

INTUBATION WITHOUT LARYNGOSCOPY

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ENDOTRACHEAL intubation has been employed for a long time in cases of stricture of the larynx, and has now taken an important place among the improvements of general anaesthesia.

In this article only intubation without laryngoscopy will be discussed without mentioning intubation practiced with the aid of a laryngoscope.

After having carried out most of the technics described by various authors, I shall describe the technics that we are employing now, giving technical precisions. The following methods will be considered: the nasotracheal (Magill), the blind orotracheal (Troup) and the tactile orotracheal method (Kuhn, Sykes).

First, how is intubation without laryngoscopy done by the nasal method?

Magill thin-walled curved tubes, sizes 14 to 38, are used. They can be passed readily, are easily depressed in the presence of a hindrance or obstacle, and provoke less epistaxis than the thick-walled tubes.

These tubes must be well lubricated. The second or third plane of third stage anaesthesia must first be realized; the muscles of the throat are relaxed, and the patient does not swallow. Since the glottis reflex is abolished, the vocal cords are not closed and the respiratory rhythm is not disturbed by the excitation produced in introducing the tube. Cocaine sprayed through the nostrils during inspiration diminishes reflex activity and shrinks the mucous membranes.

Even though one might succeed in introducing the tube during light anaesthesia, the intubation would result in trauma to the larynx on account of the coughing and of the spasms brought on by the intubation.

The spasm of the cords may cause the tube to close.

The position of the head is of utmost importance. The final success depends on it. When the head is in a good position the tube usually becomes engaged in the larynx. Its position must be correct and it will vary whether we are performing blind intubation on a child, a woman, an ordinary adult, or a sturdy person.

The larynx in children is lower than in adults, and in women it is lower than in men. The larynx can move upward 2 or 3 cm.

Extension of the head slides the larynx upward, and this must be considered when intubation is carried out. The head must be in normal position, neither flexed nor extended, and not in a lateral position.

When the patient is a child, three facts must be considered: the larynx is lower, the opening of the glottis is more toward the base of the throat than it is in the adult, and the proportions of the head and trunk are not the same as those in the adult.

In the case of a young child, the nape of the neck must lie on a level 1 or 2 inches below the shoulders, which means that the mattress or cushion of the table must be under the shoulders only so that the nape lies on the table. The part of the table that sustains the head may be lowered slightly, and the mouth may be opened with a mouth-gag.

In the case of an older child, say between the ages of 5 and 13 years, the nape will lie at the same level as the shoulders, and the head will lie on the same cushion or mattress as the body.

On the other hand, if the patient is a small adult or a woman, the nape must be at a higher level than the shoulders. For that purpose, a small pillow may be used to raise the head 5 cm. above the shoulders.

If the patient is a sturdy or robust person, and usually when the patient is a man, a second pillow is used to raise the head 10 cm. above the shoulders.

The head must be straight and it must be maintained in a position of slight extension by making traction on the chin to pull the tongue and epiglottis. In children, more extension of the head may be necessary.

The tube is first thoroughly lubricated with an anaesthetic jelly, and then is introduced into the freer nostril with the right hand. When introduced into the nostril, the tube glides along the nasal floor and is lowered into the pharynx. The anaesthetist stops as soon as he hears air whistling through the tube. At that moment, the tube, which has already traveled two-thirds of the way, is under the epiglottis in front of the laryngeal orifice. The air travels in and out of the tube.

The distance the tube is to be inserted is found by measuring the length from the nostril to the tip of the lobe of the corresponding ear and adding 6 cm. In short, it will be placed in the same position and it will lie along the same distance as the nasopharyngeal tube.

The index finger of the left hand raises the chin slightly along the median line, and by a combined movement of both hands, the anaesthetist arranges it so that the maximum respiration travels through the tube, the left hand raises the chin, and the right hand advances or withdraws the tube a little in the lower part of the throat. The anaesthetist must lower his ear toward the external end of the tube to hear the whistling air in the tube.

The right hand holds the tube at a distance from the nose far enough to allow the passage of the tube through the glottis in a single movement at the opportune time. The anaesthetist watches the respiratory movements, lowers his ear toward the external tip of the tube and at the beginning of an inspiration passes the tube through the glottis into the trachea with a rapid gesture.

If no resistance is encountered the endotracheal tube enters the trachea or the oesophagus; if it is in the trachea, the air can be felt or heard in the tube. When anaesthesia is only superficial, the presence of the tube in the larynx makes the patient cough or hold his breath.

If in doubt, the anaesthetist may blow in the tube; if it is in the correct position, the insufflated air returns because of the elasticity of the lungs; if not, a rumbling sound is produced by the air entering the stomach and not returning. If the latter is true, the anaesthetist withdraws the tube in order to return it opposite the glottis, and tries once more after having raised or lowered the patient's head still more or after changing the degree of flexion or extension of the head to modify the position of the tube in the throat.

If the tube is too curved and the patient has a long epiglottis, the tube may find its way against the vallecula. This does not occur frequently and it is necessary only to hold the mandible well forward during the passage of the tube to lift the epiglottis. Usually when the tube encounters an obstacle, the patient's head is in its proper position and the modification of the tube's course is caused by an enlargement or a deviation of the nasal septum or turbinates.

There are three methods at our disposal to determine the tube's position in the lower pharyngeal region.

The anaesthetist carefully examines the anterior region of the neck, or places his fingers on the larynx. He then can see or feel where the tube strikes against the anterior region of the neck. If the position of the tube cannot be determined by this means, a finger may be introduced into the throat.

When the tube's position is ascertained and its degree of deviation from the midline known, the anaesthetist slightly withdraws the tube until he hears the whistling of air, and before trying blind intubation once more, he pushes the thyroid body to the side with the left hand fingers proportional to the displacement of the tube in the back part of the throat. In this manner, he may succeed even if the tube touches the posterior arch of the tonsil. The index finger raises the chin and the three other fingers move the larynx to the right or the left of the midline in order to bring the larynx in front of the tube. This technique is successful in the greatest number of cases.

If necessary, a rotary movement of the free end of the tube to the right or left may be used. This small motion may modify the lateral position of the tube in the back part of the throat. If the tube digresses too much from the midline a better result may be obtained by passing it through the other nostril. If, after several vain attempts at intubation, the patient begins to wake up and coughs, the tube may be inserted during the cough, when the vocal cords are relaxed. The problem is simply to thrust the tube during the cough and not afterward. The inexperienced anaesthetist always passes the tube too late. Some anaesthetists provoke the coughing in order to pass the tube.

This procedure is successful in practically all cases, even in patients having teeth. Ankylosis of the neck is the only factor giving an inconvenience.

In the second method two fingers of the left hand are used.

A curved Magill tube or a straight tube may be employed. The method with a curved tube is as follows:

In adults the head lies in the same horizontal plane as the body; in children the head is lower. An assistant keeps the patient's head in extension.

I advise the use of a thick-walled tube which when introduced has no tendency to kink in the lower part of the throat. This tube may be provided with an inflatable cuff. The mouth may be kept open with a mouth-gag.

The anaesthetist places himself to the left of the patient and introduces two fingers of his left hand into the patient's mouth. The fingers are kept apart, and are placed in that position behind the epiglottis. In children only one finger is introduced.

The right hand lowers the tube in the midline on the dorsal side of the left hand fingers that keep the tube in the proper position. The tube must lie between the fingers below the epiglottis. The anaesthetist listens at the external opening of the tube, observes the respirations and advances or withdraws the tube several times in order to allow the maximum amount of air to pass in the glottis. When the tube is in the correct position, he slides it at the very start of an inspiration. If it is thrust into the oesophagus, the tube is raised with the two fingers which are in the mouth or the anaesthetist asks the assistant to raise or lower the patient's head.

The second method of introducing the Magill tube is as follows:

The middle finger of the left hand raises the epiglottis and the forefinger searches for the arytenoid cartilages. Then the tube is glided along on the palmar side of the forefinger as far as the underside of the epiglottis. By a slight movement of the flexion the forefinger leads the endotracheal tube toward the glottis while the right hand pushes the tube through. It is better to wait for the beginning of the inspiration to thrust the tube.

This method can be carried out more easily when the assistant pushes the larynx toward the top and extends the patient's head. The larynx thus pushed upward becomes more accessible.

When a straight tube is used, the same procedure is followed. In bending the forefinger the end of the tube is bent, thus allowing the tube to penetrate the glottis. Because of its greater rigidity the straight tube overcomes the spasm of the vocal cords more easily than does the curved tube. In some cases, the epiglottis can be felt without touching the arytenoid cartilages. The same technic is used to flex the tube below the epiglottis.

In this communication I have reviewed the technics we have adopted when intubation without laryngoscopy is practiced on our patients. A laryngoscope is always kept at hand. Even though we now use the laryngoscope less frequently, it is still without doubt an indispensable instrument. The procedure of intubing with a laryngoscope remains the standard method of intubation. I have attempted to show that intubation may be performed without a laryngoscope.

In several cases of Ludwig's angina I have carried out intubation by the nasal route alone with light anaesthesia. With the tube in place, I have looked in the throat with a laryngoscope after the operation and found that the base of the tongue was forced back and there was edema of the arytenoids and tissues around the glottis.

With patients in extremis by compression of the larynx, I have been successful in performing blind nasal intubation with a 26 size tube that is to say a size 24 tube can be passed when such patients die.

For tracheobronchial toilet I use a semirigid silk-woven catheter size 16, with two openings passed by the blind nasal method or by the oral method with the help of the fingers. In the latter case, the catheter slides farther and secretion can be aspirated more readily.

In pentothal anaesthesia, a severe spasm of the cords may follow intubation. Efficient local anaesthesia of the nostrils and glottis renders intubation easier. I prefer to slide the tube in the nose and throat and direct it with the two fingers of the other hand in the throat. This method is used when tonsillectomy is performed under pentothal anaesthesia.

In conclusion, intubation may always be performed successfully without laryngoscopy, and it is a very useful method when laryngoscopy is impossible.

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