Ventilator-associated events in children: A review of literature

By: Ali, Nam (Ali, Noor Azizah Mohd)[1,2]; Jauncey-Cooke, J (Jauncey-Cooke, Jacqueline)[3,4]; Bogossian, F (Bogossian, Fiona)[1,4]

AUSTRALIAN CRITICAL CARE
Volume: 32 Issue: 1 Pages: 55-62 Special Issue: SI
DOI: 10.1016/j.aucc.2018.11.063
Published: Jan 2019
Document Type: Review

Abstract

Background: The complexity and variation in ventilator associated pneumonia (VAP) definitions in paediatrics may pose threats to the reliable identification of VAP. The revision of the surveillance definition to ventilator-associated event (VAE) has been mandated in adult populations, to overcome these issues. However, the evidence for application of the definition is unknown in children.

Objectives: To review the evidence on the application of the new VAE surveillance definition in paediatric population and examine the potential challenges in clinical practice.

Review methods: A systematic approach was used to locate and synthesise the relevant paediatric literature. Studies were appraised according to epidemiological appraisal instrument (EAI) and the grades of evidence in the National Health Medical Research Council (NHMRC) guidelines.

Results: Seven studies met the inclusion criteria. Quality of study methods was above 50% on the EAI. The overall grade of evidence was assessed as C (satisfactory). The incidence of VAE in children ranged from 1.1 to 20.9 per 1000 ventilator days as a result of variations in surveillance criteria across included studies. There is little agreement between the new VAP and PNU/VAP surveillance definition in the identification of VAP. Challenges in the application of VAE surveillance were related to the difference in modes of ventilation used in children versus adults, inconclusive criteria tailored to paediatric samples and a lack of data that support for automatic data extraction applied in paediatric studies.

Conclusion: This review demonstrated promising evidence using the new VAE surveillance definition to define the VAE in children, but the level of the evidence is low. Before the possibility of real implementation in clinical settings, challenges related to VAE paediatric specific criteria and the value of automated data collection need to be considered.

Keywords

Author Keywords: Children; Criteria; Intensive care unit; Paediatric; Surveillance; Ventilator associated pneumonia (VAP); Ventilator associated event (VAE)

KeyWords Plus: FOR-DISEASE-CONTROL; MECHANICAL VENTILATION; SURVEILLANCE; CRITERIA; INFECTION; PNEUMONIA; COMPLICATIONS; IMPACT; DEFINITIONS; OUTCOMES

Author Information

Reprint Address: Ali, Nam (reprint author)

Univ Queensland, Sch Nursing Midwifery & Social Work, Level 3, Chamberlain Bldg, Brisbane, Qld 4072, Australia.

Addresses:

[1] Univ Queensland, Sch Nursing Midwifery & Social Work, Level 3, Chamberlain Bldg, Brisbane, Qld 4072, Australia

[2] IUM, Fac Nursing, Dept Crit Care Nursing, Selangor, Malaysia

[3] Queensland Childrens Hosp, Childrens Hlth Queensland Hosp & Hlth Serv, Brisbane, Qld, Australia

[4] Univ Sunshine Coast, Sippy Downs, Qld, Australia
1. Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia
   By: [Anonymous]
   AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE Volume: 171 Issue: 4 Pages: 388-416 Published: FEB 15 2005

2. An Evaluation of Various Ventilator-Associated Infection Criteria in a PICU
   By: Beardsley, Andrew L.; Nitu, Mara E.; Cox, Elaine G.; et al.
   PEDIATRIC CRITICAL CARE MEDICINE Volume: 17 Issue: 1 Pages: 73-80 Published: JAN 2016

3. Ventilator-Associated Events: Prevalence, Outcome, and Relationship With Ventilator-Associated Pneumonia
   By: Bouadma, Lila; Sonneville, Romain; Garrouste-Orgeas, Maïté; et al.
   CRITICAL CARE MEDICINE Volume: 43 Issue: 9 Pages: 1798-1806 Published: SEP 2015

4. A Prospective Evaluation of Ventilator-Associated Conditions and Infection-Related Ventilator-Associated Conditions
   By: Boyer, Anthony F.; Schoenberg, Noah; Babcock, Hillary; et al.
   CHEST Volume: 147 Issue: 1 Pages: 68-81 Published: JAN 2015

5. Ventilator Associated Pneumonia in Children
   By: Chang, Ivy; Schibler, Andreas
   PEDIATRIC RESPIRATORY REVIEWS Volume: 20 Pages: 10-16 Published: SEP 2016

6. Comparison of the New Adult Ventilator-Associated Event Criteria to the Centers for Disease Control and Prevention Pediatric Ventilator-Associated Pneumonia Definition (PNU2) in a Population of Pediatric Traumatic Brain Injury Patients
   By: Cirulis, Meghan M.; Hamel, Mitchell T.; Stockmann, Chris R.; et al.
   CRITICAL CARE MEDICINE Volume: 44 Issue: 2 Pages: 157-164 Published: FEB 2016

7. Ventilator-Associated Events in Neonates and Children-A New Paradigm
   By: CooRos, Noelie M.; Kleinman, Ken; PriBe, Gregory P.; et al.
   CRITICAL CARE MEDICINE Volume: 44 Issue: 1 Pages: 14-22 Published: JAN 2016

8. Ventilator-Associated Tracheobronchitis: The Impact of Targeted Antibiotic Therapy on Patient Outcomes
   By: Cravens, Donald E.; Chronneau, Alexandra; Zias, Nikolaos; et al.
   CHEST Volume: 135 Issue: 2 Pages: 521-528 Published: FEB 2009