Original Article

Disinfection of laryngoscopes: A survey of practice

Address for correspondence:
Dr. Vaishali Prabhakar Chaskar,
1303, Balaji Avenue co-op Hsg Soc., Plot No. 30, Sector 36, Kamothe, Navi Mumbai - 410 209, Maharashtra, India.
E-mail: chaskar.vaishali24@gmail.com

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Vaishali Prabhakar Chaskar, Nandini Malay Dave, Raylene Dias, Priyanka Karnik
Department of Anaesthesiology, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India

ABSTRACT

Background and Aims: The laryngoscope is a common piece of equipment used by anaesthesiologists. It has been identified as a potential source of cross infection. Although guidelines exist regarding appropriate disinfection practices, recent reviews suggest ineffectiveness of current methods of disinfection and poor compliance with the established protocols. We conducted a questionnaire-based survey to study the current disinfection practices being followed by a cross section of anaesthesiologists. **Methods:** A simple questionnaire containing 13 questions was distributed amongst anaesthesiologists in an anaesthesia conference. Data were analysed with percentage analysis. **Results:** Out of 250 delegates who attended the conference, 150 submitted the completed questionnaires. Residents constituted 41% and 46% were consultants. Eighteen (12%) used only tap water for cleaning and 132 (88%) used a chemical agent after rinsing with water. Out of 132, 76 (51%) used detergent/soap solution, 29 (19%) would wash and then soak in disinfectant or germicidal agents (glutaraldehyde, povidone iodine and chlorhexidine) and 18 (12%) would wipe the blade with an alcohol swab. With respect to disinfection of laryngoscope handles, 70% respondents said they used an alcohol swab, 18% did not use any method, 9% were not aware of the method being used, while 3% did not respond. **Conclusion:** Our results indicate wide variation in methods of decontamination of laryngoscopes. Awareness regarding laryngoscope as a potential source of infection was high. We need to standardise and implement guidelines on a national level and make available resources which will help to improve patient safety.

Key words: Disinfection, laryngoscopes, semicritical equipment, survey

INTRODUCTION

The laryngoscope is a common piece of equipment used by anaesthesiologists for general anaesthesia and endotracheal intubation. It has been identified as a potential source of cross infection because of blood and bacterial contamination.[1,2] A wide range of microorganisms have grown on laryngoscope blades.[3-6] Laryngoscopes are included in semicritical items according to the Centers for Disease Control's (CDC's) Healthcare Infection Control Practices Advisory Committee (HICPAC), which minimally require high-level disinfection using chemical disinfectants. Glutaraldehyde, hydrogen peroxide, ortho-phthalaldehyde and peracetic acid with hydrogen peroxide are approved by the Food and Drug Administration.[3-5] We carried out a survey amongst anaesthesiologists attending an anaesthesia conference to know their current practice of laryngoscope cleaning and disinfection techniques.

METHODS

We designed a simple questionnaire regarding disinfection of laryngoscopes which was verified by five professors of anaesthesia from our teaching institute. institute. Ethics committee approval was obtained. It was offered to anaesthesiologists who attended an anaesthesia conference in our city. Participation was voluntary, and participants were assured of maintaining anonymity and confidentiality. The questionnaire included 13 questions [Appendix 1]. Participants were asked to respond based on their standard everyday

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practice. Any additional comments were invited. The study cohort included anaesthesiologists working in teaching hospitals, public hospitals, private nursing homes and corporate hospitals. From the responses obtained, data were analysed with percentage analysis.

RESULTS

Out of 250 delegates who attended the conference, 150 submitted the completed questionnaire. Out of these 150 respondents, 69 (46%) were consultants, 61 (41%) were trainee residents and 20 (13%) were clinical associates [Figure 1a]. Sixty-eight (45%) worked in teaching and public hospitals, 49 (33%) delegates practiced in nursing homes and 33 (22%) in corporate hospitals [Figure 1b]. The study respondents performed 5 laryngoscopies/day (range 3-7). On enquiring about who disinfected the laryngoscopes routinely, 82 (55%) respondents said it was done by operation theatre (OT) technicians, 46 (31%) said it was done by ward boys and 22 (14%) said they cleaned the laryngoscopes themselves.

On asking about the method used for cleaning and disinfection of laryngoscope blades, 18 (12%) respondents said they used only tap water for cleaning. One hundred and thirty-two (88%) used a chemical agent after rinsing with water. Out of 132, 76 (51%) used detergent/soap solution, 29 (19%) would wash and then soak in disinfectant or germicidal agents and 18 (12%) would wipe the blade with an alcohol swab. None of the respondents used autoclaving as a method for blade sterilisation. Nine (6%) were not aware of the method used [Figure 2]. Anaesthesiologists who would soak the laryngoscope blade in disinfectant/germicidal agent were further asked how they prepared the disinfectant solution. Seventy-two (48%) did not respond to this question and 33 (22%) were not aware of the solution used. Forty-five (30%) said they used preformed solutions. Out of this 45, 22 (15%) used glutaraldehyde, 20 (13%) used povidone iodine and 3 (2%) used chlorhexidine. Time for immersion of the blades in the various solutions varied from 1 to 30 min. A large percentage (89.6%) of anaesthesiologists working in corporate hospitals was not aware of the method of disinfection used. We did not find any difference regarding awareness of disinfection methods between residents and consultants.

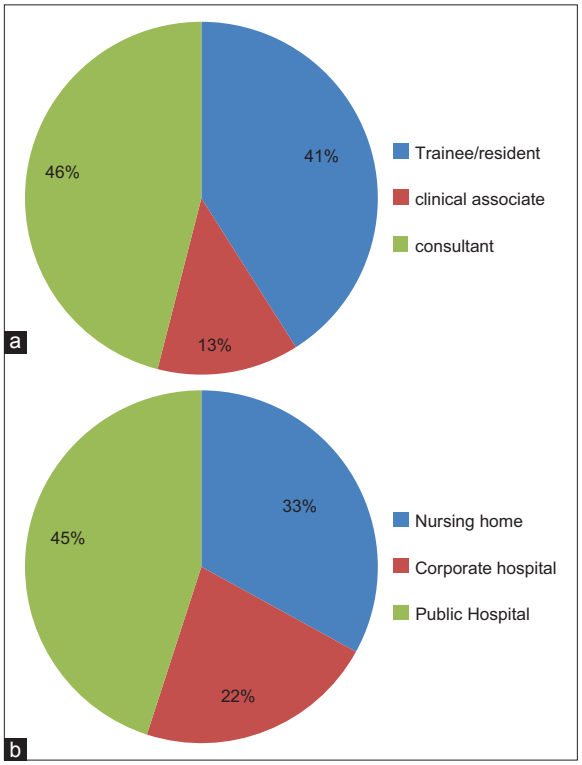

Figure 1: (a) Designation of participating anaesthesiologists. (b) Area of current practice

When asked regarding the frequency of disinfection of blades, 136 (91%) respondents said they did it after every case. Thirteen (8%) would disinfect it after use in an infected patient and 2 (1%) would clean it at the end of the day.

We also asked about frequency of cleaning and disinfection of the laryngoscope handle. Nearly 46% said they would clean it after every use, 32% would clean it only if blood or secretions were visible over the surface, 11% would clean it once in a while and 11% would not clean it at all [Figure 3].

On asking about the method of disinfection used for laryngoscope handles, 70% respondents said they used an alcohol swab, 18% did not use any method and 9% were not aware of the method being used, while 3% did not respond.

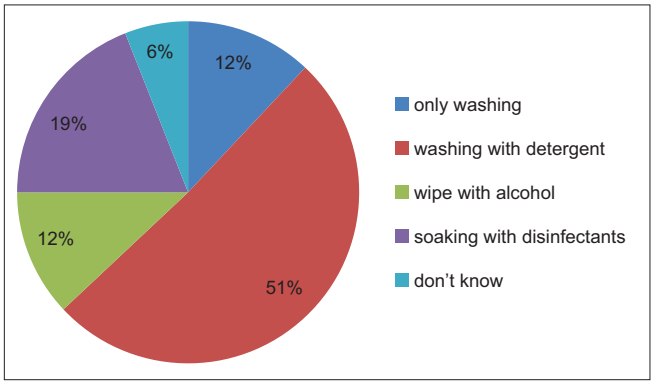

Figure 2: Methods of decontamination of laryngoscope blade

Regarding how sterility of laryngoscopes was assured, 17% respondents said they used swab and culture method and 76% did not use any method. Almost 7% did not attempt this question.

On enquiring whether they had administered anaesthesia to infected patients, 97% of respondents said they had anaesthetised infected cases with Hepatitis B, respiratory infections, dermatitis, psoriasis and retrovirus-positive patients. On enquiring about the methods of decontamination of such infected laryngoscopes, 28% did not know the method used and 18% did not attempt the question. Glutaraldehyde was used by 23%, 19% used disposable laryngoscope, 5% used autoclaving, 4% used chlorhexidine, 2% sterilised with ETO (Ethylene Oxide) and 1% washed with hot water [Figure 4].

Five of the respondents commented that they liked the questionnaire and requested that the survey results are mailed to them.

DISCUSSION

Laryngoscopy is an invasive procedure involving contact of the laryngoscope with the mucous membrane, saliva, and at times even blood, making it a source of hospital-acquired infections.[7-9]

In 1986, CDC published guidelines for disinfection of equipment. They proposed that equipment which are in direct or indirect contact with mucus membrane or respiratory tract mucosa are classified as semicritical and need a high level of disinfection which destroys all forms of microorganisms except bacterial spores.[2-4] They suggested hot water pasteurisation (80°C–100°C, for 30 min) or exposure to Environmental Protection Agency-registered sterilant chemical for short exposure time (10–45 min).[3-7] These methods have been universally accepted and supported by various organisations.[3-6]

The guidelines for preventing healthcare-associated pneumonia issued by CDC and HICPAC recommend a detailed procedure for cleaning and disinfecting laryngoscopes. They recommend thorough washing followed by disinfection with steam sterilisation or wet heat pasteurisation of these semicritical equipment.[10] The recommended chemical disinfectants are high-level disinfectants such as ethanol (>70%), formaldehyde, hypochlorite, ortho-phthalaldehyde and glutaraldehyde.[5,6,10]

Recent review articles suggest ineffectiveness of current methods of disinfection of reusable laryngoscopes and poor compliance with the established protocols.[11,12]

In India, there is no uniformity of laryngoscope disinfection practices. In our hospital too, different OTs follow different practices for disinfection of laryngoscopes. In 2010, a survey was carried out regarding existing practices of disinfection of laryngoscope in the Indian context.[13] The results of the survey showed that there was no protocol for disinfection. The authors also compared bacterial growth on front, back and light bulb of laryngoscope blade washing with water and washing with water followed by disinfection with 5% v/v aldehyde-free biguanide agent. Fifty-eight per cent samples of washing with only water showed growth of pathogenic microorganisms, whereas 3.4% samples of biguanide group showed growth of commensals. The authors recommend disinfection with 5% w/v aldehyde-free biguanide agent for at least 10 min as an effective

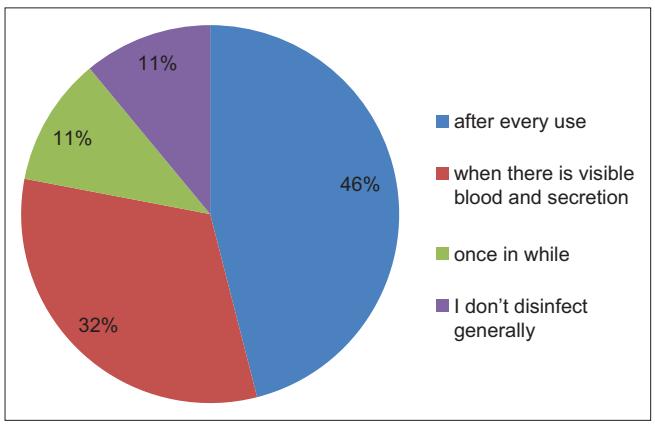

Figure 3: Disinfection of laryngoscope handle

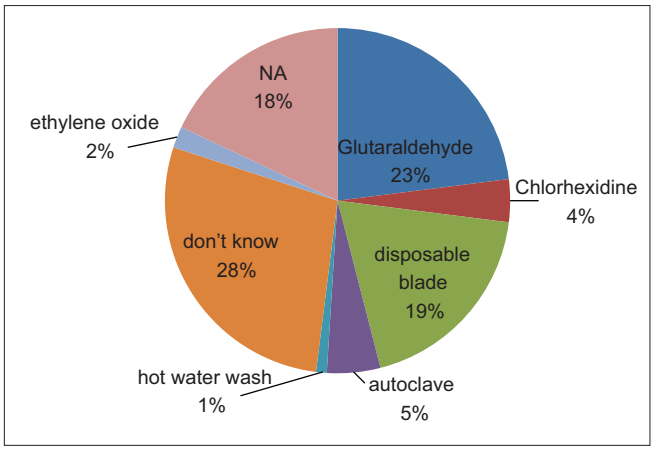

Figure 4: Decontamination of infected laryngoscope blades

and inexpensive method. In this study, a subset of patients with oral cancer showed significant bacterial growth (52%) due to suboptimal hygiene.[13] Their hospital changed the practice of sterilisation of laryngoscopes as per the study result.[13] A recent online survey of 100 anaesthesiologists from tertiary hospitals in India found that many respondents considered laryngoscopes as a potential source of infection. However, there was marked variability in decontamination methods.[14] Our study results also corroborate the results of these Indian studies. Awareness regarding the need for cleaning and disinfection of laryngoscopes was high (94% for blade; 89% for handle). However, practices differed greatly.[14]

Laryngoscope handles can also be a source of hospital infection. It may not come in direct contact with mucus membrane, but at closed position, the contaminated tip is always in contact with the handle. Various strategies to minimise contamination include improving methods of decontamination, use of disposable laryngoscopes or redesigning the handle to minimise contact points.[15-17]

Even after appropriate disinfection, improper handling methods can lead to recontamination of reusable laryngoscopes. Hence, along with standardisation of decontamination methods, there is a need to review protocols and policies surrounding the use of reusable blades.[18-20]

Our study has some limitations. Our survey was limited to a single anaesthesia conference. This survey was conducted in a metro city where adequate resources in the form of staff, disinfectant materials, equipment and well-equipped microbiology laboratories are most often readily available. Rural hospitals, nursing homes and government health centres may lack these facilities. Standardisation of protocols for disinfection and availability of resources for all will help in minimising the risk of cross infection associated with laryngoscope blade and handles.

CONCLUSION

Our survey showed a high level of awareness regarding methods of decontamination of laryngoscopes amongst anaesthesiologists. In India, practices for cleaning and disinfection of laryngoscopes vary widely. National guidelines for decontamination of anaesthesia equipment are necessary. We need to standardise and implement guidelines on a national level and make available resources which will help to improve patient safety.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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APPENDIX 1

Questionnaire

Please tick your option.

(1) Your designation:
- Resident/trainee
- Clinical associate
- Consultant

(2) I am practicing currently in:
- Nursing home practice
- Corporate hospital
- eaching institute

(3) Approximate number of patients in whom I use the same conventional laryngoscope blade per day: _____

(4) In my practice, disinfection of anaesthesia equipment is done by:
- OT technician
- Ward boy
- Any other_____

(5) I use the following method for cleaning and disinfection of laryngoscope blade:
a. Rinse under running water
b. Washing with detergent/soap solution
c. Wipe with an alcohol swab
d. Soaking in disinfectant/germicidal agent
e. Autoclaving
f. Don't know
g. Others (specify)

(6) If (d), how do you prepare the solution?
- Don't know
- Preformed solution name_____
- Dilution prepared as _____

(7) If (d), how much time is it kept in the solution?_____

(8) I disinfect the blade:
- After each patient
- Only after an infected or high-risk patient
- At the end of the day
- Other

(9) I disinfect the laryngoscope handle in the following way:
- Wiping with alcohol swab
- Any other method_____
- Don't use any method

(10) I disinfect the laryngoscope handle:
- After every use
- When there is visible blood or secretions
- Once in a while
- I don't disinfect the handle generally

(11) How do you assure the sterility of the laryngoscope?
- With the help of swab and culture
- I don't use any method

(12) Have you ever administered anaesthesia to a patient infected with?
a. A respiratory infection
   i. Yes
   ii. No
b. A GI infection
   i. Yes
   ii. No
c. Seropositive patient
   i. Yes
   ii. No
d. Psoriasis or dermatitis
   i. Yes
   ii. No
e. Herpes simplex
   i. Yes
   ii. No
f. Other infection_____

(13) If yes, do you take any extra precaution?
- Disposable laryngoscope blade
- Alternate method of sterilization (specify)_____

Any comments: _____