

BOARD REVIEW CORNER

## Mask Interface and CPAP Adherence

Sairam Parthasarathy, M.D.

*Southern Arizona VA Health Care System and University of Arizona, Tucson, AZ*

A 72-year-old retired nurse with family history of obstructive sleep apnea, loud snoring, witnessed apneas, excessive daytime sleepiness, and inability to concentrate underwent polysomnography. The patient has history of hypertension, multiple urogynecological procedures for genitourinary prolapse, and has history of atrial fibrillation and congestive heart failure. On examination, the patient had a body mass index of 31.8 kg/m<sup>2</sup>, well controlled blood pressure, normal nasal passageway, and no evidence for decompensated heart failure. Cardiovascular examination revealed normal heart sounds and no murmurs, while respiratory examination revealed bilateral normal breath sounds. Abdominal examination was normal, and skin examination was normal as well. Examination of fingers revealed the following nail findings shown in image below (Fig. 1). Polysomnography revealed severe obstructive sleep apnea with an apnea-hypopnea index of 33.2 per hour, and lowest oxygen saturation of 82% by finger pulse oximetry.

The patient underwent continuous positive airway pressure titration on a second night, which was marked by significant improvement in AHI to 3 per hour while on CPAP of 8 cm H<sub>2</sub>O with a silicone nasal mask. The patient complained of suffocation, and polysomnography revealed marked reduction in sleep efficiency despite improvement in sleep disordered breathing. The day following the CPAP titration, the patient called the lab coordinator to complain about a “skin rash” on her face, nasal burning, itching, and rhinorrhea. Examination during a follow-up clinic visit on the same day did not reveal any maculopapular rash, however skin impressions demarcating the areas of mask contact around the nose were identified. A “skin allergy patch” was constructed using a piece of the nasal mask material and affixed onto the ventral aspect of the patient’s forearm using adhesive tape to discern any evidence of skin contact allergies. On a follow-up visit 2 days later, there was no evidence of any skin change underneath the patch.

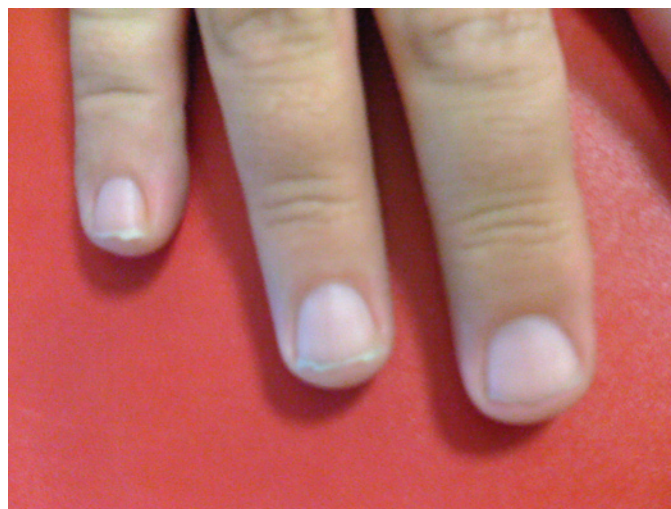


Figure 1—Image of fingers

Which one or more of the following are likely to explain the patient's intolerance to CPAP mask interface?

- A. Allergic contact dermatitis to mask material
- B. Latex allergy
- C. Anxiety disorder
- D. Lack of humidification
- E. Allergic rhinitis

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Address correspondence to: Sairam Parthasarathy, MD, Section of Pulmonary, Critical Care and Sleep Medicine, Southern Arizona Veterans Administration Health Care System, 3601 South Sixth Ave, Mail Stop 1-111A, Tucson, AZ 85723; Tel: (520) 792-1450, Ext: 5447; Fax: (520) 629-1801; E-mail: spartha@arc.arizona.edu

## DISCUSSION

Mask interface related issues can be an important determinant of adherence to continuous positive airway pressure (CPAP) therapy.<sup>1</sup> Allergic contact dermatitis to mask material may be related to rubber, silicone rubber, or components of the strap. While such contact dermatitis are usually type III hypersensitivity reactions, the more dangerous type I anaphylactic reaction—manifested as urticaria and shock—may also occur rarely in response to silicone rubber or latex.<sup>2</sup> Latex, is rarely used in the manufacturing of masks, and therefore is highly unlikely in this patient. Nevertheless, the classic history obtained from patients is that they have had multiple exposures to latex containing rubber urinary catheters following urological procedures that warrant the same.<sup>3,4</sup> Our patient had a prior history of frequent urogynecological surgery—a marker of high exposure to rubber catheters and possible sensitization—however, our patient did not have any evidence for type I hypersensitivity. Most contemporary masks and nasal pillows, however, employ silicone rubber and may lead to contact allergic dermatitis.<sup>5,6</sup> Moreover, scalp allergic dermatitis can result from the dialkyl thioureas in the neoprene mask straps.<sup>7</sup> Straps made of cloth may be used to prevent perpetuation of such chronic contact dermatitis.<sup>7</sup> Patch testing, as performed in our patient, using a piece of the potentially allergen containing material can be performed to resolve when there is a question as to whether contact allergic dermatitis is in question.<sup>7</sup>

Both lack of humidification<sup>8,9</sup> and nasal allergy<sup>10</sup> can cause non-adherence to PAP therapy. A humidifier was used during the PAP titration study and the patient did not have a prior history of nasal allergies. Nasal dryness and rhinorrhea are not uncommon in patients receiving PAP therapy and may occur in the absence of nasal allergic rhinitis.

Anxiety disorder interfering with PAP adherence has been described in both women and men,<sup>11,12</sup> and claustrophobia is another major factor.<sup>13,14</sup> While hospital anxiety and depression scale and the fear and avoidance scale were used in such studies to measure anxiety and claustrophobia, in our patient the presence of neuropathic traits such as nail biting (Fig. 1) gives clues to the underlying anxiety state of this patient.<sup>15,16</sup> Our patient was prescribed a nasal pillow circuit which was less claustrophobic and anxiety inducing. She was able to adhere to CPAP therapy and reported significant resolution of sleep related symptoms during a follow-up visit.

## DISCLOSURE STATEMENT

This was not an industry supported study. The author has indicated no financial conflicts of interest.

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