Risk Factors for Pressure Ulcers at the Ala of Nose in Oral Surgery

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A quality review revealed pressure ulcers at the ala of nose in 16 cases (2.2%) over 3 years. We therefore retrospectively investigated the risk factors for alar pressure ulcers from nasal tubes. Male gender was the highest risk factor (odds ratio = 9.1411; 95% confidence interval = 1.680–170.58), and the second highest risk factor was duration of anesthesia (odds ratio = 1.0048/min of anesthesia; 95% confidence interval = 1.0034–1.0065). Male gender and duration of anesthesia appear to be risk factors for nasal tube pressure ulcers at the ala of nose in patients.

Key Words: Oral surgery; Pressure ulcer; Ala of nose; Nasotracheal intubation.

BACKGROUND

Nasotracheal intubation for oral surgery is a well-established technique in the operating room.¹ Alar pressure ulcers have occurred postoperatively in many types of oral surgery.^{2,3} However, there are few reports in the literature regarding these pressure ulcers.³ Although nasal pressure ulcers after nasotracheal intubation and placement of other nasal tubes might be minor enough to be easily ignored medically, they might be painful and/or a cosmetic problem for patients.⁴ Retrospective review revealed pressure ulcers at the ala of nose in 16 cases over 3 years. Therefore, we retrospectively investigated the risk factors of pressure ulcers at the ala of nose in oral surgery.

MATERIALS AND METHOD

Anesthesia records of patients older than 20 years and American Society of Anesthesiologists physical status I or II who underwent oral surgery with nasotracheal intubation from April 2010 to September 2012 were reviewed. Those with postoperative alar pressure

ulcers were identified. Patients' demographic data (age, body mass index BMI, gender) and duration of anesthesia were investigated. The results were statistically analyzed using JMP 11 (SAS Institute Inc, Cary, NC). In the univariate analysis, Fisher exact test and the χ^2 test were used to compare groups. A multivariable analysis was performed using stepwise logistic regression to separately determine risk factors of pressure ulcers.

RESULTS

A total of 726 cases were suitable for this study. Sixteen of 726 cases (2.2%) had postoperative pressure ulcers at the ala of nose (Figure 1). Pressure ulcers in 11 cases were caused by nasotracheal tubes and in 5 other cases by nasogastric tubes. Table 1 shows the risk factors of pressure ulcer at the nostril using univariate analysis. Pressure ulcers were correlated with age ($p = .0213$), gender ($p = .0014$), and duration of anesthesia ($p < .0001$). Table 2 shows the risk factors of pressure ulcer using multivariate analysis by stepwise logistic regression. Two variables were associated with pressure ulcers. Male gender was the highest risk factor (odds ratio = 9.1411; 95% confidence interval = 1.680–170.58), and the second was duration of anesthesia (odds ratio = 1.0048/min of anesthesia time; 95% confidence interval = 1.0034–1.0065).

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Table 1. Univariate Analysis

	Nonulcer, <i>n</i> = 710 (97.8%)	Ulcer, <i>n</i> = 16 (2.2%)	<i>p</i> Value
Age, y	49.9 ± 19.4	61.7 ± 16.9	.0213*
Gender, <i>n</i>			.0014*
Male	385	15	
Female	325	1	
Body mass index, kg/m ²	22.5 ± 3.6	23.7 ± 2.6	.2033
Duration of anesthesia, min	321.1 ± 216.8	950.9 ± 330.7	<.0001*

* A *p*-value of 0.05 was regarded as significant.

DISCUSSION

Pressure ulcer is defined as any area of skin and/or underlying tissue that has been damaged by unrelieved pressure.² Alar pressure ulcers occur when nasal soft tissue is compressed continuously by nasal tubes. Compression may induce diminished blood supply, which may be exacerbated by intentional hypotension, as is commonly employed for LeFort surgery, which leads to decreased tissue oxygen and nutrient delivery. These decreases might lead to tissue damage if significant and prolonged enough.⁵ As expected, there is an increased incidence for longer surgery of 4.8% for every 10 minutes of anesthesia time in our analysis. Male gender also appears to be a risk factor. The reason is not clear, but it may be that females have greater skin elasticity with greater amounts of subcutaneous fat and collagen, while males might have unusually decreased skin tolerance, possibly because of lack of makeup application, which may alter skin tissue in females.

In addition, in oral surgery, tubes and the surgical site are closely colocated. The surgeon sometimes presses these tubes under the drapes unconsciously during surgery, which might lead to increased alar pressure.

Figure 1. Use of a soft material to prevent pressure ulcer.

Following this analysis, we have so far prevented alar pressure ulcers effectively by using soft materials between nasal tubes and the ala. The soft material (Cica Care, Smith and Nephew, Hull, UK) is trimmed and positioned between the nasogastric tube and the nasal rim.^{3,4}

CONCLUSION

Male gender and duration of anesthesia are suggested as risk factors for pressure ulcers at the ala of nose from nasotracheal and nasogastric tubes used during general anesthesia for oral surgery.

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Table 2. Multivariate Analysis (Logistic Regression)

	Odds Ratio	95% CI	<i>p</i> Value
Gender	9.1411	2.680–170.58	.0069*
Male			
Female			
Duration of anesthesia per minute of anesthesia time	1.0048	1.0034–1.0065	<.0001*

* A *p*-value of 0.05 was regarded as significant.