

EVALUATION OF LARYNGOSCOPES DECONTAMINATION PRACTICES IN DIFFERENT HOSPITALS

Maqsood Ahmad, Wajahat Hussain*, Muhammad Saqib***, Amer Saleem**

Pakistan Naval Station Rahat Hospital Karachi, *District Headquarter Hospital Attock, **Pakistan Institute of Medical Sciences Islamabad, ***Pakistan Air Force Hospital Shorkot

ABSTRACT

Objective: To find disinfection and sterilization practices of laryngoscope in different hospitals.

Study Design: Descriptive study.

Place and Duration of Study: Combined Military Hospital Gujranwala, from Jan 2010 to Jan 2011.

Material and Methods: Laryngoscope decontamination practices in different hospitals were evaluated in this study which was based on a telephonic structured questionnaire. Preset questions were asked on phone from operation room technicians of 50 different hospitals. For clarification and confirmation of procedure anesthesiologist of the hospital was contacted. Laryngoscope decontamination practices were asked as per questionnaire and data collected was recorded and analyzed. Results were documented and compared with studies regarding laryngoscope decontamination practices of different countries.

Results: Most exercised methods were manual decontamination with simple gauze (50%), alcohol gauze (11%) or tap water (27%). The use of disposable blades and sheathing of blades was not practiced by any of the hospitals. Similarly chemical disinfectants were used rarely (2%). Rinsing laryngoscopes with water (always 27%, sometime 23%) was very common while, autoclaving or sheathing of blades was not done in any of the hospital.

Conclusion: The rate of different postoperative infections is on the increase in our hospitals and one likely contributing source is contaminated laryngoscopes. Lack of awareness and poor practices among health care professionals, over work and economic constraints are the major contributing factors which need to be controlled by adhering to international standards.

Keywords: Disinfection, Equipment, Laryngoscopes, Sterilization.

INTRODUCTION

Laryngoscopes are routinely used in operation theatres for intubation. Such instruments come in contact with mucous membranes, saliva and blood and being invasive carry a risk of cross infection¹. Potentially harmful microbes have been isolated from these blades^{2,3} and are classified as semi-critical instruments by CDC (Centers for Disease Control and Prevention^{4,5,6}. Considering the risks, high level of disinfection, pasteurization or sterilization is recommended⁷. Inadequately disinfected laryngoscope blades and handles increase the risk of cross infection when used in patients with poor oral hygiene. Staphylococcus

aureus has been found on laryngoscope blades even after cleaning with tap water⁸.

For decontamination procedure to be appropriate the instrument should first be thoroughly cleaned and this involves removing all organic matter or residues by using water, mechanical action, detergents or enzymatic products. Disinfection or sterilization; a process that eliminates many or all pathogenic microorganisms with the exception of bacterial spores, from inanimate objects be performed following decontamination^{9,10}.

This study was carried out to compare laryngoscope decontamination practices in different hospitals of Pakistan. The current guidelines and recommendations were discussed to emphasize adoption of better methods. It is suggested that application of appropriate disinfection and sterilization practices can reduce the incidence of equipment related infections.

Correspondence: Dr Surg Cdr Maqsood Ahmad, FCPS Consultant Anaesthetist, PNS Rahat Karachi.

Email: maktabs@yahoo.com

Received: 02 Mar 2012; Accepted: 19 Sep 2013

MATERIAL AND METHODS

Information was collected from 50 operation room technicians (ORT's) of fifty different hospitals performing anaesthesia assistant duties, on telephone on a structured questionnaire after approval from hospital ethical committee. The ORT's were selected for telephonic survey because they perform decontamination /disinfection of laryngoscopes. Anaesthesiologist was consulted on telephone where data correction or clarification for inadequate answers was required. The hospitals not willing to participate in the study were not included. Average surgeries in these hospitals were 100 to 300 per month. The data thus collected was subjected to analysis and results were compared in percentages and frequencies with available data.

RESULTS

Guidelines for disinfection and sterilization of operation theatre/equipment were present in all of the hospitals included in this study but none of them specifically mentioned about the laryngoscopes. Total respondents from all hospitals were 50 ORTs from fifty different hospitals. Sterilization by autoclave and use of disposable blades were not practiced anywhere. Similarly sheathing the blades in every case was not done. Laryngoscope blade was not routinely changed in every case but when a blade of different size was required for intubation. Simple gauze rubbing and cleaning was mostly used in all hospitals (100%). Rinsing with tap water was used in 27 (54%) but most of them were using this method early in the morning before the start of operation list and 23 (46%) were sometimes practicing this. Cleaning with alcohol gauze was in 11 (22%), sometimes in 29 (58%) and was not used by 10 (20%). Disinfection by chemical disinfectants was used in 2 (4%), sometimes 2 (4%) and was not used in 46 (92%). The variable "sometimes" is used when hospitals were not routinely applying this technique and was not part of their daily practice. Laboratory analysis of laryngoscope blades failed to grow

microorganisms after rinsing with water and immersion in disinfectant.

DISCUSSION

The importance of poor infection control risks in healthcare settings is being increasingly recognized. Data from different studies showed that healthcare-associated infections (HAIs) are on the increase¹¹. Anesthesia equipment is a known source of HAIs (Hospital acquired infections), as it is exposed to microorganisms from multiple sources during routine usage and handling. Proper infection control procedures are essential to minimize the risk of this equipment turning a vector in the transmission of health-care associated infection. All the instruments used during a case are considered contaminated and be appropriately disinfected prior to use though apparently clean. The equipment may be exposed to infectious agents in many ways, including: contaminated hands of healthcare workers (HCWs), splash, spill, or contact with used equipment. Care should be taken to avoid such contamination, as these items will require the same handling as used equipment^{12,13}. Spaulding established the current classification system for instruments coming in contact with patients as regards the risk of cross infection and requirement for disinfection/sterilization. This classification has been in use for over 40 years. Instruments are classified as critical, semi-critical, or non-critical based on their intended use.

Critical items are those that come in contact with normally sterile tissues and must therefore be sterile at the time of use.

Semi-critical devices contact mucous membranes or non-intact skin and require high-level disinfection.

Non-critical devices come in contact with intact skin only and require intermediate or low-level disinfection¹⁴.

Laryngoscope are semi-critical devices as they contact mucous membranes during intubation so just high level disinfection is required before use and not sterility as per

Spaulding¹⁵. American Society of Anesthesiologists (ASA) has also supported this view that sterility is not essential for upon work load, equipment, staff and funds. Just rubbing and cleaning only with simple gauze was the preferred method in most of the hospitals

Table-: Distribution of practice of laryngoscope disinfection among respondents.

No	Variable	Value	Frequency	Valid Percent	Cumulative Percent
1	Guidelines available	Yes	50	100%	100%
		No	0	0	
2	Disposable blades	No	50	100%	100%
3	Blade change routinely	No	47	94%	100%
		Sometimes	3	6%	
4	Simple gauze	Yes	50	100%	100%
4	Rinse with water	Yes	27	54%	100%
		Sometimes	23	46%	
5	Alcohol gauze cleaning	No	10	20%	100%
		Yes	11	22%	
		Sometimes	29	58%	
6	Chemical disinfectant	No	46	92%	100%
		Yes	2	4%	
		Sometimes	2	4%	
7	Autoclave	No	50	100%	100%

laryngoscopes and high level disinfection will suffice¹⁶.

At the time of this study, our hospital was following guidelines made by hospital infection control committee for disinfection and sterilization in operation theatre but these disinfection procedures for laryngoscopes were not mentioned separately. Each morning the laryngoscope blades were rinsed with tap water and then cleaned by alcohol gauze. Later on simple gauze and/or alcohol gauze was in use for subsequent decontaminating/cleaning of the blades. Sometimes the blades were kept in disinfectant¹⁷ (Alkyldimethylammoniumsulphate, polyhexamethylenbiguanide, cocosporyleandianminguanidiumdiacetate) after use in patients with hepatitis but not in routine. To test the efficacy of this disinfection the contaminated blades following use in different patients were properly disinfected with chemical disinfectant and sent for testing growth of any microorganism in laboratory which was negative

On 5 different occasions. Other hospitals have their own methods and vary depending

because of its simplicity and easy access. Decontaminating with gauze or rinsing with tap water is ineffective and inadequate method as per ASA and CDC standards. Although alcohol was considered a better disinfectant but no longer recognized to be high level disinfectant^{16,17}. This noncompliance with international standards for asserting control on transmission of cross infection in our hospitals has many implications which needs further studies to ascertain grounds but likely causes are financial constraints, overwork and lack of awareness/education among technicians. Bucx showed in a study that there are substantial differences in decontamination procedures in different Dutch hospitals, similar results were reported by workers in different hospitals of UK and India^{1,2}.

Simply wiping the blades with gauze, rinsing with water and rubbing with alcohol, a common practice in our hospitals will not eliminate hepatitis B virus (HBV) or mycobacteria and had doubtful effect on human immunodeficiency virus (HIV)^{18,19}. Decontamination is removing visible

contaminants on equipment which is the first step in level of disinfection but semi-critical equipment requires high level disinfection and alcohol is no more considered in this category. This practice calls for a change in our setups where alcohol is normally used. The best practices for laryngoscope disinfection would be using high level disinfectants as per recommendations of CDC, APIC (The Association for Professionals in Infection Control and Epidemiology) and ASA. Sterility as mentioned earlier is not required for laryngoscope blades. All other practices, simple gauze or alcohol swab cleaning or rinsing with tap water are not safe and be quitted. Use of disposable blades and or sheathing the blades after every use may be justified in economical sound setups. Chemical disinfectants use in routine and availability of extra blades for laryngoscopes may help to control cross infection. Local studies are deficient in this regard. Furthermore, guidelines for disinfection/sterilization must be revised in accordance to international standards and applied in every institution after acquaintance of health care professionals.

CONCLUSION

The rate of different infections is on the increase in our hospitals and one likely contributing source is contaminated laryngoscopes. Lack of awareness among health care professionals and poor work place practices are the major contributing factors for in-hospital infections. This potential source of infection can be controlled by practicing international standards and guidelines adjusted to local practice policies.

REFERENCE

1. Williams D, Dingley J, Jones C, Berry N. Contamination of laryngoscope handles. *J Hosp Infect.* 2010; 74: 123-8.
2. Bucx M, Dankert J, Beenhakker M, Harrison T. Decontamination of laryngoscopes in the Netherlands. *Br J Anaesth.* 2001; 86: 99-102.
3. Hal JR. Blood contamination of anesthesia equipment and monitoring equipment. *Anesth Analg.* 1994; 78: 1136-9.
4. Morell RC, Ririe D, James RL, Crews DA, Huffstele K. A survey of laryngoscope contamination at a university and a community hospital. *Anesthesiology.* 1994; 80: 960.
5. Beamer JE. MRSA contamination of a laryngoscope blade: A potential vector for cross infection. *Anaesthesia.* 1999; 54: 1007-24.
6. Beamer JE. MRSA contamination of a laryngoscope blade: A potential vector for cross infection. *Anaesthesia* 1999; 54: 1007-24.
7. Orhan ME, Saygun O, Gozeldemir ME. An alternative simple method in laryngoscope blade decontamination. *Middle East J Anesthesiol.* 2002; 16: 529-34.
8. Ballin MS, McCluskey A, Maxwell S, Spilsbury S. Contamination of laryngoscopes. *Anaesthesia.* 1999; 54: 1115-6.
9. Rutala WA. APIC guideline for selection and use of disinfectants. *Am J Infect Control.* 1996; 24: 313-42.
10. Orhan ME, Saygun O, Gozeldemir ME. An alternative simple method in laryngoscope blade decontamination. *Middle East J Anesthesiol.* 2002; 16: 529-34.
11. Dutch Working Party on Infection Prevention. Prevention of infection with HIV and other microorganisms in anaesthesia and intensive care. 1991; 46.
12. Working Party of the British Society of Gastroenterology. Cleaning and disinfection of equipment for gastrointestinal endoscopy. *Gut* 1998; 42: 585-93.
13. Task Force on Infection Control, Committee on Occupation Health of Operating Room Personnel. Recommendation for Infection Control for the Practice of Anesthesiology. 2nd ed. Park Ridge. IL: American Society of Anesthesiologist; 1998. Available at: <http://ecommerce.asahq.org/publicationsandservices/infectioncontrol.pdf>. Accessed May 16, 2011.
14. Sehulster L, Chinn RY. Centers for disease control and prevention. Guidelines for environmental infection control in health-care facilities. *MMWR Recomm Rep.* 2003; 52: 1-42.
15. Rutala WA, Weber DJ. Disinfection and sterilization in health care facilities: what clinicians need to know? *Clin Infect Dis.* 2004; 39: 702-9.
16. Guidelines for Preventing Health-Care-Associated Pneumonia, 2003. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. Recommendations and Reports. 2004; 53: 4.
17. Endostar. High level chemical disinfectant. Manufactured by Laboratorium Dr. Deppe. D-47906 Kempen. Germany. www.dr-deppe.de
18. Centers for Disease Control. Guidelines for handwashing and hospital environmental control, 1985. Section 2: Cleaning, disinfecting, and sterilizing patient-care equipment. *Infect Control.* 1986; 7: 236-40.
19. California Department of Health and Human Services. Inadequate reprocessing of semicritical instruments: recommendations for reprocessing of rigid laryngoscopes. <http://www.cdph.ca.gov/pubsforms/Guidelines/Documents/InadequateReprocessingofRigidLaryngoscopes.pdf>. Accessed 17, 2011.