

Frequent problems and their management among mechanically ventilated critically ill elderly patients

Watchara Tabootwong and Frank Kiwanuka

Abstract

Purpose – Multiple pathologies and age-related physiological changes lead to acute respiratory failure. This necessitates mechanical ventilation among elderly patients. Mechanically ventilated critically ill elderly patients may confront various problems, including physical and psychological issues. Therefore, the purpose of this paper is to present the frequent problems encountered by critically ill elderly patients and management of such problems.

Design/methodology/approach – This paper reviews relevant literatures.

Findings – Physical problems include pain and respiratory infections. Additionally, psychological problems include anxiety and stress. Such problems should be managed by physicians, nurses and family members. Pharmacological and non-pharmacological approaches can be used to manage these problems. Pharmacological management involves use of medications, while non-pharmacological interventions include use of music therapy, acupuncture and sensory stimulation.

Originality/value – The paper indicates physical and psychological problems of mechanically ventilated critically ill elderly patients. To ensure effective management of complications encountered by mechanically ventilated elderly patients, health-care professionals ought to be aware of physical and psychological age-related changes.

Keywords Management, Elderly, Critically ill, Mechanical ventilation

Paper type Literature review

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Introduction

The elderly population is continuously increasing in hospitals partly due to the increase in life expectancy and associated age-related acute and chronic health problems (Khatib *et al.*, 2017). Frailty in the elderly is a factor of hospitalization (Richards *et al.*, 2019). Elderly patients have chronic diseases and reduced body reserves, which puts them at a higher risk of acute critical illnesses (Leblanc *et al.*, 2017). Moreover, advanced age and frailty are associated with a higher risk factor of mortality among mechanically ventilated critically ill patients (Martin-Loeches *et al.*, 2019). Elderly patients are admitted for numerous reasons, these include elective surgery, trauma, chronic obstructive pulmonary disease, heart failure and chronic renal failure (Robert *et al.*, 2017; Aggarwal *et al.*, 2017). Furthermore, alteration in respiratory physiology, which often leads to acute respiratory failure is a common reason for admission of elderly patients (Guidet *et al.*, 2018). Indeed, acute respiratory failure is the commonest reason of admission among this patient sub population (Le Borgne *et al.*, 2018), and treatment in critical care unit requiring mechanical ventilation (MV) (Jung *et al.*, 2019).

With increasing survival of mechanically ventilated critically ill elderly patients, there is subsequently an increase in occurrence of complications associated with MV including both physical and psychosocial issues. For instance, elderly patients require prolonged MV

(Le Borgne *et al.*, 2018; Aggarwal *et al.*, 2017) and high severity of the disease (Lai *et al.*, 2016b; Lai *et al.*, 2016a). Admission increases the risk of hospital-acquired infections such as respiratory infections, urinary tract infections, skin infections, and sepsis (Esme *et al.*, 2019). In addition, they can also experience sleep disturbance (Elías *et al.*, 2019), depression, anxiety and posttraumatic stress (Inoue *et al.*, 2019). Besides, they still have feelings of abandonment as they are left alone in the hospital (Acebedo-Urdiales *et al.*, 2018).

Generally, mechanically ventilated critically ill elderly patients have various problems, ranging from suffering from the consequences of using MV, infections and psychosocial issues. This literature review highlights the physical and psychosocial aspects among mechanically ventilated critically ill elderly patients and how to prevent and manage such problems. This is useful to critical care nurses, physicians and other health-care professionals in assisting and managing critically ill elderly patients. Additionally, age-related changes are explained and how to intervene with each problem in context of the nursing team.

Frequent problems and management

There are many problems which can occur during hospitalization of critically ill elderly patients, these differ according to an individual's health condition. This literature review presents the frequent physical and psychological problems as follows.

Physical problems

Pain and respiratory infections are the commonest physical problems. Physical issues and management are as follows.

Pain. Mechanically ventilated elderly patients experience pain from various sources, these include endotracheal suctioning, wound care, mouth care and repositioning (Ayasrah, 2016). Indications of intubation arise from difficulty in maintaining a patent airway, this is usually related to pre-existing severe co-morbidities and degenerative physical changes (Guidet *et al.*, 2018; Robert *et al.*, 2017). Degenerative respiratory changes include loss of lung elasticity, increased the anteroposterior chest diameter, decreased inspiratory and expiratory muscle strength and declined sensitivity of respiratory centers. Such lead to an increased risk of acute respiratory failure among the elderly (Guidet *et al.*, 2018). After intubation, the prevalence of sore throat in critically ill elderly patients is estimated at 59.6% (Gemechu *et al.*, 2017). Consequently, critically ill elderly patients may suffer from throat pain (Hajiesmaeili and Safari, 2012). Intubation also causes throat pain due to mucosal edema, tracheal ischemia from the pressure of endotracheal tube cuffs and aggressive oropharyngeal suctioning (Gemechu *et al.*, 2017).

Pain is a common sensory perception among critically ill elderly patients, this culminates into sleep disturbance, anxiety, and posttraumatic stress disorders (Shaikh *et al.*, 2018). Nurses' knowledge, attitude and practices of pain management are essential components of promoting patient comfort (Kiwauka and Masaba, 2018) notwithstanding the nursing team's common underestimation of the severity of pain among critically ill elderly patients. This arises from difficulties with verbal communication (Gomarverdi *et al.*, 2019), impaired memory and reduced visual abilities (Inoue *et al.*, 2019). Health-care professionals (e.g. physicians and nurses) should often assess pain in mechanically ventilated critically ill elderly patients. This can be done numerous tools such as the Behavioral Pain Scale (BPS) and Critical-Care Pain Observation Tool (CPOT) (Gomarverdi *et al.*, 2019; Shaikh *et al.*, 2018). Both CPOT and BPS tools can be used to assess pain in conscious and unconscious mechanically ventilated critically ill patients; however, they differ insensitivity and specificity (Severgnini *et al.*, 2016). BPS is observational score, measures depend on the elderly patient's facial expressions, upper limbs posturing and compliance with MV. Scores range

from 3 to 12, and a total score of 6 or higher suggests that the patient needs pain management (Shaikh *et al.*, 2018). The BPS and scoring are shown in Table 1.

CPOT is usually used for the assessment of pain in mechanically ventilated critically ill patients (Rijkenberg *et al.*, 2015). The subscales of the CPOT includes facial expressions, body movements, muscle tension and compliance with invasive MV. Each element is scored between 0 and 2. The total score ranges from 0 (no pain) to 8 (maximum pain) (Rijkenberg *et al.*, 2015). A CPOT score of ≤ 2 warrants future re-evaluated in critically ill elderly patients. However, elderly critically ill patients with a CPOT score of >2 should be considered for appropriate pain management (Shaikh *et al.*, 2018). The CPOT tool subscales and scoring are presented in Table 2. When users (e.g. physicians and nurses) need to classify levels of pain severity (as mild, moderate and severe), BPS scores of 3–4 and CPOT scores 0–2 reflect absence pain to mild pain, BPS scores of 5–7 and CPOT scores of 3–4 reflect moderate pain, while BPS scores 8–12 and CPOT scores 5–8 reflect severe pain (Severgnini *et al.*, 2016).

Strategies for pain management: physicians and nurses are responsible for assessing and managing pain. Pain management consists of pharmacological and nonpharmacological pain management (Ayasrah *et al.*, 2014). Pharmacological pain management included use of opioid analgesics (e.g. fentanyl, remifentanyl and morphine). Opioids are commonly used to relieve moderate to severe pain, but non-opioid analgesics (e.g. paracetamol, dexmedetomidine and gabapentin) are increasingly used in the management of mild to

Table 1 The BPS and scoring

Elements	Criteria	Score
Facial expressions	● Relaxed	1
	● Partially tightened	2
	● Fully tight	3
	● Grimacing	4
Upper limbs posturing	● No movements	1
	● Partially bent	2
	● Fully bent with fingers flexion	3
	● Permanently retracted	4
Compliance with mechanical ventilation	● Tolerating movements	1
	● Coughing but tolerating ventilation most of the time	2
	● Fighting with ventilator	3
	● Unable to control the ventilation	4

Source: Shaikh *et al.*, 2018

Table 2 The CPOT tool subscales and scoring

Elements	Criteria	Score
Facial expressions	● Relaxed, neutral	0
	● Tense	1
	● Grimacing	2
Body movements	● Absence of movements	0
	● Protection	1
	● Restlessness	2
Muscle tension	● Relaxed	0
	● Tense or rigid	1
	● Very tense or rigid	2
Compliance with mechanical ventilation	● Tolerating ventilator or movement	0
	● Coughing but tolerating	1
	● Fighting ventilator	2

Source: Shaikh *et al.*, 2018

moderate pain. Meanwhile, there is a newer trend for treatment; “*multimodal analgesia*” here, combinations of analgesic medications with a different mechanism of action are used (Shaikh *et al.*, 2018). Pharmacological pain management has widely gained acceptance for managing pain among elderly patients. Prevention and control of side effects should be monitored carefully because of age-related physiologic changes such as degenerative reduction in the efficiency of the gastrointestinal drug absorption, distribution, liver metabolism and renal excretion (Horgas, 2017).

Nonpharmacological pain management involves the management of pain without medications. For instance, putting the patient in a comfortable position, applying hot or cold compress, massage, music therapy, therapeutic touch and acupuncture (Khalil, 2018). Studies have investigated the effectiveness of non-pharmacological pain management approaches: DellaVolpe and Huang (2015) examined music therapy for relieving pain during ventilatory support among critically ill patients. In this study, patients wore noise-abating headphones for a mean duration of 34 min/day. By the fifth study day, listening to preferred music reduced sedative usage compared to usual care. Feeney *et al.* (2017) investigated the use of acupuncture treatment for relieving pain among critically ill patients. The result revealed that acupuncture was safe and acceptable in an ICU setting. Their findings revealed that it alleviated pain, and there was a significant decrease in morphine usage after treatment.

Respiratory infections. Infections are a common cause of hospital mortality among critically ill elderly patients (Martin-Loeches *et al.*, 2019). Factors associated with the severity of infections in critically ill elderly patients are immunosenescence, comorbid chronic disease and age-related physiological changes (Esme *et al.*, 2019). Particularly, immunosenescence is combinations of immunosuppression and inflamm-aging, which results in higher incidence of severe infections (Boumendil and Guidet, 2006). Regarding respiratory infections, elderly have various risk factors that predispose them to respiratory tract infections. Physical changes predisposing elderly patients to respiratory tract infections include decrease in cough and other protective reflexes, lung elasticity, mucociliary clearance and immunoglobulin levels in respiratory secretions (Esme *et al.*, 2019). Furthermore, pneumonia increases dramatically with advanced age (Esme *et al.*, 2019). Pneumonia is commonly caused by *Staphylococcus aureus*, and it a common complication of MV (Miller and Linge, 2017). Ventilator-associated pneumonia (VAP) is the critical infection in mechanically ventilated critically ill elderly patients (Guillamet and Kollef, 2015; Lau *et al.*, 2015). Moreover, the increasing prevalence of multidrug-resistant (MDR) or extremely drug-resistant (XDR) pathogens have also increased the occurrence of VAP. Physicians and nurses should be aware of the increasing prevalence of MDR pathogens and their association with increase in VAP (Guillamet and Kollef, 2015). To prevent VAP, the general management of respiratory infections in critically ill elderly patients is not different from that younger patients (Esme *et al.*, 2019). Examples of prevention strategies are as follows (Lau *et al.*, 2015):

- using standard infection control precautions;
- aseptic technique should be performed during intubation and tracheostomy tube change;
- ventilator circuits should not be changed more frequently than every week unless it is visibly soiled;
- prevention of self-extubation and re-intubation;
- daily assessment of physical strength for extubation and using an evidence-based protocol to guide weaning from MV;
- maintenance of PEEP during MV, and avoiding zero PEEP;

- avoiding routine suction and use the lowest suction pressure necessary for the shortest duration;
- considering continuous oral suction;
- regular maintenance of cuff pressure of 20-30 cm H₂O;
- regular oral care with 0.12–2.0% chlorhexidine;
- elevation of the head of the bed to between 30° and 45°; and
- consider early antibiotic treatment for ventilator-associated tracheobronchitis.

Psychological problems

Mechanically ventilated critically ill elderly patients experience psychological problems (Inoue *et al.*, 2019). Castillo *et al.* (2016) reported that most patients who received MV had moderate to severe levels of anxiety during their ICU stay. Anxiety among critically ill elderly patients associates with the use of MV (Chlan and Savik, 2011). Feelings of abandonment resulting from a lack of proximity between patients and families causes anxiety among this patient subpopulation (Back *et al.*, 2009). To assess anxiety, various tools can be used: the Visual Analog Scale-Anxiety (VAS-A) can be used to measure anxiety in conscious elderly patients receiving MV who are able to interact appropriately with the nursing team (Chlan and Savik, 2011). Elderly patients can rate their current level of anxiety on the VAS-A on a 100-millimeter vertical line that is anchored on each end by statements: not anxious at all (0 points) to the most anxious level they experience (100 points) (Chlan and Savik, 2011).

Critically ill elderly patients may experience difficulties in concentrating. The Intensive Care Psychological Assessment Tool (IPAT) may be used to measure psychological problems of critically ill elderly patients that are experiencing difficulties with concentrating (Wade *et al.*, 2014). The IPAT has 10 items, these include questions on whether the patient has: communication difficulty, sleep difficulty, tense, sad, panic, hopeless, disorientation, delusions, hallucinations and intrusive memories. Scoring: there are three possible responses for each item (no = 0; yes (a bit) = 1; yes (a lot) =2), the total IPAT score is 20 points. Points ≥ 7 indicate a risk of psychological problems (Wade *et al.*, 2014; Duman *et al.*, 2019). The IPAT should also be considered for routine clinical use to assess acute distress among critically ill patients who are alert, awake and orientated (Wade *et al.*, 2014).

If the nursing team knows what score of psychological problems based on the assessment using the aforementioned tools, the nursing team can help critically ill elderly patients by selecting proper strategies in dealing with their problems. For example, music therapy can reduce the anxiety level in mechanically ventilated critically ill patients (DellaVolpe and Huang, 2015). Relaxing music should be slow tempo of 60–80 beats/min, low pitch and no lyrics. Listening to music affects the central nervous system through the release of inhibitory neurotransmitters and, withdrawal of sympathetic activity via diminished norepinephrine release (Chlan, 2016). Furthermore, stress may occur and lead to increase oxygen consumption in the critically ill patient's body. Therefore, sensory stimulation is one of the important methods to reduce stress and increase the level of arterial blood oxygen saturation in the elderly patient by a family member of the elderly patient. Techniques for doing sensory stimulation include (Yousefi *et al.*, 2015):

- A family member sits beside the patient.
- A family member holds the patient's hand smoothly, touches and calls the patient by his/her name, as well as greet and talk to him/her for 5 min.
- After 5 min, there should be 1 min of silence and no-touch. Then, a family member starts to touch the patient's head and face smoothly and orient him/her to the current time and talk about household events and family members for 5 min.

- A minute of silence and no-touch is performed again. Finally, the family member holds the patient's hands, touch him/her, wish him/her good health and say goodbye in the final 5 min.

Conclusion

Mechanically ventilated critically ill elderly patients have various reasons that warrant hospital admission, these include multiple pathologies and age-related physiological changes. The care for critically ill elderly patients may be difficult because of physical and memory impairment as well as little attention to what critically ill elderly patients face. Therefore, health-care professionals should select the proper assessment tools and manage physical and psychological issues while considering age-related changes. Pharmacological or nonpharmacological management can be used to manage complications experienced by mechanically ventilated critically ill elderly patients.

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