

Retrograde and Antegrade Intubation: Improvisation of Conventional Technique of Retrograde Intubation in Indian Scenario

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Abstract

To have a definite airway is must in case of intraoral bleeds or long surgeries. Highest challenge of difficult intubation is when mouth opening is nil or it is impossible to relax the jaw even after administration of muscle relaxants. In this study conventional retrograde intubation technique was compared and evaluated with improvised retrograde and antegrade intubation for securing airway in difficult intubation cases on the basis of efficacy and complication rate. Patients were randomized into two groups of 10 each. They were prepared for awake nasal intubation and were kept NPO overnight with the procedure explained beforehand. Premedication done with injection glycopyrrolate 0.04 mg/kg IV and injection midazolam 0.03 mg/kg IV. In operation theatre standard monitoring was done. Induction and maintenance of anaesthesia was done as per routine protocol. Independent observer recorded the time required for securing the ETT from cricothyroid puncture to the confirmation of tube placement, number of attempts required, any desaturation during the procedure and haemodynamic changes. Postoperatively assessment was done two hours later for hoarseness of voice, pain in throat, coughing, subcutaneous emphysema, assessment for any cartilage injury and/ or local haematoma by an ENT surgeon. During the study, it has been seen that the retrograde and antegrade intubations might be more efficacious with lower complication rates. Hence this modified technique with improvisation of conventional technique can be recommended for regular use in Indian scenario.

Key Words

Difficult intubation, Retrograde intubation, Antegrade intubation.

Introduction

Highest challenge of difficult intubation is when mouth opening is nil as in cases of oral submucous fibrosis and TMJ ankylosis where it is impossible to relax the jaw even after administration of muscle relaxants. To have a definite airway is must because of risk of intraoral bleeding and long surgery (1, 2).

For coping with difficult tracheal intubation the methods of choice are blind nasal, fiberoptic laryngoscopy or bronchoscopy, retrograde intubation and tracheostomy (3). Blind nasal intubation is technically demanding. However fiberoptic bronchoscopy or laryngoscopy is not always available or feasible. Tracheostomy has got its adverse effect like scarring, tracheal stenosis, higher risk of LRTI. Retrograde intubation is minimally invasive airway management technique. This technique is

unfamiliar with anaesthesiologists or they hesitate to become invasive and it is technically demanding (4).

In our study we have divided 20 patients randomly in two groups of 10 each and have compared conventional retrograde intubation with improved retrograde and antegrade intubation.

Technique of conventional retrograde intubation includes:

- Patient positioning.
- Identifying cricothyroid membrane.
- Superior Laryngeal nerve block with 2% lignocaine.
- Transtracheal topical block with 4% lignocaine.
- Cricothyroid puncture using 18 gauge epidural needle.
- Threading of epidural catheter through the cannula

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- and retrieval of epidural catheter from the pharynx.
- Ryle's tube inserted and retrieved from the mouth.
- Then the catheter is tied to the Ryle's tube and is retrieved from the nostril.
- Threading of endotracheal tube over the catheter.

Whereas in improvised retrograde and Antegrade intubation first eight steps are same as conventional technique followed by:

- Threading of hollow bougie over the catheter and advanced into the trachea.
- Threading of Endotracheal tube over the bougie.

Improvised hollow bougie is prepared from the cover of endovascular guide wires used in cath labs. Length should be 60 cm with the cut ends smoothed. It was made slightly softer by dipping it into hot water before use.

Aims and Objectives

- Compare and evaluate the efficacy of conventional retrograde intubation with Improvised retrograde and antegrade intubation technique.
- Compare and evaluate the complications of conventional retrograde intubation with Improvised retrograde and antegrade intubation technique.

Material and Methods

Ethical committee approval taken from Datta Meghe Institute of Medical Sciences. Also written informed consent taken from the patient and relatives after explaining them the procedure and its complications.

Inclusion criteria

- Age >15yrs
- Mouth opening < 2 cms
- ASA I & II
- OSMF and TMJ ankylosis cases

Exclusion criteria

- Age <15 yrs
- Mouth opening >2 cms
- ASA > III
- Trauma and oral tumors
- Patient refusal
- Coagulopathy
- Preexisting voice and laryngeal abnormalities
- Nasal problems

Patient kept nil by mouth overnight. Procedure explained to the patient. Monitors and IV line secured.

Preparation for Awake nasal intubation done:

- Nasal decongestants overnight.
- Nebulisation with 4% Lignocaine for 5 minutes.
- Lignocaine jelly water based put into both nostrils.
- Transtracheal and superior laryngeal nerve blocks given using 4% and 2% lignocaine respectively.

Premedication:

- Inj. Glycopyrrolate 0.004 mg/kg IV.
- Inj. Midazolam 0.03mg / kg IV.

Following parameters recorded by independent observer:

- Total Time required for securing the endotracheal tube from cricothyroid puncture to confirmation of endotracheal tube placement (by Et CO₂ monitor and auscultation).
- Number of attempts required to thread the tube.
- Desaturation during the procedure (fall of saturation below 90%).
- Hemodynamic swings during the procedure (HR- % change from baseline and BP-% change from baseline).

After securing the airway; the anesthesia induction and maintenance done as per routine protocol. Surgery proceeded. Post operatively patients were extubated after adequate reversal of neuromuscular blocking agents and sedation. Postoperative assessment was done 2 hours later for hoarseness of voice, pain in throat, coughing, assessment for cartilage injury and local hematoma by ENT surgeon and subcutaneous emphysema.

Results

Time required in group B was overall less than required by conventional retrograde. The mean time for group A was 8.79 minutes as compared to 7.78 minutes in group B. (*Figure 1*)

In our study, single attempt success rate of group B was 100% as compared to 60% in group A as shown in *Figure 2*. There was only one case of desaturation in group B as compared to three cases in group A as shown in *Figure 3*. Haemodynamically, both the techniques were found to be producing almost similar results as shown in *Figure 4 & 5*.

Hoarseness of voice, pain in throat and coughing was found in both groups but it was more in group A than group B. None of the cases had any major local trauma in the form of cartilage injury or local hematoma. Subcutaneous emphysema was seen on 2 cases of group A only may be related to traction or manipulation of epidural catheter as shown in *Figure 6*.

MEAN TIME REQUIRED FOR ENDOTRACHEAL TUBE PLACEMENT

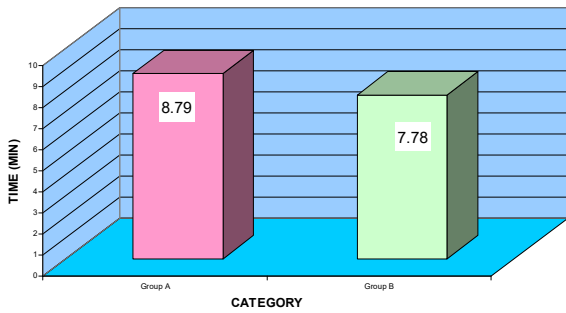


FIGURE 1

PERCENTAGE CHANGE OF BLOOD PRESSURE

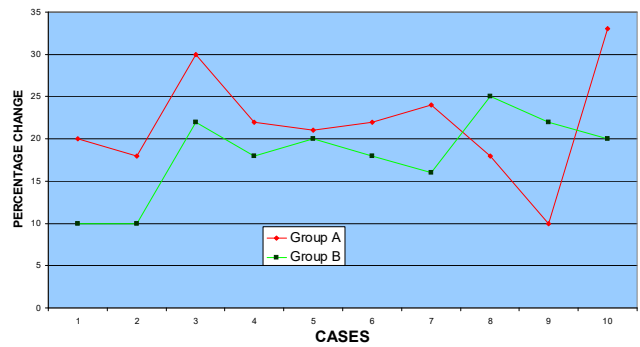


FIGURE 5

NUMBER OF ATTEMPTS REQUIRED FOR ENDOTRACHEAL TUBE PLACEMENT

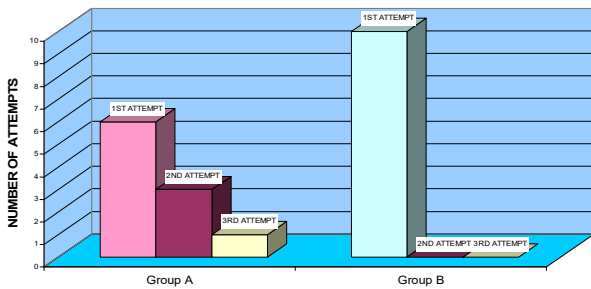


FIGURE 2

DESATURATION

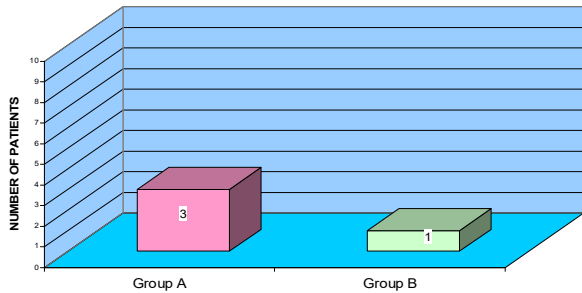


FIGURE 3

PERCENTAGE CHANGE IN HEART RATE

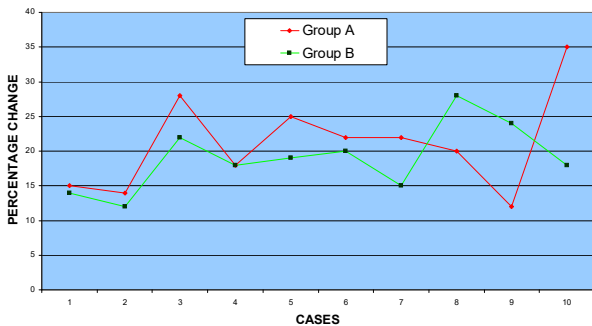


FIGURE 4

COMPLICATIONS

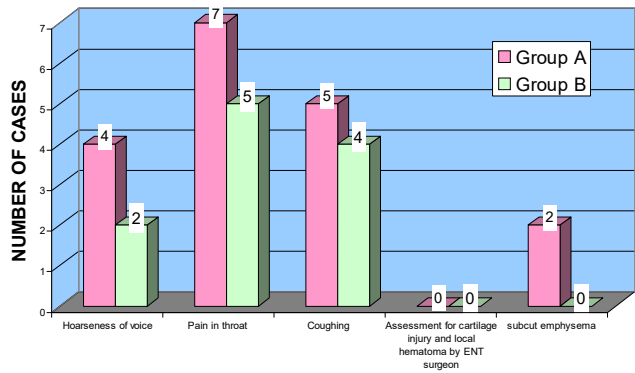


FIGURE 6

Discussion

For difficult endotracheal intubation options available with us are blind nasal, fiberoptic laryngoscopy or bronchoscopy, retrograde intubation and tracheostomy (3). Blind nasal intubation is technically demanding. However fiberoptic bronchoscopy or laryngoscopy is not always available or feasible even at tertiary centres. Tracheostomy has got its adverse effect like scarring, tracheal stenosis and higher risk of LRTI. Retrograde intubation is minimally invasive airway management technique. This technique is unfamiliar with anaesthesiologists or they hesitate to become invasive and it is technically demanding (4). Retrograde intubation kits (Cook's) are not readily available and are costly. Retrograde and antegrade intubation technique is done by similar commercial sets but indigenously made bougie makes it more cost effective and easily available.

Problems of using epidural catheter in conventional retrograde intubation are: size discrepancy of epidural catheter and endotracheal tube which makes threading

the endotracheal tube difficult; tension on epidural catheter required during threading of tube can/ does elongate and thin out the catheter so risk of breaking the epidural catheter; with all steps followed religiously always a possibility of esophageal intubation due to higher flexibility of epidural catheter. Making use of antegrade intubation has following advantages: better size correspondence of bougie and endotracheal tube; less possibility of esophageal intubation due to rigidity of the bougie; can be used as ventilation device with venture; less technically demanding (5-7).

In our study, time required in group B was overall less than required by conventional retrograde technique. The mean time for group A was 8.79 min as compared to 7.78 min in group B. This is comparable with study done by Kamat et al. (5).

In our study single attempt success rate of group B was 100% as compared to 60% in group A, which is comparable with studies done by Dhulkhed (6).

There was only one case of desaturation in group B as compared to three cases in group A may be related to inadequate action of local blocks with more number of attempts causing laryngospasm, bronchospasm or breath holding which is comparable with the study done by Lenfant et al. (7). Hemodynamically both the techniques were found to be producing almost similar results which is similar to study done by Kamat et al. (5). Hoarseness of voice, Pain in throat and coughing was found in both groups but it was more in group A than group B (2,4,5,7). None of the cases had any major local trauma in the form of cartilage injury or local hematoma. Subcutaneous emphysema was seen in 2 cases of group A only, may be related to traction or manipulation of

epidural catheter which is comparable to the study done by Krishan et al. (3).

Conclusion

- Retrograde and antegrade intubation might be more efficacious when number of attempts are considered.
- Complication rates may be lower with retrograde and antegrade intubation
- Hence this modified technique may be stated as improvisation of the conventional technique and can be recommended for regular use in Indian setups.

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