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Ventilator associated events... perhaps not the answer

Richard Pugh, Wendy Harrison, Ceri Battle, Chris Hancock, Tamas Szakmany

In the most recent issue of JICS, Dr Thomas has rightly argued that ventilator-associated pneumonia (VAP) can be difficult to diagnose and that efforts to limit ventilator-associated morbidity must extend beyond VAP prevention (1). We share his concerns, but are unconvinced that adopting the CDC NHSN ventilator-associated event (VAE) surveillance system recently introduced in the United States (2) is currently the right approach for our population (3).

In Wales, there has been a national surveillance programme to identify episodes of VAP since 2008, originally using the Hospitals in Europe Link for Infection Control through Surveillance definitions (HELICS, classified as PN 1 to 5, according to radiological, systemic, pulmonary and microbiological criteria). We recently investigated triggers for initiating antibiotic therapy for suspected ventilator-associated respiratory tract infection (VARTI) and the implications of variation in clinical practice for VAP surveillance (4). Among 282 invasively ventilated patients admitted to ICU for 48 hours or more, 33 developed VARTI – the main features having been volume and purulence of sputum, inflammatory markers and radiographic changes. In less than 50% cases was chest radiography performed at time of diagnosis, which precludes diagnosis of VAP according to HELICS definition – though these episodes were associated with a significantly prolonged duration of mechanical ventilation and ICU stay.

However, applying the new CDC NHSN definitions to our cohort, we found no overlap between VAE and suspected VARTI. Outside of the UK, other investigators have also described potential limitations to VAE surveillance. A ventilator-associated complication (VAC) is identified when there is sustained increase in FiO₂ or PEEP after a stable baseline of 48 hours or more. However, many patients do not meet the definition of VAC because fluctuations in FiO₂ and PEEP prevent them achieving this stable baseline (5). Variations in practice may affect whether a patient develops a VAC depending on preference for PEEP level or ventilator mode, such as APRV. Previous studies have also found low level of agreement between episodes of VAC and VAP; indeed patients meeting VAC criteria have a range of pathology which might include VAP, but alternatively may represent fluid overload, ARDS or atelectasis. Interventions required to prevent and treat such heterogeneous pathology are likely to differ and it may be difficult to understand the contribution of different processes to patient outcomes associated with VAC.

There are distinctions between the diagnostic needs of the clinician at the bedside and the surveillance administrator - and it is possible to perceive a risk of disengagement with a quality improvement programme that does not emphasise clinical discrimination. Furthermore, although VAE data is highly objective, in a paper-based clinical environment, the workload associated with screening should not be underestimated. Our approach has not been to dispense with HELICS definitions of VAP at this stage, but – appreciating the variation in performance of chest x-ray and subjectivity in interpretation – to supplement with an additional category “PNO” where there is pulmonary, systemic and microbiological evidence of VARTI but without radiographic evidence. We look forward to reporting further on this issue.

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