Commentary on: The Electric Household Chimney: A Cost Effective Alternative for Smoke Evacuator in the Operating Room

Ashique and Kaliyadan report use of electric household chimney as an economic alternative of smoke evacuator.[1] Surgical plume is generated when lasers and electrosurgery devices that are used to cut, coagulate or ablate tissue cause cells to heat and rupture leading to vaporisation of cellular contents into the air. It is well known that surgical smoke is hazardous to patients and surgical team members but yet, awareness about smoke evacuators is lacking. This is important as many surgical procedures in dermatology that emit smoke such as electrosurgery, radiofrequency procedures and lasers are carried out as ambulatory office procedures, where smoke evacuation facilities may not be available.

Tomita *et al.*,[2] showed that surgical smoke generated by electrosurgery devices was twice as harmful as the smoke generated by lasers and when inhaled, was equivalent to smoking six unfiltered cigarettes. It can cause burning and watering of the eyes, respiratory problems, nausea, and pathogenic contamination and regrowth of infective organisms such as human papilloma virus. The offensive odour in surgical smoke is caused by a wide variety of toxic gases which are inhaled. Some of these toxins such as benzene, toluene and formaldehyde are known carcinogens. A recent study by Tseng *et al.*,[3] established that abundant submicron particles and high concentrations of polycyclic aromatic hydrocarbons, which are known carcinogens were found in electrosurgery smoke during mastectomies, in a concentration that was 20-30 times higher than the environment. The size of the particulate matter is also important. Wearing a standard surgical mask can only filter particulate matter more than 5 μm in size. Thus most of the plume can easily pass through the mask and be deposited in the lungs. It has been shown that 77% of the particulate matter in the plume is less than 1.1 μm in size, which is not filtered by the surgical mask and can be inhaled, causing bronchitis, emphysema and chronic irritation.[4] Tseng *et al.*,[3] also found that most particles were in the size range of 0.3 to 0.5 μm, which can potentially penetrate through the medical masks into human respiration. The particulate matter can also contain viable bacteria and viruses. Hence there is a potential for transmission of diseases such as warts that are commonly treated by dermatologists.[5,6] A report of a surgeon developing laryngeal papillomatosis after using a laser to ablate condyloma on his patient, which was the same serotype, highlights the dangers of surgical smoke.[7] Baggish *et al.*,[8] detected the presence of the human immunodeficiency virus DNA in laser plume, which was positive on tissue culture in the tubing of the smoke evacuator.

The use of smoke evacuators as a routine practice is probably hindered by a lack of awareness and a comparative high cost of equipment. This article brings to focus the need of a smoke evacuator in a small set up with space constraints in a cost-effective way by using the common household electric chimney, an equipment that is routinely available.[1] In addition it may not always be possible to have an assistant to hold the standard smoke evacuators at all times. An advantage of the household chimney is that this stationary device does away with the requirement of an assistant. What is required are further studies to evaluate the effectiveness of this simple device and probably certain modifications and additions of better filters to make it safer. Other alternate options that can be utilised are the use of suction devices. The difference between the standard smoke evacuators and these devices is the efficiency of the system and the disposal of the smoke. Hence comparative studies should be done. The use of a smoke evacuation system should be made mandatory in all settings, whether the operation theatre or a clinic

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Niti Khunger

Department of Dermatology and Sexually-Transmitted Disease, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi, India

Address for correspondence:

Dr. Niti Khunger, Department of Dermatology and Sexually-Transmitted Disease, Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi-110 029, India. E-mail: drniti@rediffmail.com

where surgical smoke is generated in order to protect the health personnel and the patients.

REFERENCES

1. Ashique KT, Kaliyadan F. "Something Better Than Nothing" Using the House Hold Electric Chimney in the Procedure Room as an Attempt to Reduce the Smell and Biohazard. J Cutan Aesth Surg 2014;7:46-8.
2. Tomita Y, Mihashi S, Nagata K, Ueda S, Fujiki M, Hirano M, *et al*. Mutagenicity of smoke condensates induced by CO_2-laser irradiation and electrocauterization. Mutat Res 1981;89:145-9.
3. Tseng HS, Liu SP, Uang SN, Yang LR, Lee SC, Liu YJ, *et al*. Cancer risk of incremental exposure to polycyclic aromatic hydrocarbons in electrocautery smoke for mastectomy personnel. World J Surg Oncol 2014;12:31.
4. Mihashi S, Ueda S, Hirano M, Hirano M, Tomita Y, Hirohata T. Some problems about condensates induced by CO_2 laser irradiation. Karume Japan, Department of Otolaryngology and Public Health; 1975.
5. Hallmo P, Naess O. Laryngeal papillomatosis with human papillomavirus DNA contracted by a laser surgeon. Eur Arch Otorhinolaryngol 1991;248:425-7.
6. Sawchuk WS, Weber PJ, Lowy DR, Dzubow LM. Infectious papillomavirus in the vapour of warts treated with carbon dioxide laser or electrocoagulation: Detection and protection. J Am Acad Dermatol 1989;21:41-9.
7. Garden JM, O'Banion MK, Shelnitz LS, Pinski KS, Bakus AD, Reichmann ME, *et al*. Papillomavirus is the vapor of carbon dioxide laser-treated verrucae. JAMA 1988;259:1199-202.
8. Baggish MS, Poiesz BJ, Joret D, Williamson P, Refai A. Presence of human immunodeficiency virus DNA in laser smoke. Lasers Surg Med 1991;11:197-203.

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