfactory, but this does not seem to allow quite as much room for individual variation in the patient.

**OBSERVATIONS**

In a series of 25 adult cases the following observations were made. Eighteen female and 7 male patients were intubated. The tip of the tube was placed 2 inches below the vocal cords and the distance from the tip of the tube to the upper central incisor teeth or gum was noted in each case. In the female patients the length from the tip of the tube to the upper teeth varied from 15.5 cm. to 20 cm., with an average of 16.7 cm. In the male patients this length from tip to teeth varied from 16 to 20 cm., with an average of 18.3 cm. It was also noted that all patients in whom the length from the tip to teeth was 20 cm. weighed 160 pounds or more.

When the tubes were placed at the 2 inch level below the vocal cords it was often found that 2 or 3 inches of tracheal tube which ordinarily were inserted in the trachea were outside the mouth. This often placed the tube near the bifurcation of the trachea and probably sometimes in the right bronchus, which may prove serious or fatal if maintained for any length of time without relief.

**CONCLUSION**

1. A technic is described which makes it possible to determine the distance of the tip of the tracheal tube below the vocal cords.
2. Intubation of the right bronchus is prevented by inserting a tracheal catheter a measured distance in the trachea.
3. The use of this guide in endotracheal anesthesia seems definitely advisable since it is an added precaution for the safety of the patient.

**REFERENCES**


**MANAGEMENT OF THE AIRWAY IN COMPRESSION OF THE LOWER END OF THE TRACHEA: A CASE REPORT**

A 62-year-old white female was to have a large thyroid carcinoma removed. The tumor was approximately 7 x 9 cm. and extended from the right side of the midline well over to the left side of the neck, and in the other direction, from just below the mandible to the clavicle. No respiratory difficulty was noted. Hoarseness and dysphagia were present. Direct laryngoscopy revealed the left vocal cord fixed...