Airborne bacteria in hospital operating rooms during ongoing surgery

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Sie haben Ihr Abstract als **freier Beitrag** in **Englisch** mit folgendem Inhalt eingereicht:

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Abstract

Introduction
Post-operative infections obtained from open-wound surgeries constitute an unnecessary load on both healthcare and affected patients. It is well established that increased air cleanliness reduces the number of post-operative infections. Therefore, the ventilation system is important in order to reduce the number of infectious particles in the air during surgery. Ventilation with high airflow, as in operating rooms, consumes a high amount of energy and it is thus desirable to find energy efficient solutions. The purpose of this work is to evaluate air quality, energy efficiency and working environment comfort for three different ventilation techniques in operating rooms.

Method
The newly developed ventilation system temperature controlled airflow (T_cAF) was compared with the conventionally used turbulent mixed airflow (TMA) and laminar airflow (LAF). In total, 750 air sample measurements were performed during 45 orthopaedic operations: 15 for each type of ventilation system [1]. The concentration of colony forming units (CFU)/m^3 was measured at three locations in the rooms: close to the wound (<0.5 m), at the instrument table and peripherally in the room. The working environment comfort was evaluated in a questionnaire.

Results
Our study shows that both LAF and T_cAF maintains CFU concentrations in the air during ongoing surgery significantly below 10 CFU/m^3 at the wound and at the instrument table, and for T_cAF also in the periphery of the room, see Table 1. The median CFU concentration in TMA was at or above 10 CFU/m^3 at all locations. T_cAF used less than half the airflow to that of LAF, resulting in a 28% reduction in energy consumption. The working environment comfort was perceived less noisy and having less draft in the T_cAF than the LAF ventilation.

Table 1. Concentration of airborne bacteria measured in CFU/m^3 at three locations in the room, reported as median (lower quartile-upper qurtile).

Measurement location	TMA	LAF	T_cAF
Wound	10 (6-25)	0 (0-0)	1 (0-4)
Instrument table	22 (10-35)	0 (0-0)	3 (2-6)
Peripherally in the room	17 (13-28)	9 (5-17)	5 (3-10)

Summary
Both the LAF and T_cAF ventilation maintain high air cleanliness with low CFU concentrations throughout the operation. TMA is less efficient in removing bacteria from the air close to the patient.

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References
[1] Alsved, M., et al. (2017). Temperature controlled airflow ventilation in operating rooms compared with laminar airflow and turbulent mixed airflow. J Hosp Infect. Online: http://dx.doi.org/10.1016/j.jhin.2017.10.013.

Conflict of Interest

Peter Ekolind is the CEO of Avidicare AB

Rahmenthemen

Krankenhausbau, Umwelthygiene