Ventilator Associated Pneumonia (VAP) Care Bundle		
Organisation	West Yorkshire Critical Care Operational Delivery Network	
Ratified by	Critical Care Clinical Advisory Board	Date 28/02/2017
Target Audience	General Adult Critical Care	
Review date	2 years	
Distribution	Adult General Critical Care Units	
Purpose	To reduce the incidence of ventilator associated pneumonia (VAP)	

Introduction

Ventilator Associated Pneumonia (VAP) is defined as pneumonia occurring in a patient within 48 hours or more after intubation with an endotracheal tube or tracheostomy tube and which was not present before. Early onset VAP occurs within 48 hours and late onset VAP beyond 48 hours of tracheal intubation.

VAP occurs in 10-20% of ICU patients and is associated with an increased mortality, length of ICU and hospital stay, and cost. Preventing VAP should be part of an overall strategy to reduce HCAI.

The best definition of VAP and the optimal criteria for diagnosis remain controversial, and studies in VAP prevention are limited by inconsistent definitions. Furthermore, although many interventions have reduced rates of VAP, few have had an impact on length of stay or mortality[1].

The High Impact Intervention VAP Care Bundle was last updated by the DH in 2010. Since then further evidence has been gathered on the effectiveness of the bundle, some elements have been shown to be clinically effective whereas others have been less successful. This document outlines the care elements that are considered to have a positive impact on reducing the incidence of VAP in critical care patients.

Elements of the VAP Bundle (2016)

Subglottic suction tubes

Secretions are potentially able to bypass the ETT cuff, especially when it is deflated. Secretions that pool above the ETT but below the vocal cords are a potential source of pathogens that could cause VAP. Since conventional suction methods cannot access this area, ETT tubes that have a designated suction catheter for this space allows this pool to be drained. The benefits of subglottic secretion drainage (SSD) have been analysed in three meta-analyses with a consistent signal of a reduction in VAP and ICU length of stay [2,3,4.] .

Cuff pressures

Micro-aspiration can be reduced by maintaining an endotracheal tube cuff pressure between 20 - 30 cmH2O[5]. Based on recent recommendations, cuff pressure should be checked and adjusted around 25 cmH2O, at least 4 hourly. It is noted that individual assessment is required as there will be cases where a patient's clinical condition and ventilation may

require higher pressures - the rationale for this decision must be documented and the position reviewed as a minimum daily.

Daily sedation interruption and assessment of readiness to extubate

Sedation of intubated patients to ensure patient comfort is universal practice. Continuous sedation can lead to accumulation of sedatives and over sedation, and is associated with increased duration of mechanical ventilation. Since intubation and mechanical ventilation predisposes patients to VAP, reducing the duration of mechanical ventilation should reduce that time at risk for developing VAP. Strategies used successfully to reduce the duration of mechanical ventilation are daily sedation interruption (DSI) and daily spontaneous breathing trials (SBT)[6].

More recently there has been a move towards targeted sedation to allow the patient to be calm, comfortable and cooperative which broadly equates to a RASS score of -1/0 [7]. This is achieved by using drugs that are relatively short acting and easy to titrate. Targeting sedation of mechanically ventilated patients will preserve/reinstate spontaneous breathing earlier and facilitates liberation from ventilation thereby reducing the risk of VAP.

It is however recognised that some patients will not benefit from a DSI or reduced levels of sedation due to their clinical status and therefore a clinical assessment should be undertaken and documented.

Semi recumbent positioning

Aspiration of oropharyngeal or gastric contents is implicated in the pathogenesis of VAP. Nursing the mechanically ventilated patient in a semi-recumbent position aims to prevent aspiration of gastric content. Whilst elevating the bed to 45 degrees has been shown to reduce VAP, practically this does not appear to be achievable. The exact degree of elevation needed to prevent VAP is unclear but aiming to avoid the supine position and raising the bed to at least 30 degrees is recommended [8].

Avoidance of scheduled ventilator circuit changes

Humidified gases condense in the ventilator circuitry and are at risk of becoming contaminated. Evidence suggests that frequent circuit changes are associated with an increased incidence of VAP, probably due to the excessive manipulation of the ventilator circuit causing contaminated secretions to enter the bronchial tree via the ETT lumen8. Changing the ventilator circuit should occur only when clinically indicated such as visible soiling or when faulty, following manufacturer's recommendations (7-14 days). This does not increase the incidence of VAP and would result in significant cost savings compared to routine changing of circuit [9,10,11,12.]

Stress ulcer prophylaxis

The prevention of stress ulcers must be weighed against the increased risk of VAP. There is insufficient evidence to give a clear recommendation of the use of SUP and the potential protective benefits of enteral feeding. We therefore recommend consideration of the risk profile of GI bleeding in each patient with judicious use of SUP in patients considered to be at risk of GI bleeding[3].

Oral Hygiene

In light of this recent evidence the use of oral cholrhexadine in non-cardiac surgery patients is not advocated as part of routine oral hygiene. Oral hygiene remains important in ventilated patients in order to remove dental plaque (which may lead to gingivitis or dental

caries), for patient comfort, and to promote a 'normal' microbial community. Therefore regular oral hygiene remains an essential component of care.

Eight Elements of the VAP Bundle

Subglottic suction endotracheal / tracheostomy tubes should be used in patients who it is anticipated will be mechanically ventilated for more than 72 hours.
Mechanically-ventilated patients should be tracheally intubated with an orotracheal tube and cuff pressure maintained between 20-30 cmH2O (optimally 25cmH2O)
Cuff pressure measurements should be carried out every 4-6 hours as a minimum and following any significant movement of the patient i.e. transfer, mobilisation,
Daily sedation hold (unless contraindicated) or based on targeted RASS
Patients should be nursed in a semi-recumbent position (>30^0) unless contraindicated
Ventilator tubing and suction systems should only be changed if specifically indicated, such as by visible soiling, to avoid unnecessary changes (in conjunction with manufacturers recommendations)
Stress ulcer prophylaxis should be used judiciously, and only in patients considered to be at high risk of upper gastrointestinal (GI) bleeding. If a patient is prescribed SUP this should be reviewed regularly and specifically when enteral feeding is established.
Regular oral hygiene should be maintained; oral care should be assessed and delivered according to identified risk.

Audit

Clinical audit is a way to find out if healthcare is being provided in line with required standards and allows care providers and patients to identify where their service is doing well, and where there could be improvements. The aim is to allow quality improvement to take place where it will be most helpful and will improve outcomes for patients. Compliance to the bundle will be audited monthly and data submitted to the West Yorkshire Critical Care Operational Delivery Network. Reports will be produced quarterly for each unit (Appendix 1).

References

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Appendix 1 - Audit Tool

West Yorkshire
Critical Care & Major Trauma
Operational Delivery Networks

Demographics										
Person completing form:										
Trust										
Unit										
Year										
Month										
	Patients Audited									
Activity	1	2	3	4	5	6	7	8	9	10
Subglottic suction endotracheal / tracheostomy tubes should be used in patients who it is anticipated will be mechanically ventilated for more than 72 hours										
Mechanically-ventilated patients should be tracheally intubated with an orotracheal tube and cuff pressure maintained between 20-30 mcH20										
Cuff Pressure measurements should be carried out every 4-6 hours as a minimum and following any significant movement of the patient i.e transfer , mobilisation										
Daily sedation hold (unless contraindicated) or based on RASS										
Patients should be nursed in a semi-recumbet (>30) unless contraindicated										
Ventilator tubing and suction systems should only be changed if specifically indicated , such as by visible soiling , to avoid unnecessary changes (in conjuntion with manufacturers recommendations)										
Stress ulcer prophlyaxis should be used judiciously , and only in patients considered to be at high risk of upper gastrointestinal (GI) Bleeding. If a patient is prescribed SUP this should be reviewed regularly and specifically when enteral feeding is established										
Regular oral hygiene should be maintained which should be assessed and delivered according to identified risk										