Letters to Editor

Bundle of care approach to reduce ventilator-associated pneumonia in the intensive care unit in a tertiary care teaching hospital in North India

Sir,

Ventilator-associated pneumonia (VAP) is one of the most serious treatment-related infections resulting in increases risk of mortality and morbidity. Patients at risk of VAP must be managed with a “bundle of preventive measures.” The implementation of care “bundles” is simple sets of evidence-based practices that, when implemented collectively, help to create reliable and consistent care systems and improve patient outcomes. The VAP bundle, which is derived from the IHI bundle, is composed of the following five major interventions: (1) Head-of-bed elevation between 30 and 45; (2) a daily “sedation vacation” and a readiness-to-wean assessment; (3) peptic ulcer disease prophylaxis; (4) deep vein thrombosis prophylaxis; and (5) daily oral care with chlorhexidine (a new intervention added since 2010).[1]

We evaluated the impact of the bundle care approach in VAP in intensive care units (ICUs). The study period was 15 months between November 2016 and January 2018 which was divided into three phases, each comprising 5 months — pre-VAP bundle phase, post-VAP bundle phase, and late postimplementation phase. During the pre-VAP bundle phase, the baseline VAP rates for ICU were calculated as per the standard healthcare-associated infections (HAI) surveillance guideline laid down by the Centers for Disease Control and Prevention’s NHSN, 2016.[2] During the post-VAP bundle phase, besides the five primary interventions adopted from the IHI bundle, and Five Moments for Hand Hygiene by the WHO was added to the daily quality rounding checklist. The concerned doctors and nurses of the ICUs were educated (both by mass lectures and bedside training) about the importance of adherence to the bundle care approach. During the late postimplementation phase, the bundle care forms were continued to be used by the ICUs. At monthly meetings, performance feedback was provided to concerned ICU doctors and nurses by communicating and reviewing the rates of practices performed.

Demographic characteristics of ICU patients from the pre- and post-VAP phases are given in Table 1. Month-wise VAP rate of ICU during the study is given in Figure 1. About 35.8% of these patients had multidrug-resistant bacterial growth in their endotracheal aspirate with some Gram-negative bacteria more than Gram-positive bacteria. There was a statistically significant steady decline of VAP rate from preimplementation to late postimplementation phase from 16.12 to 13.15/1000 ventilator days ($P = 0.009; 95\%$ confidence interval $= 1.22–6.31$). Many studies have documented a similar decrease in VAP rate, following bundle implementation.[3,4] Khan et al. showed the rate of VAP decreased from 8.6/1000 ventilator-days to 2.0/1000 ventilator-days ($P < 0.0001$) after implementation of the care bundle.[5] This study suggests that the systematic implementation of a multidisciplinary team approach can reduce the incidence of VAP. Overall, our results support the use of VAP prevention bundle in clinical practice.

Table 1: Demographic characteristics of intensive care unit patients

| Variables                        | Pre-VAP bundle phase | Post-VAP bundle phase | Late postimplementation phase |
|----------------------------------|----------------------|-----------------------|------------------------------|
| Study period in months, $n$      | 5                    | 5                     | 5                            |
| Sex, male (%)                    | 26 (61.9)            | 25 (62.5)             | 23 (65.7)                    |
| Age, mean±SD (years)             | 57.4±4.2             | 55.6±4.5              | 56±3.8                       |
| ICU stay, mean days              | 7.5                  | 7.1                   | 7.0                          |
| VAP rate per 1000 ventilation days | 16.12               | 14.96                 | 13.15                        |

Pre-VAP bundle phase, November 2016–March 2017; Post VAP bundle phase, April 2017–August 2017; Late postimplementation phase, September 2017-January 2018. Ventilation days: The total number of days of exposure to mechanical ventilation by all of the patients in the selected population during the selected time period. $P_1$: $P$ value for comparing between pre-VAP bundle phase and post-VAP bundle phase, $P_2$: $P$ value for comparing between pre-VAP bundle phase and late postimplementation phase, $P_3$: $P$ value for comparing between post-VAP bundle phase and late postimplementation phase, ICU: Intensive care unit, VAP: Ventilator-associated pneumonia, SD: Standard deviation
Letters to Editor

Acknowledgment
We like to give our gratitude to the residents of the Department of Anaesthesia and Microbiology, and most importantly, the infection control nurses of SMCH for their immense help during data collection.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Varun Goel, Savita Gupta¹, Dakshina Bisht, Rashmi Sharma²
Departments of Microbiology and ²Anaesthesia, Santosh Medical College and Hospital, Ghaziabad, ¹Department of Anaesthesia, Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh, India
E-mail: dr.gsavita@gmail.com

REFERENCES
1. Caserta RA, Marra AR, Durão MS, Silva CV, Pavao dos Santos OF, Neves HS, et al. A program for sustained improvement in preventing ventilator associated pneumonia in an intensive care setting. BMC Infect Dis 2012;12:234.
2. Centers for Disease Control and Prevention. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting; 2016. Available from: http://www.cdc.gov/nhsn/. [Last accessed on 2018 Aug 05].
3. Rosenthal VD, Rodrigues C, Álvarez-Moreno C, Madani N, Mitrev Z, Ye G, et al. Effectiveness of a multidimensional approach for prevention of ventilator-associated pneumonia in adult Intensive Care Units from 14 developing countries of four continents: Findings of the international nosocomial infection control consortium. Crit Care Med 2012;40:3121-8.
4. Eldesuky Ali HI, Rayan AA, Ibrahim TH. Root cause analysis of ventilator-associated pneumonia and the effect of analysis of expanded ventilator bundle of care. Ain Shams J Anesthesiol 2016;9:170-7.
5. Khan R, Al-Dorzi HM, Al-Altas K, Ahmed FW, Marini AM, Mundekkar Dan S, et al. The impact of implementing multifaceted interventions on the prevention of ventilator-associated pneumonia. Am J Infect Control 2016;44:320-6.

Learning curve: Endobronchial ultrasound-guided needle aspiration

Sir,
The skill of performing interventional procedures is associated with a learning curve depending on skill, expertise, and training of the interventionist. Here, we would like to report the learning time required to achieve proficiency in the technique of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS- TBNA). Various studies have shown wide variation in the learning ability ranging from 10 to 100 procedures. The American College of Chest Physicians (ACCP) empirically recommends 50 EBUS- TBNA under supervision. [1]

In contrast, the proficiency was reported to be obtained adequately even after 10 procedures in other single center experiences. [2]

In India still, we practice-see one, learn one under the supervision and do one dictum, and Indian data on the learning curve of EBUS- TBNA is limited. Therefore, we analyzed data of our center retrospectively to find out our learning curve of acquiring competence.

The EBUS scope was acquired at Asthma Bhawan, Jaipur in May 2016. Two pulmonologists trained in the technique of flexible bronchoscopy observed the procedure in 20 cases at an expert center and performed one procedure under supervision. Consecutive cases who underwent EBUS-TBNA for mediastinal adenopathy were included in the study. Sample yield showing abnormal diagnosis or lymphoid cells was considered adequate, and noncellular or bronchial sample was taken as inadequate.

We analyzed the diagnostic yield calculated in blocks of five consecutive patients. In the first block of five cases, it was only 20%, while it became 60% in the second block of five patients (6–10 cases). In the third block, it became 80% but reduced to 60% in 4th block. Thereafter, it remained 80% or above except one occasion. Therefore, our data suggest that at least 20 independently done cases are necessary to cross the barrier of EBUS learning curve for an expert bronchoscopist [Figure 1].