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HPV Positive Tonsillar Cancer in Two Laser Surgeons: Case Reports

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Background:

Carbon dioxide (CO2) lasers are commonly used to excise lesions on the larynx, cervix, lower genital tract, and perianal regions. Tissue destruction from the laser's energy produces a gaseous plume containing cell contents and other aerosols. Many potential risks have been associated with laser plume exposure including the risk of human papillomavirus (HPV) transmission; in vitro experiments have reported HPV transmission through laser plumes. This case report describes, to the author's knowledge, the first cases of HPV-16 positive oropharyngeal squamous cell carcinomas in two surgeons following long-term occupational laser plume exposure.

Case presentation:

Patient A is a 53 year-old male gynecologist who consulted the Department of Otolaryngology having noticed a lesion on his right tonsil and a lump in the right side of his neck. The physical exam revealed right tonsil hypertrophy and a small node at the posterior aspect of the right mandible. A biopsy of the right tonsil was performed confirming invasive squamous cell carcinoma of moderate to poor differentiation. Patient A had no identifiable risk factors for oropharyngeal cancer or HPV with the exception of occupational exposure to HPV-positive laser plumes, having performed laser ablation and later loop electrosurgical excision procedures (LEEP) of more than 3000 dysplastic cervical and vulvar lesions over 20 years. Most of these procedures were performed in an environment without proper ventilation or mask. He returned to work 11 months following initiation of therapy. He continues to practice gynecology, but has not returned to laser surgery.

Patient B is a 62 year-old gynecologist who recently consulted his local otorynolaryngologist after having a foreign body sensation in his throat for many weeks. A biopsy of the base of the tongue revealed a squamous cell carcinoma the lesion was positive for HPV 16. He had been practicing for 30 years, of which he spent 15 doing weekly laser ablations with a CO2 laser. He reported poor ventilation in this clinic space and subsequently moved to a different area where he performed loop electrosurgical excision procedures for the next 15 years. Once again, this patient may have contracted HPV through occupational laser plume exposure.

Discussion:

Squamous cell carcinomas are accountable for 90% of head and neck cancers.[1] In the absence of other risk factors, is it possible that the source of HPV infection could be due to occupational laser plume exposure. The potential for HPV transmission through laser plume has been explored by various authors. Two case reports describe HPV infection in two healthcare professionals regularly exposed to laser plumes in an occupational setting. Both reported no other risk factors or other possible exposures to the virus.[2,3] Furthermore, there is a significant increase in the incidence of nasopharyngeal warts in laser surgeons when compared to a control group.[4] HPV transmission and subsequent tumor growth has been demonstrated in bovines inoculated with laser plume produced by destruction of HPV-positive tissue.[5] This presents a strong argument in favor of HPV transmission through laser plume.

Conclusion:

This article reports on a case of HPV-16 positive oropharyngeal squamous cell carcinoma in two laser surgeons following occupational exposures to laser plumes. It is also recognized that HPV may be transmitted through laser plume. Therefore, long term occupational exposure to laser plumes may lead to HPV infection and oropharyngeal squamous cell carcinomas. It would thus seem prudent to reduce laser plume exposure amongst healthcare professionals. Existing protective methods such as standard mask and laser masks have been described as ineffective against viral pathogens.[6] Portable smoke evacuators should be used to reduce surgical smoke levels. The nozzle inlet should be kept within 2 inches of the surgical site and be kept ON at all times when the laser is in use.[7]

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