Health Effects of Perisept in Operating Room Workers

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Sentinel Health Event

57 yo F OR RN and 30 yo F OR surgical tech presented to the Occupational Medicine clinic with upper and lower respiratory symptoms, mucus membrane and skin irritation, and headaches that were worse at work and improved away from work

- Nasal congestion and irritation
- Sore throat
- Itchy, irritated eyes
- Pruritis
- Cough, Shortness of breath, Chest tightness
- Lightheadedness, Headaches
History

Symptom onset after change in protocol to use Perisept

OR team new duty: cleaning ORs to decrease HAIs

Terminal cleaning: ceiling, walls, all surfaces

Cleaning in one OR triggered the most symptoms

Some workers continued to use old wipes while others used Perisept
History, PE, and A/P

PPE: nitrile gloves and N95 mask

PE: oropharynx erythematous posteriorly; cobblestoning
  • edematous nasal mucosa b/l
  • cervical LAD b/l
  • otherwise unremarkable

A/P: Irritation likely d/t Perisept
  • Modified duty to include no use of Perisept for one week
Steps taken

• Safety officer informed
• Safety goggles and proper gloves (neoprene or rubber) ordered
• Education by company on dilution and use
Two weeks later

34 yo F OR RN with six weeks of
- Persistent sore throat
- Daily worsening headaches
- Decreased endurance
- Inability to catch her breath
- Improvement of s/s away from work

Symptoms started with use of Perisept to clean OR

PPE: N95 and neoprene gloves
Exam

PE: hyperemic nasal turbinates otherwise unremarkable

Spirometry: FEV/FVC wnl, but tracing shows pattern of plateau near the beginning of exhalation c/w vocal cord dysfunction (VCD)
Assessment and Plan

A: Vocal Cord Dysfunction and new daily persistent headache due to use of Perisept

P: Only participate in two cleanings per shift and only use Perisept with proper PPE
Independent Medical Exam

Conclusion: Her VCD was due to use of Perisept

Recommendations at the worksite:
- N99 mask
- Neoprene or rubber gloves
- Proper splash goggles
IH Investigation Results

One personal sample collected in OR during terminal cleaning was half the ACGIH 15 minute STEL (0.2 ppm).

Ventilation issue, resolved
F/U personal sample 0.09 ppm

When terminal cleaning occurred, potential for exposure of at least half of the Peracetic acid ACGIH STEL of 0.4ppm

Amending cleaning procedure by not cleaning the floors with Perisept resulted in less exposure to Peracetic acid

Clean floors with an alternative cleaning product when a patient does not have confirmed C-Difficile
Perisept

Peracetic acid (PAA): Highly reactive, unstable, corrosive oxidizer

Perisept:
- Diluted combination of PAA, hydrogen peroxide, and acetic acid
- Sporicidal disinfectant
- Kills C. Difficile
- Industrial use:
  - Healthcare, meat-packing, daycares, and the food and beverage industry
Perisept

Difficult to measure
No standardized method for PAA

• REL: none
• PEL: none
• ACGIH TLV-STEL: 0.4 ppm
• Draft IDLH: 0.64 ppm
Safety Data Sheet

PPE:
Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection
Hand protection: Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Other: Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Chemical respirator with organic vapor cartridge.

Studies of Perisept

Few studies have evaluated cleaning workers’ full-shift exposures to cleaning fluids and disinfectants as well as reported respiratory symptoms.

Few studies of hospital workers exposed to disinfectant composed of HP, PAA and AA.
French study

Case study by Emmanuelle Cristofari-Marquand et al, 2007: Asthma caused by peracetic acid-hydrogen peroxide mixture

- 48 yo M & 47 yo F nurses who sterilized endoscopic equipment with a combination of PAA & HA
- Developed cough, wheezing and shortness of breath after being exposed to PA-HP vapors
- Serial PEF of subject 1 and an inhalation challenge test of subject 2 suggested that PAA-HA mixture can induce occupational asthma
2018 NIOSH health hazard evaluation examined symptoms and exposures associated with use of a sporicidal agent containing hydrogen peroxide (HP), peracetic acid (PAA), and acetic acid (AA) in a hospital. Despite measured levels that were below limits of detection, workers had symptoms of sneeze, itchy, burning, runny nose, eye irritation, burning, dry or sore throat, chest tightness, shortness of breath, and difficulty breathing.
Limitations of study

- Small sample size
- Likely that exposures are higher than recorded
- No objective data
  - Absence of physiological confirmation of symptoms
- Pilot study, building block for subsequent studies
Conclusions

• We lack exposure limits for these chemicals and need to develop them

• Perisept likely presents health issues at levels lower than previously thought

• The health of workers is being jeopardized

• More specific PPE information needed in SDS
Final Question

How do you balance protecting patients from HAI while protecting the workers who protect the patients?
References


