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JCI Whitepaper Summary

MEDICAL SUCTION AND FLUID WASTE MANAGEMENT: RISKS AND HOW TO MITIGATE THEM

SAFETY FIRST

Precious life – Progressive care

INTRODUCTION

Medical suction and fluid waste management have rapidly evolved over the last decades and have become integral to patient care. Their uses are manifold, for example clearing airways and draining fluids during surgery, or resuscitating critically ill patients. This is a summary, based on the JCI white paper “Medical Suction and Fluid Waste Management,” that provides a high-level overview of the risks associated with medical suction and fluid waste management systems and provides recommendations to both caregivers and purchasers.

Medical suction and fluid waste management

Medical suction systems rely on the concerted action of multiple components to achieve therapeutic function. They consist primarily of three components: the vacuum source (i.e. electronic pump or vacuum regulator), reusable jars or disposable liners (e.g. Medela DCS solutions), and the suction tubing that connects all the components. Tight monitoring of the safe use of the entire system, and especially the power of the vacuum, is crucial to ensure patient safety.

According to the World Health Organization (WHO), improperly managed medical waste can put patients, staff, and community members at risk of infection, toxicity, and environmental damage or contamination.

Adverse events – medical suction and fluid waste handling

Several main causes for adverse events have been identified:
The primary cause of adverse events is human error. Common sources for human error are a lack of skill and knowledge for correct operation of the devices, the use of different units for measuring and reporting vacuum pressure, negligence, and unsafe design or manufacturing of medical suction devices and fluid collection systems.
A second cause of adverse events is excessive negative pressure. It can result in tissue damage, such as trauma to the upper airways, vital organs, or blood vessels.
Another common source of suction-induced adverse events are infections, either related to the use of contaminated medical suction or fluid collection devices, or to the exposure to infectious and/or hazardous fluid waste throughout the collection and disposal process.

RECOMMENDATIONS

Clear and concise practice guidelines for medical suction and recommendations on managing fluid waste or evidence-based purchasing are crucial in order to improve patient and workplace safety. Existing international and regional standards have to be complied with, like ISO 10079-3:2014.

How to optimize medical suction

- Medical suction procedures must only be performed by qualified and trained staff, who are familiar with all the regulations and the equipment at hand. Staff must also be aware of the possible hazards and complications and how to react in such situations.
- It is important to regularly monitor and maintain the entire suction system. Any malfunctions must be addressed immediately. In addition, backup suction devices need to be available in all patient care areas.
- To minimize errors, conversion charts for the different vacuum scales should be used.
- Low noise level devices help minimize distraction and miscommunication. Light-weight systems are also beneficial in reducing health exposure to the staff.

- Today's surgical procedures often generate surgical smoke, consisting of carcinogenic and neurotoxic compounds. A medical suction unit with embedded smoke protection filter or a smoke evacuator for bigger amounts of smoke, high filtration masks, and proper operating room ventilation are recommended to address this potential workplace hazard.

How to optimize infection control

- Fifteen percent of all medical waste must be considered hazardous or infectious. Fluid waste should only be collected and disposed of by certified experts. Education and training of all involved personnel are crucial to prevent cross-contamination and healthcare-associated infections.
- If reusable systems are used, all components must be cleaned and disinfected frequently – more often in high-risk areas. When draining fluids down the sanitary sewer, wearing full protective equipment is required to avoid exposure to droplets or aerosols.
- Single-use and other disposable items must be disposed of as per all relevant regulations. Prepacked disposable liners (like the Medela DCS liners) with solidifier reduce the possibility of exposure or contamination from spilling or droplets. Disposable suction tubing and suction tips should be discarded after every patient use or, when used for the same patient, after 24 hours.

How to optimize evidence-based purchasing

- Evidence-based purchasing of any medical suction and fluid collection system plays a key role in optimizing safety and efficacy. Decision-makers must be aware of the implications, efficiency, and environmental hazards when purchasing medical fluid handling systems.
- The purchased systems must conform to international standards for safety and efficacy like the ISO 10079-3:2014 and include infection prevention features, such as biofilters or overflow protection. Low noise levels are also of importance, as previously mentioned.
- Fluid waste management is a major factor in purchasing decisions. According to local regulations, the disposal of the fluids can be done in four ways: into biohazard waste, traditionally by draining it down the sanitary sewer; using disposable liners with or without solidifier; or pumping it directly to the sink.
- Cost-based decisions on whether to purchase reusable vs. single-use systems should be determined after a full risk-benefit analysis. This includes consideration of the reduced exposure risk and simple handling that is associated with newer disposable fluid collection systems, and the direct implications on staff workflow that are associated with the time spent on individual tasks such as collecting, transporting and cleaning or disposing of components.

CONCLUSION

Medical suction and fluid waste management have become widespread in healthcare. Both processes are associated with a number of potential risks to the patient, the involved staff – clinicians, infection preventionists, and service staff – as well as the environment. Therefore, clear-cut standards and guidelines, as well as thorough training of all involved healthcare providers are needed to ensure optimal safety and efficacy. Already in the purchasing process, a full risk-benefit analysis should be made for fluid collection systems, taking into account directly involved product and workflow costs as well as the less tangible costs like staff exposure to infections or noise.

The Medela single-packaged liners

The Medela DCS jars and liners

COMMON MISBELIEFS: FACT-CHECKED

Common Belief	Facts & Recommendations
There are no clear guidelines on optimal pressure per application	**Nasotracheal** Neonates/infants: 80~100 mmHg, Children: 100–120 mmHg Adults: 100–150 mmHg **Endotracheal** Neonates: 88–100 mmHg, Adults: < 150 mmHg **Pleural Drainage** Less than 75 mmHg (7–10 kPa) **Anesthesia Suction & Surgical Field Suction** No published standards
There is no instrument to lower the exposure and contamination of fluid waste	Fluid waste can be disposed of by adding a solidifying agent. This process adds extra cost, but reduces the risk of exposure or contamination. Once completely solidified, the waste in the container can be disposed of as either regulated or nonregulated medical waste per local regulation or ordinance. Disposable liners can decrease the risk of exposure to contaminated waste, associated with manual disposal of waste and cleaning/disinfection of the reusable container. Liners minimize the risk of spillage and cross-contamination.
Medical suction and fluid collection systems are not frequently contaminated and do not become a source of infection	There are multiple epidemiologic studies linking suctioning, suction apparatus, and healthcare-associated infections. The individual components of medical suction and fluid collection systems are frequently contaminated and may become the source of infection. The overall risk of infection due to collected fluids is high if each component of the system is not managed or maintained well, and not thoroughly disinfected or sterilized after every use.
Options to reduce surgical smoke in the OT/OR environment are limited	Surgical smoke may contain carcinogenic and neurotoxic compounds. The use of a smoke evacuator, a disposable liner with pre-installed smoke protection filter, high filtration masks, and proper operating room ventilation are recommended to address this potential workplace hazard.

Summary based on

"Medical Suction and Fluid Waste Management: Patient and Workplace Safety Considerations for Health Care Organizations"

A White Paper by Joint Commission International Published in August 2017

Download the whitepaper here

http://www.jointcommissioninternational.org/news/white-papers/

Find out more about Medela DCS at

https://www.medela.com/healthcare/products/fluid-collection/disposable

Medical Vacuum Technology for Healthcare Professionals

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