

Brüske-Hohlfeld I, Preissler G, Jauch KW, Pitz M, Nowak D, Peters A and Wichmann HE (2008). "Surgical smoke and ultrafine particles". Journal of Occupational Medicine & Toxicology; 3, 31.

LINK - <https://www.ncbi.nlm.nih.gov/pubmed/19055750>

Abstract

BACKGROUND:

Electrocautery, laser tissue ablation, and ultrasonic scalpel tissue dissection all generate a 'surgical smoke' containing ultrafine (<100 nm) and accumulation mode particles (< 1 µm). Epidemiological and toxicological studies have shown that exposure to particulate air pollution is associated with adverse cardiovascular and respiratory health effects.

METHODS:

To measure the amount of generated particulates in 'surgical smoke' during different surgical procedures and to quantify the particle number concentration for operation room personnel a condensation particle counter (CPC, model 3007, TSI Inc.) was applied.

RESULTS:

Electro-cauterization and argon plasma tissue coagulation induced the production of very high number concentration (> 100000 cm⁻³) of particles in the diameter range of 10 nm to 1 µm. The peak concentration was confined to the immediate local surrounding of the production side. In the presence of a very efficient air conditioning system the increment and decrement of ultrafine particle occurrence was a matter of seconds, with accumulation of lower particle number concentrations in the operation room for only a few minutes.

CONCLUSION:

Our investigation showed a short term very high exposure to ultrafine particles for surgeons and close assisting operating personnel - alternating with longer periods of low exposure.