Use of Merocel® aids in prevention of nasal pressure ulcers following nasal intubation: Case series of 33 patients

INTRODUCTION

Nasotracheal intubation is the preferred route of airway management for oral and maxillofacial surgeries.[1] Nasal pressure ulcers are a frequently overlooked complication of this technique, especially in cases where intubation is required for a prolonged period. The necrosis can lead to cosmetic and functional disability that may require prolonged medical care and even surgical correction. It may also raise medicolegal problems. Techniques described in the literature to reduce the risk of alar necrosis include the use of hydrocolloid dressing, polyvinyl alcohol foam, Dynaplast™ and modified endotracheal tube (ETT).[2-5] We evaluated the efficacy of the use of polyvinyl alcohol foam dressings to prevent nasal alar necrosis in patients requiring prolonged nasotracheal intubation for surgeries for oral and maxillofacial carcinoma.

METHODS

After obtaining approval from the institutional review board, we selected adult patients of either sex requiring prolonged nasotracheal intubation for surgeries for oral and maxillofacial carcinoma lasting more than 8 h to receive Merocel® nasal pack. The study was conducted between December 2015 and July 2016. Written informed consent was obtained from all the patients. The exclusion criteria were patient’s refusal to participate in the study and anticipated duration of nasotracheal intubation <8 h. All the patients underwent detailed pre-anaesthetic evaluation as per the institutional protocol. The more patent nostril or the right nostril in case both the nostrils were equally patent, was selected for nasotracheal intubation. The nostril was prepared for intubation by 0.5% xylometazoline drops and lignocaine 2% jelly. After induction of general anaesthesia, nasotracheal intubation using flexometallic ETT no. 7.5 for males and 6.5 for females was done using direct laryngoscopy and Magills forceps guidance. We used polyvinyl alcohol foam dressings (Merocel® Standard Nasal dressing, 8 cm Medtronic) for packing the nasal alae which formed a cushion between the ETT and nasal mucosa. The Merocel® was trimmed to the shape of nasal cavity and lubricated with Neosporin™ ointment before nasal placement [Figure 1]. The packing was fixed to the tube using silk to prevent its dislodgement. After the completion of surgery, as per our institutional protocol, all patients received elective mechanical ventilation for 12 h via the nasotracheal tube. The patients were evaluated immediately after the surgery and after 24 h.

The development of the pressure ulcers was categorised based on the European Pressure Ulcer Advisory Panel–National Pressure Ulcer Advisory Panel classification system.[6]

- Grade 1: Persistent discolouration of the skin including non-blanchable erythema
- Grade 2: Partial-thickness skin loss involving epidermis and dermis
- Grade 3: Full-thickness skin loss involving subcutaneous tissues but not underlying fascia, bone, tendon or joint capsule
- Grade 4: Full-thickness skin loss extending to the underlying bone, tendon or joint capsule.

The continuous variables are presented as mean and standard deviation, and as percentages for discrete variables.

RESULTS

A total of 33 patients were taken up for Merocel® nasal packing for prevention of nasal alar necrosis following prolonged nasotracheal intubation. All patients underwent reconstructive surgeries with modified neck dissection for oral and maxillofacial carcinomas. The mean duration of nasal intubation was 26.07 ± 2.2 h. The mean duration of surgery was 9 ± 2.9 h. One patient developed pressure sores of
category 1 (3%). No intervention was required in any of the patients. Prior data from our institution suggested that the incidence of nasal ulcers from prolonged nasotracheal intubation (24-30 hours) without using Merocel for fixation of ETT was 51.4%.

The patient demography, baseline parameters and incidence of nasal pressure ulcer are presented in Table 1.

**DISCUSSION**

The development of nasal pressure ulcers is an ignored complication of prolonged nasotracheal intubation. The nose is especially at risk of development of ulcers as it is devoid of fatty cushion, and therefore there is a high likelihood of full-thickness damage. The development of nasal pressure ulcer depends on the material of the ETT, its duration of placement and whether fixation of tube is proper or not. There is increased risk in prolonged surgeries, and with frequent movement of the ETT, Skin moisture/oedema during the prolonged contact period may macerate the skin, making it less resilient. The incidence of this complication is rarely reported in literature. A case series reported a prevalence of 0.59% for pressure sores; all patients affected had operations that lasted for more than 10 h. Another study reported incidence of nasal alar necrosis to be 24.48% in the head and neck reconstructive surgeries lasting more than 6 h.

To reduce the risk, use of many specialised dressings such as hydrocolloid dressing, Dynaplast™ and polyvinyl alcohol foam dressings (Merocel®) have been reported. Merocel has various desirable protective properties. It forms a cushion that leads to pressure redistribution and reduces frictional forces between the nasal mucosa and the ETT during frequent turning of the head. An additional feature that reduces maceration of skin is moisture absorption which is not seen with Dynaplast™ or hydrocolloid dressing. Merocel is being routinely used by otorhinolaryngologists after nasal surgeries for packing. It facilitates haemostatic and reparative process and creates a moist environment in the nasal cavity. The minor disadvantages of using nasal packs include in situ pain, bleeding and pain on removal. However, their incidence is rare. Merocel is commonly used and cost effective. A single pack of 8 cm Merocel is available in India for Rs. 300–400.

The mean duration of nasotracheal placement was 26.07 ± 2.2 h in our patients. Merocel has been safely used for up to 48–72 h for nasal packing. Its prolonged use may increase the risk of bacterial colonisation. Despite using Merocel®, one patient of 33 developed Grade 1 pressure ulcers which implies that adjunctive steps are needed to reduce the occurrence and severity of pressure ulcers. These may include using proper size of ETT, appropriate fixation and positioning of the tube, use of soft flexible nasotracheal tube, repeated assessment of the skin during surgery, and avoidance of repositioning of tube and frequent head movement.

In our patients, we used flexometallic ETT for nasal intubation as standard of care. All participants were intubated with appropriately sized ETTs according to size of nostrils and unnecessary manipulation of tube, and head position was avoided. The limitation of this study is that a small number of patients were undertaken without any control group for comparison. Future randomised controlled trials are warranted to examine the efficacy of Merocel in prevention of nasal pressure sores associated with prolonged nasotracheal intubation. Another limitation is that patients were followed only upto 24 hours after surgery; further studies should consider follow up of patients for longer period to assess any cosmetic deformity.

**CONCLUSION**

Thenasal pressure ulcer is a commonly unacknowledged complication of prolonged nasotracheal intubation. During surgeries, requiring prolonged nasotracheal intubation, the use of Merocel® during fixation of ETT is a simple and effective adjuvant for prevention of pressure ulcers.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the 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 efforts 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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**How to cite this article:** Singh R, Sood N, Kerai S, Puri A. Use of Merocel® aids in prevention of nasal pressure ulcers following nasal intubation: Case series of 33 patients. Indian J Anaesth 2017;61:513-5.

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