

Harmful gases including carcinogens produced during transurethral resection of the prostate and vaporization.

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Source

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Abstract

OBJECTIVE:

To determine the chemical composition of surgical smoke produced during transurethral resection of the prostate (TURP) and vaporization.

METHODS:

A total of 12 smoke samples were collected from a continuous irrigation suction drainage system to a Tenax absorber at a 0.05L/min flow rate during TURP and vaporization. The gases were quantitatively and qualitatively analyzed by gas chromatography-mass spectrometry (GC-MS) equipped with a purge and trap sample injector.

RESULTS:

The main chemical constituents of surgical smoke produced during TURP and vaporization include propylene, allene, isobutylene, 1,3-butadiene, vinyl acetylene, mecaptomethane, ethyl acetylene, diacetylene, 1-pentene, EtOH, piperylene, propenylacetylene, 1,4-pentadiene, cyclopentadiene, acrylonitrile and butyrolactone. Three of the constituents are very toxic and carcinogenic (1,3-butadiene, vinyl acetylene and acrylonitrile). The amount (mean±standard deviation) of chemical components in the 45L of gas and room air mixture produced during TURP and vaporization were as follows: propylene, 0.80±0.52mg; isobutylene, 212.85±75.65mg; 1,3-butadiene, 0.93±0.34mg; ethyl acetylene, 0.09±0.05mg; 1-pentene, 6.75±1.62mg; 1,4-pentadiene, 0.06±0.02mg; and acrylonitrile, 1.62±1.19mg.

CONCLUSIONS:

Three of the toxic gases generated during TURP and vaporization are carcinogens (1,3-butadiene, vinyl acetylene and acrylonitrile). Therefore, higher quality filter masks, smoke evacuation devices and/or smoke filters should be developed for the safety of the operating room personnel and patients during TURP and vaporization.

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