Nursing Experience of an Elderly Awake Patient with Severe Pneumonia and ARDS Undergoing Prone Position Ventilation: A Case Report

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Abstract

Summarized nursing experience of a conscious elderly patient with severe pneumonia complicated by ARDS undergoing prone position ventilation. Severe pneumonia is a relatively serious respiratory disease, in which patients are often complicated by acute respiratory distress syndrome (acutrrespiratiory distress syndrome,ARDS), with involvement of other organ systems and prone to various complications. Through summarizing the nursing experience of a patient with severe pneumonia complicated by ARDS undergoing prone position ventilation, this study aims to explore its efficacy and practical considerations in operation. The patient was discharged after 19 days of hospitalization. In 3-month regular follow-up, the prognosis was good.

Full Text

Nursing Experience of an Elderly Conscious Patient with Severe Pneumonia and ARDS Undergoing Prone Position Ventilation

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Abstract

This article summarizes the nursing experience of an elderly conscious patient with severe pneumonia complicated by acute respiratory distress syndrome (ARDS) undergoing prone position ventilation. Severe pneumonia is a serious respiratory disease in which patients often develop ARDS, involving multiple organ systems and predisposing them to various complications. By documenting the nursing experience of this case, we aim to explore the therapeutic efficacy and practical considerations of prone positioning. The patient recovered and was discharged after 19 days of hospitalization, with favorable outcomes observed during 3-month regular follow-up.

Keywords: severe pneumonia; ARDS; prone position therapy; nursing experience

Introduction

Severe pneumonia is a leading cause of mortality among elderly patients, with most presenting initially to the emergency department [1]. Acute respiratory distress syndrome (ARDS) refers to acute lung injury from various etiologies, with pathophysiological manifestations including reduced lung volume, decreased compliance, and ventilation-perfusion mismatch [2-3], ultimately leading to acute hypoxemic respiratory insufficiency characterized by refractory respiratory distress and hypoxemia. The disease progresses rapidly with high mortality risk, and may be complicated by multiple organ failure in later stages, threatening life. Mechanical ventilation is often required in severe cases. Prone position ventilation (PPV) is a therapeutic approach for critically ill patients that improves oxygenation and ventilation by placing the patient in prone position, allowing gravity-dependent lung regions to achieve better ventilation and perfusion. This article summarizes the clinical nursing experience of an elderly conscious patient with severe pneumonia and ARDS who underwent prone position ventilation on December 31, 2022, to promote optimization of related preventive measures and provide practical references for improving treatment outcomes and nursing quality.

Clinical Data

The patient was an 86-year-old male, 167 cm in height and 68 kg in weight, who presented to the emergency department by wheelchair accompanied by family members on December 31, 2022, with a 7-day history of cough and sputum production and 4 days of dyspnea. Admission vital signs were: temperature 36.9°C, respiratory rate 32 breaths/min, heart rate 74 beats/min, blood pressure 157/56 mmHg (1 mmHg = 0.133 kPa), and oxygen saturation 86% on high-flow oxygen. Symptoms included cough, sputum, dyspnea, chest tightness, and breathlessness without dizziness, headache, nasal congestion, sore throat, abdominal pain, diarrhea, or altered consciousness. The patient reported poor appetite but normal sleep and bowel/urinary function.

Physical examination revealed symmetrical chest without deformity, bilateral moist and dry rales, heart rate 74 beats/min with regular rhythm, no pathological murmurs in any valvular auscultation area, soft abdomen without tenderness, non-palpable liver and spleen, negative renal percussion tenderness, and no lower extremity edema. Neurological examination showed present physiological reflexes and absent pathological reflexes.

Laboratory findings included: complete blood count + CRP: neutrophils 84%, hematocrit 38.5%, lymphocytes 5.9%, mean platelet volume 88 fL, WBC 133 $\times$ 10^9/L, eosinophils 0.1%, CRP 195.68 mg/L, lymphocyte count 0.78 $\times$ 10^9/L, hemoglobin 129 g/L, monocytes 1.33 $\times$ 10^9/L, neutrophil count 11.14 $\times$ 10^9/L; infectious inflammation panel: serum amyloid A 436.2 mg/L, procalcitonin 0.78 ng/mL, interleukin 6184.1 pg/mL, CRP 1191 mg/L; emergency chemistry panel: sodium 133.2 mmol/L, urea 8.47 mmol/L, lactate dehydrogenase 324 U/L, AST 45 U/L, glucose 24.81 mmol/L, albumin-globulin ratio 1.0, chloride 93.2 mmol/L, total CO_2 14.4 mmol/L; coagulation profile: fibrinogen 9 g/L, D-dimer 1.38 mg/L, fibrinogen degradation products 5.91 mg/L; arterial blood gas: pH 7.509, PCO_2 30.6 mmHg, PO_2 45 mmHg, HCO_3^- 24.2 mmol/L, glucose 13.7 mmol/L, anion gap 5 mmol/L, lactate 1.55 mmol/L. COVID-19 nucleic acid test was negative. Chest CT showed extensive bilateral inflammatory changes consistent with viral pneumonia.

Traditional Chinese Medicine diagnosis: Cough disease with qi-yin deficiency pattern. Western medicine diagnosis: severe pneumonia; acute respiratory distress syndrome. Western medical treatment included anti-infection, antiviral therapy, nebulization, anticoagulation, and high-flow oxygen therapy. TCM treatment principle: tonify qi and nourish yin, resolve phlegm and stabilize wheezing. TCM nursing interventions: intradermal acupuncture at Hegu (LI4), Zusanli (ST36), and Neiguan (PC6) to strengthen the foundation; auricular acupressure at heart, liver, kidney, spleen, and endocrine points to regulate viscera and promote qi flow. The treatment sites remained intact.

Patient Characteristics and Outcomes

Implementation of prone position ventilation in conscious patients differs from deeply sedated, intubated patients. Conscious patients maintain spontaneous breathing capacity, can actively express discomfort during prone positioning, allowing timely detection and adjustment, thereby reducing risks of tubing kinks and pressure injuries. However, Ibarra-Estrada et al. [5] reported that some patients interrupt prone positioning due to pain, intolerance, vomiting, or other discomforts, compromising therapeutic efficacy. Therefore, nursing interventions to improve tolerance and compliance are crucial.

On January 19, 2023, the patient's cough, sputum, chest tightness, and breathlessness had improved. High-flow non-invasive ventilation was transitioned to nasal cannula oxygen with intermittent prone positioning, which the patient tolerated well. The patient remained alert with good appetite, sleep, and normal

bowel/urinary function. Vital signs were: temperature 36.4°C, respiratory rate 21 breaths/min, heart rate 77 beats/min, blood pressure 101/55 mmHg, oxygen saturation 99%. Physical examination showed symmetrical chest without deformity, clear breath sounds with moist rales, heart rate 77 beats/min with regular rhythm, no pathological murmurs, soft abdomen without tenderness, non-palpable liver and spleen, negative renal percussion tenderness. Neurological examination remained normal. Follow-up labs on January 19, 2023 showed: total protein 54.1 g/L, albumin 32.2 g/L, ALT 52 U/L, creatine kinase 20.8 U/L, uric acid 154 mol/L, glucose 9.65 mmol/L, total CO_2 29.4 mmol/L. Respiratory infection panel was positive for respiratory syncytial virus Ig antibody. The patient was discharged on January 19, 2023. Three-month regular follow-up revealed good recovery.

Complications Management

Facial Edema In prone position, the face occupies a dependent position, making edema common. Mild edema typically resolves within days of returning to supine position. During prone ventilation, protective dressings or elevating the head 15°–30° can reduce edema. Liu et al. [6] demonstrated that elevating the head of bed 30°–45° yields the most significant oxygenation improvement. Adjusting pillow position and head-of-bed angle reduces facial pressure and improves comfort while dynamically monitoring oxygen saturation and respiratory rate.

Conjunctival Edema Conjunctival edema frequently occurs during prone ventilation. Mechanical ventilation affects orbital venous return, and endotracheal tube securing straps exacerbate fluid leakage into periorbital tissues [7]. Scholars have proposed maintaining the head above heart level and using ocular dressings to protect the supraorbital and temporal regions, reducing direct pressure on the eyeball [8].

Exposure Keratitis Prone position ventilation increases risk of exposure keratitis due to the prone posture and absent blink reflex [9]. Ahmadinejad et al. [10] conducted a randomized controlled study of 152 subjects comparing three methods for prevention: eye ointment, polyethylene film, and eyelid taping.

Pressure Injuries Due to age-related physiological decline and reduced sensory sensitivity, elderly patients are prone to pressure injuries. Maintaining pillow softness and preventing irreversible collapse is essential. Prophylactic application of appropriate dressings before prone positioning is crucial [11].

Gastric Content Reflux When continuing prone ventilation after eating and position changes, gastric contents may approach or enter the lower esophageal sphincter, causing reflux. Interventions such as head-of-bed elevation and prophylactic prokinetic agents can improve gastrointestinal motility [12].

Considering the characteristics of conscious elderly patients, continuous dynamic nursing care was provided through improved compliance and management of related precautions. While conventional nursing focuses on fundamental care [13], quality nursing involves analyzing factors contributing to complications, strictly controlling these influences during care, and implementing preventive measures to effectively reduce complication rates. Prone position ventilation was incorporated into the *Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 5)*, reaffirming its advantages in critically ill COVID-19 patients. As emergency nursing professionals, we should continuously optimize prone positioning techniques to benefit more patients while effectively preventing complications.

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Note: Figure translations are in progress. See original paper for figures.