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NOTE PREVIEW ARTICLE

PATHOGENS IN ELECTROCAUTERY SMOKE: CAUTERIZATION OF WARTS CAUSED BY THE HUMAN PAPILLOMA VIRUS

PATÓGENOS NA FUMAÇA DO ELETROCAUTÉRIO: CAUTERIZAÇÕES DE VERRUGAS CAUSADAS PELO PAPILOMA VÍRUS HUMANO

PATÓGENOS EN EL HUMO DE LA ELECTROCAUTERIZACIÓN: ABRASADOR DE VERRUGAS CAUSADAS POR EL VIRUS DEL PAPILOMA HUMANO

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ABSTRACT

Objective: to analyze the presence of pathogens in the smoke generated by electrocautery during the cauterization procedure of warts caused by the Human Papilloma Virus. ***Method:*** cross-sectional, descriptive study with a quantitative approach. Data will be collected through filters with the aid of a smoke cleaner and an instrument containing the sociodemographic characterization and the environment where the collection will be held. The data will be analyzed by the reaction method of polymerase chain and descriptive statistics, inferential and multivariate analysis. This study was approved by the Ethics Committee in Research of the State University of Londrina/UEL under CAE: 53181516.7.0000.5231. ***Expected results:*** to identify possible pathogens present in the smoke that could expose workers to risks during the execution of the procedure. Assist the service in the pursuit of strategies aimed at implementation of measures for protection of these professionals. ***Descriptors*:** Virus; Bacteria; Cauterization; Surgical Smoke.

RESUMO

Objetivo*:** analisar a presença de patógenos na fumaça gerada pelo eletrocautério, durante o procedimento de cauterização de verrugas causadas pelo vírus Papiloma Vírus Humano. ***Método*:** estudo transversal, descritivo, com abordagem quantitativa. Os dados serão coletados por meio de filtros, com auxílio de um aspirador de fumaça e de um instrumento, contendo a caracterização sociodemográfica e do ambiente onde será realizada a coleta. Os dados serão analisados pelo método de reação em cadeia da polimerase e por estatística descritiva, inferencial e análise multivariada. Este estudo foi aprovado pelo Comitê de ética em pesquisa da Universidade Estadual de Londrina/UEL sob CAE: 53181516.7.0000.5231. ***Resultados esperados*:** identificar possíveis patógenos presentes na fumaça que possam expor o trabalhador a riscos durante a execução do procedimento. Auxiliar o serviço na busca de estratégias que visem à implantação de medidas para proteção desses profissionais. ***Descritores: Vírus; Bactérias; Cauterização; Fumaça Cirúrgica.

RESUMEN

Objetivo: analizar la presencia de patógenos en el humo generado por la electrocauterización durante el procedimiento de cauterización de verrugas causadas por el virus de papiloma humano. ***Método:*** estudio transversal, descriptivo con enfoque cuantitativo. Los datos se recogerán a través de los filtros con una aspiradora de humo y de un instrumento, que contiene la caracterización demográfica y del medio ambiente donde se llevará a cabo la coleta. Los datos se analizaron por el método de reacción en cadena de polimerasa y por la estadística inferencial y descriptiva, análisis multivariado. Este estudio fue aprobado por el Comité de ética de investigación de la Universidade Estadual de Londrina/UEL bajo el PPA: 53181516.7.0000.5231. ***Resultados esperados:*** identificar posibles agentes patógenos presentes en el humo que puedan exponer el trabajador a los riesgos durante la ejecución del procedimiento. Asistir al servicio en la búsqueda de estrategias dirigidas a la aplicación de medidas para la protección de estos profesionales. ***Descriptores*:** Virus; Bacterias; Cauterización; Humo Quirúrgico.

INTRODUTION

The Human Papilloma Virus (HPV) is a sexually transmitted disease (STD) growing fast in recent years, among men and women in the sexually active age, and the most diagnosed STD between 1998 and 2001 and its incidence has increased over the years, with the Human Immunodeficiency Virus (HIV) .[1] Condom use is not common in adolescents who start early sex life, especially in the age group of 15 to 19 years.[2]

There are several treatment modalities for HPV, including topical medications, that are known as treatment by chemical method. Among the topical medications, trichloroacetic acid (TAA) is effective in mucosal lesions, but has limitations in keratinized skin.[3] Other forms of treatment for this viral disease are surgical ablation, as electrocoagulation (excision and laser therapy), methods made with electrocautery. This topical disease has a high incidence of recurrence, as in the case of large and multicentric warts, which are resistant to drug treatment.[1]

Since its an effective method, the use of electrocautery has been growing gradually and with it the concern for the safety of professionals and patients exposed to this technique. Air contaminants generated by the use of electrocautery may form during the interruption of tissue cells by heat. This procedure causes the release of plume that may contain viable bacteria, viruses, cell debris, particles, harmful and toxic aerosols, gases, vapors or fumes.[4]

The electrocautery used at low temperatures generates the tissue vaporization producing bioaerosols that comprise biohazards. Such biological pollutants are suspended in a large number of particles, including intact cells, debris or blood cells may contain bacteria or viruses such as tuberculosis mycobcterium, HIV, hepatitis B virus (HBV), hepatitis C virus (HCV) and HPV producing a risk of infection to workers that is still not quantified for workers.[5]

The smoke produced by electrocautery is constituted by a mixture of extremely diverse chemicals in the form of gas, vapor and particulate components where the generated pollutants can be present as organic pollutants, inorganic and organic, and can create dangerous effects, local or systemic, reversible or irreversible to those using this technology.[5]

At high concentrations, the smoke causes eye irritation and the upper airways may create visual and respiratory problems for the professional.[5] Although there is no documented transmission of infectious diseases through surgical smoke, the potential exists to generate infectious viral fragments, particularly after the treatment of venereal warts.

In general, there are two techniques to protect exposed workers, including the use of appropriate personal protective equipment (PPE), that is to use the N95 mask and goggles. It is emphasized that the use of common surgical masks, routinely used in clinical practice, protects the worker from transmission fluids, contamination of the sterile environment and contamination between patients for two hours maximum, however, the same mask is not able to filter the smoke produced by the use of electrocautery, allowing up to 80% of the particles exhaled to have direct contact with the worker.[6]

Another form of protection is in relation to room ventilation, which is the most important, or local exhaust, or a combination. Local exhaust may include spillways smoke or suction systems in the wall.[4] Portable smoke weirs require appropriate filters and absorbents. The most commonly used are the air with ultra low penetration (ULPA) and high efficiency particulate filter (HEPA) .[4]

The use of a ventilation systems as exhaust pipe and adequate ventilation is indispensable in operating theaters and surgical centers using electrocautery as recommended by the Association of Perioperative Registered Nurses (AORN).[7] These air extraction systems can reduce the number germs in the air, particles and at the same time to evacuate the heat generated and any hazardous substances emitted.[7] But in practice such measures are not applied in most outpatient settings, the procedures are performed only with the use of PPE. There is debate about whether smoke weirs is effective in collecting debris generated by smoke generating devices.

Surgical smoke contains toxic gases and vapors such as cyanide and formaldehyde, as well as bacteria and viruses contaminants.[5] Therefore, in addition to a smoke evacuation system, team members should wear masks with high filtration of particles filter as a second line of defence.[8]

The worker exposed to this situation is in a real biological risk. However, after a systematic search with a protocol formulated

through elements of PICC (population, intervention, comparisson and closing) strategy,[9] it was possible to find only one article with exploratory methodology that describes the presence of HPV in the smoke of electrocautery during the laser cauterizarion procedure.[10]

That same literature search was not possible to identify studies that include other pathogens which can be found in suspension after use of electrocautery in venereal warts, which justifies this study.

OBJECTIVES

● To analyze the presence of pathogens in the smoke generated by electrocautery during the cauterization procedure of warts caused by the Human Papilloma Virus.

MÉTHOD

A cross-sectional, descriptive study with a quantitative approach will be carried out, with patients treated at the referral center for contagious infectious diseases in a city in northern Paraná from April to July 2016.

Inclusion criteria is to be male, have medical indication for the cauterization procedure of venereal warts in the institution and exclusion criteria: patients undergoing treatment of cauterization of venereal warts by chemical method.

The smoke generated by electrocautery will be collected during the cauterization procedures of warts caused by HPV. For purposes of the survey two smoke vacuums will be used. The filters used in the vacuum will be analyzed by PCR method of reading and the data will be analyzed using the *Statistical Package for the Social Sciences* / SPSS, version 20.0, using inferential descriptive statistics, and multivariate analysis.

The ethical guidelines established in Resolution No. 466/2012 of the National Health Council will be followed, which establishes parameters for research involving humans. Thus, participants will be duly informed according to the objectives highlighting the secrecy related to information obtained in the questionnaires, respecting the autonomy of individuals, respecting their decision to participate or not in this study. The research project was approved by the Research Ethics Committee, under CAAE: 53181516.7.0000.5231.

EXPECTED RESULTS

When identifying which pathogens are present in the smoke generated by electrocautery during the cauterization procedure of venereal warts caused by HPV is to establish with the service measures to minimize worker exposure and consequently the possible complications from inhaling the smoke generated during these procedures , establishing regulations for the proper use of PPE.

REFERENCES

1. Nadal SR, Manzione CR, Horta SHC, Calore EE. Sistematização do Atendimento dos Portadores de Infecção Perianal pelo Papiloma virus Humano (HPV). Rev Bras Coloproct [Internet]. 2004 [cited 2015 Nov 15]; 24(4):322-8. Available from: http://www.sbcp.org.br/revista/nbr244/P322_328.htm

2. Araújo EC de. Vulnerabilidade dos adolescentes frente ao HIV/aids (Editorial). Rev enferm UFPE on line [Internet]. 2016 Feb [cited 2016 June 12];10(supl. 2). Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/9577/pdf_9802

3. Federação Brasileira das Sociedades de Ginecologia e Obstetrícia. Papiloma vírus humano (HPV): diagnóstico e tratamento. São Paulo: Febrasgo; 2002. (PRINTED).

4. Bargman H. Laser generated Airborne Contaminants. J Clin Aesthet Dermatol [Internet]. 2011 Feb [cited 2015 Oct 21];4(2):56–7. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3050618/pdf/jcad_4_2_56.pdf

5. Eickmann IU, Falcy M, Fokuhl I, Rüegger M, Bloch M, Merz B. Surgical smoke: risks and preventive measures [Internet]. Germany: ISSA; 2012 [cited 2015 Nov 12]. Available from: http://prevencion.umh.es/files/2012/04/2-surgical_smoke.pdf

6. Bałazy A, Toivola M, Adhikari A, Sivasubramani SK, Reponen T, Grinshpun SA. Do N95 respirators provide 95% protection level against airborne viruses, and how adequate are surgical masks? Am J Infect Control [Internet]. 2006 Mar [cited 2015 Dec 11];34(2):51-7. Available from: http://www.ajicjournal.org/article/S0196-6553(05)00911-9/pdf

7. Castelluccio D, Association of Perioperative Registered Nurses. Implementing AORN Recommended Practices for Laser. AORN J. 2012 May;95(5):612-24. (PRINTED)

8. Ball K. Surgical smoke evacuation guidelines: compliance among perioperative

nurses. AORN J. 2010 Aug; 92(2):e1-23. (PRINTED)

9. Santos CMC, Pimenta CAM, Nobre MRC. A estratégia PICO para a construção da pergunta de pesquisa e busca de evidências. Rev latinoam enferm [Internet]. 2007 May/June [cited 2015 Nov 16];15(3):508-11. Available from: http://www.scielo.br/pdf/rlae/v15n3/v15n3a23.pdf

10. Ferenczy A, Bergeron C, Richart RM. Human papillomavirus DNA in CO2 laser generated plume of smoke and its consequences to the surgeon. Obstet Gynecol [Internet]. 1990 Jan [cited 2015 Dec 12];75(1):114-8. Available from: https://www.surgimedics.com/Research%20Articles/Laser%20Plume/Human%20Papillomavirus%20DNA%20in%20CO2%20Laser%20Generated%20Plume%20Of%20Smoke.pdf

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