Primary Arthroplasty

Contamination Relative to the Activation Timing of Filtered-Exhaust Helmets

Andrew E. Hanselman, MD *, Michael D. Montague, MD, Timothy R. Murphy, MD 1, Matthew J. Dietz, MD

Department of Orthopaedics, West Virginia University, Morgantown, West Virginia
Introduction:

Although the use of filtered exhaust surgical helmets is common place in joint replacement surgery there ability to prevent infection has not been established.

Additionally some have suggested that they in fact increase the potential of contamination during surgery.

Hypothesis:

“Our first hypothesis was that airflow from the filtered-exhaust helmet would lead to widespread dispersion of fluorescent particles in a surgical draping scenario. Our second hypothesis was that activation of the airflow system on a filtered-exhaust helmet before complete surgical gowning would lead to increased contamination of the surrounding surgical environment. “
Materials and Methods:

Part I: The authors used a UV fluorescent powder to represent contaminants
  - One tablespoon was applied to the top of the helmet at the intake and the helmet was run for 30 seconds
  - The particles were allowed to settle for 30 minutes

Part II: Helmet is applied to the surgeon and the UV powder is applied to the helmet.
  - Control Group: helmet is activated before gowning (4X)
  - Experimental Group: helmet is activated once gowning is completed (4X)

UV light was used to analyze particle spread “contamination”
Results:

- Spray Pattern: up to 5 feet in front of helmet
- Airflow activation timing:
  - UV light was used to score for contamination in 6 regions of the surgeon's gown
  - Control group had contamination potential score of 6/6
  - Experimental group had a contamination potential score of 0/6
Discussion/Conclusion:

- Study does demonstrate a statistically significant decrease in contamination potential
- “Delaying airflow activation until after complete surgical gowning is a simple step that requires minimal alteration of current practices.”

Limitations:

- Study did not evaluate for actual bacterial contamination
- No laminar flow in the OR used for the study
- Did not study actual infection rates
THANK YOU