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Ultraviolet lighting during orthopaedic surgery and the rate of infection.

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Abstract

BACKGROUND:

Ultraviolet lighting is an alternative to laminar airflow in the operating room that may be as effective for lowering the number of environmental bacteria and possibly lowering infection rates by killing the bacteria rather than simply reducing the number at the operative site. The purpose of the present study was to compare the infection rates following joint replacement procedures performed by one orthopaedic surgeon with and without the use of ultraviolet lighting.

METHODS:

From July 1986 to July 2005, one surgeon performed 5980 total joint replacements at one facility. In September 1991, ultraviolet lighting was installed in the operating rooms. All procedures that were performed before the installation of the ultraviolet lighting utilized horizontal laminar airflow, whereas all procedures that were performed after that date utilized ultraviolet lighting without laminar airflow. Factors associated with the rate of infection were analyzed.

RESULTS:

Over a nineteen-year period, forty-seven infections occurred following 5980 joint replacements. The infection rate without ultraviolet lighting (and with laminar airflow) was 1.77%, and the infection rate with ultraviolet lighting was 0.57% ($p < 0.0001$). The odds of infection were 3.1 times greater for procedures performed without ultraviolet lighting (and with laminar airflow) as compared with those performed with only ultraviolet lighting ($p < 0.0001$). The infection rate associated with total hip replacement decreased from 1.03% to 0.72% ($p = 0.5407$), and the infection rate associated with total knee replacement decreased from 2.20% to 0.50% ($p < 0.0001$). Revision surgery, previous infection, age, total body mass index, use of cement, disease, and diagnosis were not associated with an elevated infection rate.

CONCLUSION:

When appropriate safety precautions are taken, ultraviolet lighting appears to be an effective way to lower the risk of infection in the operating room during total joint replacement surgery.

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