

Clinical Article Summary

Prospective randomized study evaluating the usefulness of a surgical smoke evacuation system in operating rooms for breast surgery

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ABSTRACT

Background:

A prospective randomized study was conducted to evaluate surgical smoke evacuation system in terms of reducing the quantity of environmental pollutants found in operating room air and reducing the occupational exposure of doctors and nurses involved in surgical procedures to surgical smoke, volatile organic compounds, formaldehyde, etc.

Method:

Operating room environment conditions with and without the use of a surgical smoke evacuation system were measured. CONMED's Aer Defense was used with 3-part filter including ULPA filtration. Levels of formaldehyde, acetone, acetaldehyde, dust, temperature, and humidity were measured at 1.5 m and 3.5 m. Additionally, personal exposure levels of doctors and nurses involved in surgical procedures were also surveyed by attaching sterile monitor to chest. Use of the evacuation system was determined randomly, and the procedures involved were breast-conserving surgery and mastectomy, which were treated as stratification factors.

Results:

TVOC concentration significantly elevated in group that did not use the smoke evacuator. TVOC concentration intermittently peaked three times to greater than 3000 ug/m³ throughout the procedure. The Ministry of Health, Labour, and Welfare's recommendations for upper limits of indoor TVOC's is 400/ug/m³. The findings were similar for formaldehyde concentration. Multiple regression analysis for healthcare professionals' personal exposure levels showed that the evacuation system was a factor that significantly impacted their formaldehyde and acetaldehyde personal exposure levels, which were greatly reduced by the use of the system.

Conclusion:

This study's findings demonstrate the effectiveness of the evacuation systems, which should increase awareness that their benefits take priority over the drawbacks.

KEY TAKEAWAY:

- Total volatile organic compounds in the OR were significantly lower with the use of a smoke evacuator
- Formaldehyde concentrations were significantly lower when smoke evacuator was used.
- Healthcare professionals' personal exposure to these substances was significantly lower when a smoke evacuator was used intraoperatively.



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