Nasal ala pressure sores following head and neck reconstructive surgery: A retrospective analysis from a tertiary cancer hospital

INTRODUCTION

Complex surgeries and reconstruction in the oromandibulofacial region pose an airway challenge and require nasotracheal intubation. This difficulty is compounded by prolonged surgical time, need for frequent manoeuvring of the head position and ‘head-end’ position of the surgical team. Nasotracheal intubation provides uninhibited access to the mouth, facilitating instrumentation and an enlarged surgical field. Columellar necrosis and alar notching [Figure 1] has been recognised as a complication of prolonged nasal intubation.\[1,2\] At our centre, we commonly use two varieties of endotracheal tubes for nasotracheal intubation: flexometallic (FM) reinforced endotracheal tubes and preformed Ring-Adair-Elwyn (RAE) tubes.

The purposes of this article were to find out the incidence of alar pressure sores and the association of alar necrosis with type of nasal tube and duration of surgery.

METHODS

We conducted a retrospective, observational study after approval from the Institutional Ethics Committee. The data were collected from 1st January, 2013, to 31st December, 2013. All the patients who underwent prolonged (more than 6 h) head and neck reconstructive surgery with nasotracheal intubation were included in the study. Patients with tracheostomy were excluded from the study. Patients were distributed into two groups, namely, FM and RAE groups based on the type of endotracheal tube. We studied the data for total incidence of nasal alar pressure sore, difference of the incidence of pressure sore in two groups and whether this incidence is related to the duration of surgery. Statistical measures included mean, median, standard deviation and range (minimum, maximum) for continuous data and percentages for discrete variables. Inter-group comparison of continuous variables was performed using the two-sample t-test and Fischer’s exact test for discrete variables.
RESULTS

The total number of patients was 54, of which we included 49 patients as 5 patients were tracheostomised from the beginning of the surgery for surgical indications. Demographic data were comparable between the two groups. The incidence of nasal alar necrosis was 24.48% in all patients, 23% in FM group and 26% in RAE group. The difference was not statistically significant in two groups \(P = 0.80\), Table 1. The duration of surgery in the patients who did not develop alar necrosis \((n = 37)\) was 10.44 ± 1.60 h (7–16 h), while it was 11.25 ± 1.58 h (7.66–13 h) in the patients who developed alar necrosis \((n = 12)\) which was statistically not significant \(P = 0.14\).

DISCUSSION

Anaesthesia for complex maxillofacial surgery requires securing the airway either by orotracheal or nasotracheal intubation or through a tracheostomy. During intraoral surgery, nasotracheal intubation provides uninhibited access to the mouth, for routine and more complex head and neck surgery. Pressure sores as a result of nasotracheal intubation sometimes develop due to excessive tension and angulation of the nasotracheal tube against the nose. One study has shown that pressure >32 mmHg on soft tissue for a certain time may result in pressure ulcers. Another study found that applied pressure of 500 mmHg for 2 h or 100 mmHg for 10 h can sufficiently cause muscle necrosis, and the authors concluded that a small amount of pressure maintained for a long period might induce more tissue damage than a large amount of pressure applied for a short period. Probably, the earlier cause (small pressure for prolonged period) explains the cause of this complication. Although the incidence of this easily missed complication is not much documented in the literature, one study reported the prevalence of 0.59% of pressure sores for operations that lasted for more than 10 h. In another study, they reported that 100% nasal ala pressure occurred after prolonged nasotracheal intubation using the preformed nasotracheal tube in animal model. Many authors have shown different techniques to prevent this complication, but they need to be assessed in a series of patients. The shortcomings of this observational study are that an association between incidence of alar necrosis and other comorbid conditions such as diabetes mellitus could not be established as the sample size was small and the degree and stages of pressure necrosis could not be assessed due to the retrospective nature of the study. It is possible that the degree of necrosis may vary with the types of tubes. We hope that further prospective randomised studies may fill the lacunae of this study.

CONCLUSION

In this retrospective analysis of nasal ala pressure sores following head and neck reconstructive surgery, the incidence of nasal alar necrosis was 24.48%. The occurrence of pressure sore was not associated with the type of endotracheal tube or duration of surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the

![Figure 1: Patient with nasal alar necrosis](image)

| Table 1: Patients characteristics and incidence of pressure sores in two groups |
|----------------------------------|-------------------|-------------------|-------------------|-------------------|
| **Patient characteristics**      | **FM group**      | **RAE group**     | **FM group**      | **RAE group**     |
| **Total**                        | **Patients with alar necrosis** | **Total** | **Patients with alar necrosis** | **Total** | **Patients with alar necrosis** |
| Number of patients (%)           | 26 (53.0)         | 6 (23)            | 23 (46.82)        | 6 (26)            |
| Age (years)                      | 55 (25-73)        | 52 (46-60)        | 52 (20-82)        | 59 (40-63)        |
| Sex (male:female)                | 16:10             | 3:3               | 15:8              | 4:1               |
| Comorbidity                      |                   |                   |                   |                   |
| Hypertension                     | 6                 | 1                 | 1                 | 2                 |
| Diabetes                         | 9                 | 2                 | 6                 | 3                 |
| Hypothyroid                      | 6                 | 1                 | 1                 | 1                 |
| IHD                              | 1                 | 1                 | 2                 | 0                 |
| Other                            | Smoking-1, multiple myeloma-1 | 0 | Asthma-1, CRF-1 | 0 |

FM – Flexometallic; RAE – Ring-Adair-Elwyn; IHD – Ischaemic heart disease; CRF – Chronic Renal Failure
patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due anonymity will be made to conceal their identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

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**REFERENCES**

1. Dupoirieux L, Jammet P, Bonnet MC, Atlan G, Souyris F. Necrosis of the columella after prolonged intranasal intubation. Ann Fr Anesth Reanim 1993;12:64‑6.
2. Zwillich C, Pierson DJ. Nasal necrosis: A common complication of nasotracheal intubation. Chest 1973;64:376‑7.
3. Saheb SM, Nath VN, Kumar KP, Padmaja PP. A novel method using Seldinger’s technique for submental intubation in major craniofacial fractures: A case series. Indian J Anaesth 2014;58:48‑50.
4. Landis EM. Studies of capillary blood pressure in human skin. Heart 1930;15:209‑21.
5. Daniel RK, Wheatley D, Priest D. Pressure sores and paraplegia: An experimental model. Ann Plast Surg 1985;15:41‑9.
6. Huang WS, Chou TD, Chen TM, Wang HJ, Lee GY, Wong CS. Nasal ala pressure sore: Easily missed complication of nasotracheal tube intubation. J Med Sci 2002;22:101‑4.
7. Huang TT, Tseng CE, Lee TM, Yeh JY, Lai YY. Preventing pressure sores of the nasal ala after nasotracheal tube intubation: Prom animal model to clinical application. J Oral Maxillofac Surg 2009;67:543‑51.
8. Iwai T, Goto T, Maegawa J, Tohnai I. Use of a hydrocolloid dressing to prevent nasal pressure sores after nasotracheal intubation. Br J Oral Maxillofac Surg 2011;49:e65‑6.

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| Quick response code | Website: www.ijaweb.org | DOI: 10.4103/0019-5049.198393 |

**How to cite this article:** Rastogi S, Bhutia T, Singh A, Arun P. Nasal ala pressure sores following head and neck reconstructive surgery: A retrospective analysis from a tertiary cancer hospital. Indian J Anaesth 2017;61:74‑6.

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