

Nebulizer practices among paramedics in India

Sir,

Nebulizers have been used for many years in acute and chronic management of airflow obstruction in adults and children.^[1] Drug deposition in lungs with nebulizer is around 10%, compared to 20%–30% with handheld inhalers.^[2,3] Despite this difference, studies have concluded that all devices have similar efficacies,^[4,5] when used appropriately. Nebulizers require minimal coordination and patient effort during inhalation,^[4,6] an important aspect in patient satisfaction.^[7]

Although nebulization is prescribed by the clinician, paramedics play a critical role in administering treatment to the patient. We conducted a county-wide survey with paramedics (from nursing homes, hospitals, and clinics) to assess the current nebulizer practices. A 15-item questionnaire in English and Hindi on instructions provided by clinicians, administration of the nebulized drugs, and maintenance of the nebulizer was administered to 100 paramedics (62% females, mean practice 5.89 ± 5.77 years, and mean age 29.68 ± 8.58 years).

Fifty-three percent administered nebulization to more than 10 patients a week. Nebulization time was 5–8 min by 36% paramedics, more than 10 min by 28% and 32% reported time to be dependent on drug volume in the medication chamber. It has been observed that longer nebulization time causes inconvenience resulting in reduced patient compliance.^[7]

Nebulized drugs can be delivered through either face mask or mouthpiece.^[8] Nasal inhalation can filter drug particles, reducing bronchodilator response to nearly half which further reduces lung deposition; inhaling through the mouth, especially with the facemask, is therefore important.^[5-7,9,10] In the survey, 46% paramedics provided facemask to all patients requiring nebulization.

Sixty-seven percent clinicians instructed on drug and dosage followed by cleaning (50%), nebulization frequency (43%), selection of facemask/mouthpiece (38%), and nebulization time (31%). These parameters are equally important for effective delivery with nebulizers. Inconsistencies in the instructions may affect drug delivery, thus compromising clinical response and treatment outcomes.

Nebulizer accessories are potential sources of infection hence should be cleaned after every use and disinfected

daily. Nebulizer manufacturers recommend that medication chamber, facemask, mouthpiece, and tubing should not be reused for multiple patients without being sterilized.^[11] Our survey reported that cleaning was done after each use by 62% paramedics, 44.68% cleaned only mouthpiece/face mask, and 4.26% cleaned only medication chamber. Disinfectant was used by 39% paramedics whereas 35% used only water for cleaning purposes. To reduce the incidence of nosocomial infections such as pneumonia, measures to prevent transmission of pathogenic microbes^[8,12] should be practiced in clinics and hospitals.

68% paramedics were trained on the use and maintenance of nebulizers, 11% learnt through observation while 21% were untrained. About 34.34% paramedics could not recall attending any training program on handling nebulizers in their practice years.

To the best of our knowledge, this is the first ever paramedic survey from India which highlights the nebulizer practices among paramedics across the country. Inconsistencies reported may lead to inadequate drug delivery and predispose patients to infection transmission. Thus, it is imperative to develop and propagate standardized protocols on “good nebulization practices” and conduct training programs for paramedics which can be followed at clinics as well as hospitals.

Acknowledgment

1. We would like to thank the field force workers from Cipla Ltd., and all the participating doctors and their paramedics for their time and valuable contribution to this survey
2. Ms. Sushma Jadhav and Ms. Sapna Madas from Chest Research Foundation, Pune, for assisting in the statistical analysis of the survey
3. Ms. Sushmeeta Chhowala from Cipla Ltd., for reviewing the manuscript.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Randeep J Guleria, Khushboo Mahendra Thakkar¹

All India Institute of Medical Sciences, New Delhi,

¹Cipla Ltd., Mumbai, Maharashtra, India

E-mail: khushboo.m.thakkar@gmail.com

REFERENCES

1. Current best practice for nebuliser treatment. The Nebulizer Project Group of the British Thoracic Society Standards of Care Committee. *Thorax* 1997;52 Suppl 2:S1-3.
2. Fernández Tena A, Casan Clarà P. Deposition of inhaled particles in the lungs. *Arch Bronconeumol* 2012;48:240-6.
3. Le Brun PP, de Boer AH, Heijerman HG, Frijlink HW. A review of the technical aspects of drug nebulization. *Pharm World Sci* 2000;22:75-81.
4. Geller DE. Comparing clinical features of the nebulizer, metered-dose inhaler, and dry powder inhaler. *Respir Care* 2005;50:1313-21.
5. Fink JB, Rubin BK. Problems with inhaler use: A call for improved clinician and patient education. *Respir Care* 2005;50:1360-74.
6. Barrons R, Pegram A, Borries A. Inhaler device selection: Special considerations in elderly patients with chronic obstructive pulmonary disease. *Am J Health Syst Pharm* 2011;68:1221-32.
7. Sharafkhaneh A, Wolf RA, Goodnight S, Hanania NA, Make BJ, Tashkin DP, *et al.* Perceptions and attitudes toward the use of nebulized therapy for COPD: Patient and caregiver perspectives. *COPD* 2013;10:482-92.
8. Hess DR. Nebulizers: Principles and performance. *Respir Care* 2000;45:609-22.
9. Everard ML, Hardy JG, Milner AD. Comparison of nebulized aerosol deposition in the lungs of healthy adults following oral and nasal inhalation. *Thorax* 1993;48:1045-6.
10. Hess DR. Aerosol delivery devices in the treatment of asthma. *Respir Care* 2008;53:699-723.
11. Tablan OC, Anderson LJ, Besser R, Bridges C, Hajjeh R; CDC; Healthcare Infection Control Practices Advisory Committee. Guidelines for preventing health-care – Associated pneumonia, 2003: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR Recomm Rep* 2004;53:1-36.
12. Jadhav S, Sahasrabudhe T, Kalley V, Gandham N. The microbial colonization profile of respiratory devices and the significance of the role of disinfection: A blinded study. *J Clin Diagn Res* 2013;7:1021-6.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online

Quick Response Code:



Website:

www.lungindia.com

DOI:

10.4103/lungindia.lungindia_147_18

How to cite this article: Guleria RJ, Thakkar KM. Nebulizer practices among paramedics in India. *Lung India* 2019;36:80-1.

© 2018 Indian Chest Society | Published by Wolters Kluwer - Medknow