

Novel Techniques to Prevent Nasal Intubation Induced Pressure Sores after Head and Neck Oncological Surgeries–An Institutional Experience

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Abstract

Nasal ala pressure sores or necrosis is sometimes reported following prolonged nasotracheal intubation which in some cases may become permanent. The actual incidence of alar pressure sores caused by the pressure of naso-endotracheal tubes that remains in situ for a longer duration is not well documented and is often under reported. It is generally noticed at the time of extubation and becomes an embarrassing issue for the surgeon. The effects of nasal alar pressure sores are in most cases minor and self-limiting, but in few cases when necrosis sets in, it results in severe functional and cosmetic deficits with negative impact on patients' health, satisfaction and quality of life. In this paper we have discussed about simple yet novel techniques that we employ in our institution that aids us in avoiding this potential complication. By meticulously applying the techniques we can avoid such extreme instances and hence recommend these techniques.

Keywords: Nasal Intubation; Pressure Sores; Alar Sores; Alar Necrosis

Introduction

Nasotracheal intubation is the preferred intubation technique, routinely used in patients undergoing head and neck oncological surgeries. Nasal ala pressure sores or necrosis is sometimes reported following prolonged nasotracheal intubation which in some cases may become permanent (Figure 1).

Common complications include pain, sinusitis and bacteraemia; however, necrosis of nasal ala is infrequent with an incidence rate of 2.2-24.48% and can be disfiguring for the patient [1]. The actual incidence of alar pressure sores caused by the pressure of naso-endotracheal tubes that remains in situ for a longer duration is not well documented and is often under reported. The tube obstructs regional micro-circulation at the alar region which may convert

into necrosis if the pressure applied is too much and too prolonged. It is generally noticed at the time of extubation and becomes an embarrassing issue for the surgeon. The effects of nasal alar pressure sores are in most cases minor and self-limiting, but in few cases when necrosis sets in, it results in severe functional and cosmetic deficits with negative impact on patients' health, satisfaction and quality of life. The general risk factors associated to formation of alar pressure sores are the gender of the patient, increased duration of surgery, intra-operative hypotension, type and material of endotracheal tubes used, bare contact of the tube with the alar surface and an acute angle between the tube and nose [2]. The other major reasons causing it are pressure on the tube by the surgical drapes abutting the tube to the nasal ala and unintentional pressure from surgeon's hands resting on ala of nose causing drag or traction on the tube. Other complications that may result from prolonged nasal

intubation include epistaxis turbinectomy or in rare cases, even retropharyngeal dissection, the discussion of which is beyond the scope of this paper [3]. In this paper we have discussed about simple yet novel techniques that we employ in our institution that aids us in avoiding this potential complication.



Figure 1: Nasal Ala Pressure Sores.

Materials and Methods

In our institution, all the head and neck patients undergoing surgery are intubated via the nasal route. Because of prolonged surgical hours and post-surgery intubation time ranging from 24-48 hours, these patients are potential candidates for developing pressure induced alar sores or alar necrosis. Hence, for all patients we use the following modifications in the intubation technique which has helped us in drastically decreasing the rate of nasal alar pressure sores.



Figure 2: Tube Allowed Taking its Natural Inclination along the Surface of the Nasal Ala, Laterally.

After nasal intubation, the tube is allowed to take its natural inclination along the surface of the nasal ala, laterally Figure

2 and is not forcefully secured in a perpendicular direction Figure 3 or in the direction opposite to its natural inclination. Sometimes however, it is the surgeon's preference to have the tube tilted opposite to the surgical side. In those cases, the tube was allowed to assume its natural position after intubation through the opposite nostril and if the tilt was medial the tube could be safely tilted against the columella. In our experience, it is a safe procedure and columellar pressure sores or necrosis have not been observed.



Figure 3: Tube not to be Forcefully Secured in a Perpendicular Direction.

The tube is not allowed to be in direct contact with the nasal skin, instead, during fixing the tube, the tube is directed caudally and then secured with dynaplast dressing making sure that direction is not cranial towards the forehead and the final angle after fixation of the tube and the nasal skin is not acute (Figure 4).



Figure 4: The Tube is not allowed to be in Direct Contact with the Nasal Skin.

The first surgical drape should always follow the direction of the natural inclination of the tube and should not provide any additional pressure to the tube in any other direction (Figure 5).



Figure 5: The First Surgical Drape should always follow the Direction of the Natural Inclination of the Tube.

Usage of an extra catheter mounts to the original endotracheal tube to increase the overall length of the tube to avoid any unnecessary and unintentional drag to the tube against the skin by the surgeons (Figure 6).



Figure 6: Usage of an Extra Catheter Mounts to the Original Endotracheal Tube.

Use of a towel clip or a sponge holder to secure the lax connection of the tube in a “U” shaped manner and not hanging directly downwards, generating less pressure (Figure 7).



Figure 7: Use of a Towel Clip or a Sponge Holder to Secure the Lax Connection of the Tube.

Use of a tie with a gauze piece to secure the tube connector to the operating table to prevent any untoward displacement of the tube (Figure 8).



Figure 8: Use of a Tie with a Gauze Piece to Secure the Tube Connector to the Operating Table.

After the surgical procedure, if the patient is kept on ventilator support, the ventilator is fixed to the side of the natural inclination of the tube with no drag to the opposite side. We add the rest of the circuit with the supporter provided with the ventilator or tie the circuit to the bed loosely so that any drag due to head movement is minimised in the ICU setting.

Discussion

When there is pressure on ala nasi or alar columella, pressure sores may occur due to decrease of the capillary blood supply. The prolonged duration of surgery under

general anaesthesia with nasotracheal tube is one of the significant contributing factors to development of nasal alar sores with studies reporting an increasing rate of upto 4.8% for every 10 min increase of anaesthesia time [4]. Nasal intubation sometimes causes development of excessive tension and acute angulation of the nasotracheal tube against the nasal skin causing pressure sores which may eventually turn into necrosis. One study has shown that greater than 32 mmHg of pressure for a long time can result in necrosis but many authors concluded that even a smaller amount of pressure, constantly maintained for a longer period induce more tissue damage than a larger amount of pressure applied for a shorter duration [5]. Since we do not orient our tube perpendicular to the nasal ala or columella, or in any other direction except for its natural direction of inclination, the pressure applied is much less. Using an extra connector to make the tube connection lax is also another means of lessening the pressure at the alar site. Avoiding direct contact of the nasal ala skin by advancing the tube forwards by a few millimetres and then fixing it can leave the tube hanging laterally and decreases the chances of a sore. Authors also advocate the combined use of Soft Liner (a soft denture lining material) and DuoDERM (a bioactive skin protector), hydrocolloid dressing and polyvinyl acetyl sponge (Merocel) as a cushioning material between the tube and the skin and claims to significantly reduce the size and severity of nasal ala pressure after prolonged nasotracheal intubation. Surgeons, during draping the patient, sometimes aggressively press the nasotracheal tube tightly under the surgical drapes which aggravates the pressure sore from the sharp angulation. However, in all our cases, we mandatorily ensure that the first covering of the surgical drape is made along the direction of the tube and the second covering is tightened over the first decreasing the final pressure over the tube. Some authors advocate the use of an extra supporter to the circuit (Breathing Tube Holder) to prevent drag Figures 9a & 9b but we have found its routine use cumbersome and do not advocate its use. Authors have advocated use of modified endotracheal tubes consisting of an oral endotracheal tube and a proximal part of a preformed nasotracheal tube linked by a connector and have claimed to have reduced the incidence of alar pressure sores [3]. We use regular flexometallic tubes without any special modification and report similar results with the inclusion of the simple manoeuvres mentioned above. In our experience, age and gender did not play a significant role in causation of the pressure sores.

Although nasal ala pressure sores are not fatal, this unwanted postintubation complication may result in permanent nasal deformity and might also give rise to medico legal problems and care should be taken to avoid it at all cost. By meticulously applying the techniques we can avoid such extreme instances.

However, if pressure sores do occur in spite of taking all the necessary precautionary measures, early detection is warranted, and prompt treatment should be initiated with application of corticosteroid cream. But this complication greatly affects patients' functional, and cosmetic concern and therefore, prevention and early treatment are the most effective solution.

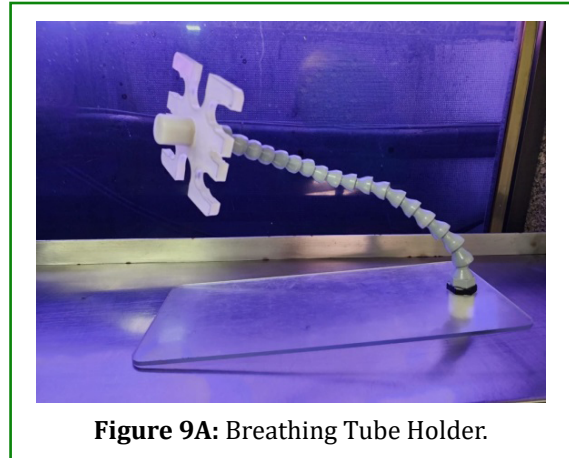


Figure 9A: Breathing Tube Holder.

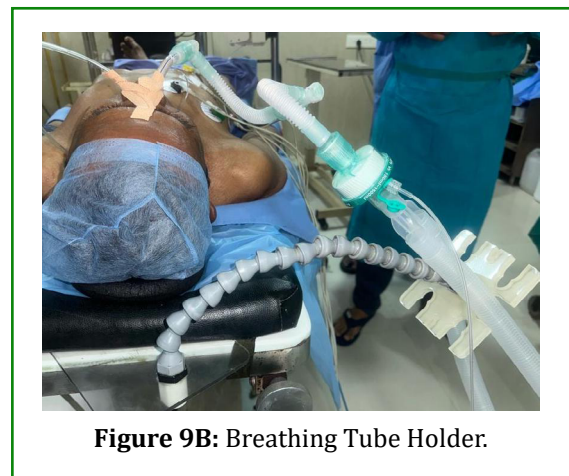


Figure 9B: Breathing Tube Holder.

Conclusion

The actual incidence of alar pressure sores caused by the pressure of naso-endotracheal tubes that remains in situ for a longer duration is not well documented and is often under reported. It is generally noticed at the time of extubation and becomes an embarrassing issue for the surgeon. The effects of nasal alar pressure sores are in most cases minor and self-limiting, but in few cases when necrosis sets in, it results in severe functional and cosmetic deficits with negative impact on patients' health, satisfaction and quality of life. In this paper we have discussed about simple yet novel techniques that we employ in our institution that aids us in avoiding this potential complication. By meticulously applying the techniques we can avoid such extreme instances and hence

recommend these techniques by anaesthetists and surgeons alike.

Ethical Statement

The paper has been made in compliance with the ethical standards of our institution
No funding has been received
There are no conflicts of interest
The paper has been approved by the ethical committee
Informed consent was taken from the patients for participation in the study

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