



KEY POINT SUMMARY

OBJECTIVES

The objective of this research was to evaluate the impact of HEPA-filtered air conditions, either turbulent or directed by (vertical) laminar airflow on surgical site infection rates in orthopedic and abdominal procedures.

DESIGN IMPLICATIONS

Rates of surgical site infections were seen to be higher in ORs having HEPA-filtered laminar airflow ventilation. It may be noted that the study did not take into consideration all factors that may have impacted the rate of SSI.

Operating room ventilation with laminar airflow shows no protective effect on the surgical site infection rate in orthopedic and abdominal surgery

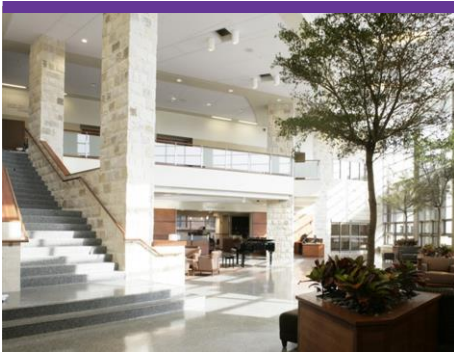
Brandt, C., Hott, U., Sohr, D., Daschner, F., Gastmeier, P., & Rüden, H. 2008 | *Annals of Surgery*. Volume 248, Issue 5, Pages 695-700

Key Concepts/Context

Operating rooms (ORs) in hospitals of different countries use ventilation systems to assist with the prevention of surgical site infections (SSIs). The authors cite literature to show that adequate evidence does not exist to support the use of expensive ventilation systems in preventing SSIs. For this research, infection surveillance data collected for the German National Nosocomial Infections Surveillance System was analyzed to study the influence of open, vertical laminar airflow OR ventilation on the occurrence of SSI in several large hospitals. The study found that this type of ventilation was not helpful in preventing SSIs; it was, in fact, associated with increased risk for SSI in the case of hip prosthesis.

Methods

This was a retrospective cohort study of data gathered and reported between 2000 through 2004. Data on SSIs was gathered and reported by surgical departments of hospitals participating in the German National Nosocomial Infections Surveillance System. A questionnaire on OR ventilation techniques was provided to the infection control teams responsible for the collection and reporting of data. The OR surgical departments were categorized into three groups - (i) those without artificial ventilation, i.e., natural ventilation by windows; (ii) those with conventional turbulent ventilation with HEPA-filtered air, and (iii) those with HEPA-filtered laminar airflow ventilation. Given the low number of departments with natural ventilation, only data from departments with artificial ventilation was analyzed for this study. There were six surgical procedure categories included in the study. Since the data set also had several hospital- and patient-based variables, it was possible to control for possible confounders. Univariate and multivariate analysis of both the surveillance and the questionnaire data was conducted. Analyses were conducted



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for all SSIs and subsequently for severe SSIs. Data was gathered from 63 surgical departments from 55 hospitals, where a total of 99,230 operations had been performed and a total of 1901 SSIs were reported.

Findings

The study found that

- As compared to turbulent clean air, it was found that there were higher rates of SSI where ORs used laminar airflow during procedures for all procedures except colon surgery.
- The differences in the SSI rates were statistically significant in the case of hip prosthesis ($P < 0.001$), but not for the other procedures.
- Severe SSI after hip prosthesis was higher under laminar airflow.

Limitations

The authors identify the following limitations to this study:

- This study is based on established surveillance data – there may be several confounding variables that could have influenced the objective of the study.
- Some patient-based factors were not available in the data set.
- Perioperative management details that may have impacted the rates of SSI and could have possibly affected the results of the study were not considered.

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