Case Study: Critical Care

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G.R. was a 58 year old African American female. Her past medical history included congestive heart failure, diabetes mellitus, hypertension, and chronic morbid obesity. She was a full code. Prior to this hospitalization, she was admitted to Chesapeake General Hospital (CGH) on September 9, 2014 after she sustained a fall. She had a “blister” and other wounds on her sacrum and back; wounds included, but are not limited to: a large stage 4 ulcer on her sacrum, a stage 2 ulcer on her upper back, and various unstagable wounds to her buttocks and legs. She underwent a series of incision and drainage procedures to restore her tissues. However, she developed sacral osteomyelitis and was infected with methicillin-resistant staphylococcus aureus; sepsis ensued.

During her stay at CGH, G.R. developed acute kidney injury as her filtering system became poorly functioning. Additionally, a nasogastric tube insertion went awry; the tube was inserted into her right lung. Unfortunately this was not determined early to prevent further deterioration. G.R. developed a pneumothorax and respiratory failure ensued. Her status improved and she was discharged from Chesapeake. However, she was admitted to Riverside Regional Medical Center on October 19, 2014 after experiencing increased respiratory distress. This paper is a discussion of the multidisciplinary needs and plan of care for G.R. Goals and expected outcomes will be determined for her recovery with the incorporation of knowledge inspired by different health fields with a concentration in nursing theory and research.

Medical Diagnosis
G.R.’s first hospitalization initiated the start of a multitude of problems. However, the reason she continued her stay in intensive care units is due to chronic respiratory failure. Prior to being hospitalized, she lived with her sister alone. Although she was morbidly obese and had decreased mobility, she was still able to live a life unconfined to a hospital bed. However, as a result of her first hospitalization, she had decreased lung expansion and oxygenation in which she became dependent on the ventilator to support her respiratory status. This is potentially due partly to her excess adipose tissue. The excess of tissue shifts the diaphragm, a critical muscle needed for the work of breathing, greatly reducing the “lung volumes” (Siela, 2009, pg. 302).

Respiratory failure occurs when the body’s ventilation and/or perfusion abilities are compromised. The lungs have an important task of oxygenating blood for circulation and the sustentation of organs and tissues. When the body is unable to effectively oxygenate and excrete carbon dioxide, the respiratory system will fail (Urden, Stacy, & Lough, 2014). G.R. was admitted to the intensive care unit due to her increased respiratory distress. She had a prior resolved pneumothorax, but a recent chest x-ray on October 27, 2014 indicated she had perihilar and bibasilar atelectasis. Atelectasis is partial or complete collapse of the lung; the alveoli collapse rather than stay open. Collapsed alveoli “contributes to poor gas exchange and hypoxemia” which can increase her work of breathing (Siela, 2009, pg. 302).

G.R.’s lung fields were auscultated, and there were diminished breath sounds at the bases, correlating with the bibasilar atelectasis as seen on the chest x-ray. G.R. was placed on a weaning trial of the ventilator for four hours. Over the course of the trial, she had a fraction of inspired oxygen level of 35. Thus, when 35 is multiplied by 5 to calculate the expected partial pressure of oxygen in her blood, her oxygen level should be 175 mm Hg. However, her level was
only 92, a little over half of her expected oxygen level. This low number indicated that she was inadequately oxygenating her blood which had dire impacts on her body’s perfusion.

Additionally, during the clinical day, she experienced fatigue and dyspnea during seemingly simple interventions. This could be due to the decreased expansion of her lungs and “reduced function” of the diaphragm (Siela, 2009, pg. 304).

**Nursing Diagnoses**

After assessing G.R.’s physical status and analyzing her medical history, it was necessary to prioritize the problems to effectively care for G.R. The five nursing diagnoses applicable to G.R. in order of priority are impaired tissue integrity, impaired gas exchange, anxiety, excess fluid volume, and risk for falls. The first two priorities will have detailed interventions, goal outcomes, and evaluations.

The nursing priorities are prioritized based on The University of British Columbia (UBC)’s Model for Nursing. In this theory, the nurse utilizes their knowledge of disease processes and the patient to provide an individualized plan of care. Every patient has a set of “basic human needs” to survive (Johnson & Webber, 2010, pg. 155). The nurse strives to help the patient meet these needs and return to as normal functioning as possible and “achieve balance” (Johnson & Webber, 2010, pg. 156). Every system in a patient’s body impacts other systems, and when one system is poorly functioning, it impacts the balance of the patient (Johnson & Webber, 2010). Impaired tissue integrity is considered the first priority problem for G.R. Her other health issues mainly occurred as result of her body’s response to the damage, and caused an imbalance in her body. Goals of care will be targeted at regaining this sense of balance and unity within her body.
Nursing Diagnosis One

G.R.’s impaired tissue integrity is related to poor oxygenated blood circulation to infected tissues as suggested by a chronic history of hyperglycemia and high blood pressure. High glucose levels in the blood vessels can cause the blood to coagulate and move slowly. This further impairs the blood's ability to return to the heart for oxygenation. In addition, her tissue impairment is related to the excess fluids her body is unable to excrete due to inadequate filtration. G.R. is morbidly obese and has decreased mobility. She is barely able to move her extremities and requires staff assistance to lift them. Her hospitalization has led to an imbalanced diet that is less than her body requirements.

This diagnosis is evident by the status of her integument; she has broken, dry skin with wounds on her sacrum, back, and legs degraded to muscle and bone. Additionally, her albumin level was 2.2; as protein is necessary for tissue and muscle recovery, a decreased albumin level predisposes G.R. to be a susceptible host to infection and increased wound healing time (Urden, Stacy, & Lough, 2014).

Outcomes. G.R. will have increased granular tissue before discharge. She will not sustain further skin breakdown during shift and before discharge. She will maintain normothermia during shift. With the assistance of multidisciplinary staff, G.R. will utilize pharmacological means to decrease her risk of further infection during shift and throughout hospitalization. Visitors of G.R. will utilize proper contact protective equipment during hospitalization of G.R.

Interventions. An assessment of her skin is probably one, if not the most, important intervention for impaired tissue integrity. Assessment should include the skin, muscle, and bone as well as
vital signs. If the skin is assessed and the nurse is cognizant of changes in integument, it can impact the future to prevent further breakdown.

The upper back wound should be cleansed with Vashe cleanser. The Vashe cleanser with Santyle debrides the wound; debriding exfoliates the dead tissue and allows new growth to develop. Additionally, dakins solution will be heavily applied to kerlex and set in the sacral wound to saturate it. Dakins is an antiseptic that is used to prevent bacteria growth. Additional cleansers utilized are collagenase and tripsin which act by cleaning the ulcer and preventing infection. The sacral wound was a stage 4 ulcer; the wound was so severe, it was down to the bone. Thus due to the open wound, it is important to cover the wound with gauze and tape it down. The hole in her back poses a huge risk for infection (Ignatavicius & Workman, 2013).

Additionally, she is at risk for further impaired tissue integrity. Thus, it is important to not only treat infection and current impairment, but to also prevent it. Chlorhexidine will be utilized to decrease bacteria in her mouth. In the research study ‘Effects of oral care solutions on mucous membrane integrity and bacterial colonization’, the nurse researchers aimed to determine if there was a statistical difference in “oral mucous membrane integrity” among three popular oral care solutions: “5% sodium bicarbonate, 2% chlorhexidine, and saline solution” (Özden, Türk, Düger, Güler, Tok, & Gülsoy, 2014, pg. 78). The researchers divided 60 patients into groups of three, 20 patients per group. They explored assessments and data to determine there was no large statistical difference in mucous membrane integrity. Each group had some “mild dysfunction” (Ozden et al., 2014, pg. 78). There are several microorganisms that are commonly seen in ventilator use. P. aeruginosa, one of the more common ventilator associate pneumonias, increased in the chlorhexidine and sodium bicarbonate groups, but remained
constant in the saline group. However, A. baumannii, another common microorganism, decreased only in the chlorhexidine group (Ozden et al., 2014). Thus, the implications for this study indicate that it type of solution does not matter in reducing tissue integrity in the mouth; many solutions work the same. It is important to perform mouth care in patients. The mouth is a harbor of different bacteria. When this bacteria is able to sit on the gums and teeth, it can lead to infection and pneumonia (Urden, Stacy, & Lough, 2014).

G.R. is on contact precautions. Anyone who enters her room must don a gown and gloves. Any visitors she receives need to receive education on the purpose of the isolation and how to put on the appropriate protective apparel. Contact precautions are necessary to protect the person who enters her room from contracting MRSA. Protective equipment must be donned before entering her room, and before exiting (Ignatavicius & Workman, 2013). Hand washing is considered to be the most important means of reducing the transmission of infection. Proper hang hygiene incorporates the use of either an alcohol-based cleanser or soap and warm water. Hands must be scrubbed for at least fifteen seconds if soap and warm water is used. It is known that friction removes “transient bacteria and soil from hand surfaces” (Ignatavicius & Workman, 2013, pg. 438).

Immobile patients should be turned every two hours. However, the amount of time it takes for even small interventions for G.R. is extreme due to her size. Thus, it is important to maintain a strict turning schedule. The excess adipose tissue G.R. has poses a great risk for increased tissue impairment as well as hinders the healing of her current wound. A study conducted by four nurse researchers, Toshiko Kaitani, Keiko Tokunaga, Noriko Matsui and Hiromi Sanada, aimed to denote the risk factors involved in the manifestation of pressure ulcers.
The researchers utilized a prospective cohort design on 98 patients in an intensive care unit. The researchers chose this population as pressure ulcers commonly develop in the critical care setting. They analyzed data to determine if there was a correlation between pressure ulcer incidence with medications, turning and repositioning, and “severity of disease” (Kaitani, Tokunaga, Matsui, and Sanada, 2010, pg. 417). The study found that those who had pressure ulcers had a significantly decreased amount of positioning and turnings. The implications are that turning is essential in decreasing impaired tissue integrity in patients. However, they are not always utilized in those who have ulcers. Thus, it is important to initiate positioning as much as possible. Sometimes this will require prior

**Evaluation.** During my care of G.R. I was able to provide education to a family visitor on proper contact precaution equipment. I informed him the reason G.R. was on isolation and progressed to show him the steps of ‘gowning up’. He verbalized an understanding of the reason she was on isolation and put the equipment on properly. During the wound dressing change, I was able to observe granulation tissue indicating the wounds were progressing towards healing. Her temperature during the clinical day was 96.9 Fahrenheit; she did not spike a temperature. So, this goal of care was met for the week, but the future is to not sustain any other infection.

She was given dilaudid before the dressing change, but still experienced pain. However, she did allow the dressing change to occur. She was not positioned every two hours, as the interventions indicated. This was partly due to her size and the amount of staff and time it took to do simple interventions. In the future, it would be helpful to have a set schedule of turning and maybe have different nurses sign up to do the positioning changes at the set times or receive outside help for the positioning because more than three people are needed to do so. Additional
interventions could be to have G.R. do active range of motion exercises periodically throughout the day. This could improve her range of motion and allow her muscles to be utilized to prevent muscle breakdown (Ignatavicius & Workman, 2013).

**Nursing Diagnosis Two**

The second priority nursing diagnosis for G.R. is Impaired Gas Exchange related to lack of expansion of her alveoli, prior collapsed lung, and excess weight as evidence by PaO2 92 on FiO2 35%, blood pressure 152/73, restlessness, diminished breath sounds at bases Imbalanced Nutrition Less than body requirements related to nothing by mouth status for several days prior to this clinical, dietary intake lower than body requirements as evidence by no residual, albumin 2.2, documented “inadequate calorie intake” per dietician, dry skin.

**Outcomes.** G.R. will be alert and responsive to verbal stimuli during clinical day.

G.R. will maintain oxygenation saturation of 95 percent or greater during clinical day and throughout hospitalization. G.R. will be able to be on a weaning trial for greater than 12 hours by end of hospitalization.

**Interventions.** Respiratory therapy will administer albuterol treatments in order to dilate the bronchi to allow optimal depth and breathing for adequate oxygenation. Albuterol is a bronchodilator that impacts the “smooth muscle relaxation” to promote easier breathing (Ignatavicius & Workman, 2013, pg. 609). G.R. has an increased work of breathing due to her increased adipose tissue.

Additionally, it is important to provide a relaxed environment by keeping the room quiet and clean. The environment can have an effect on anxiety levels, and anxiety can cause an
increase in vital signs such as the increased heart rate, blood pressure, and respirations. When the heart is beating excessively, the body does not receive adequate oxygenated blood, leading to further decompensation of tissue. Level of consciousness should be monitored along with vital signs.

Suctioning is vital to the patient on ventilation. The patient is not usually able to effectively remove secretions from their lungs by turning, coughing, and deep breathing. “Suctioning maintains a patent airway and promotes gas exchange by removing secretions” (Ignatavicius & Workman, 2013, pg. 574). Thus, removal of these secretions allows for an effective breathing pattern. When suctioning, the nurse first wash their hands and apply gloves. They will explain the procedure to the patient before doing so. The patient must know that it can cause some discomfort and “shortness of breath and coughing are to be expected” (Ignatavicius & Workman, 2013, pg. 574). After explaining the procedure, the patient should be oxygenated with 100 percent oxygen; this allows for the prevention of hypoxemia. Maintaining the head of the bed elevated to 45 degrees allows for the expansion of the lungs.

Several nurse researchers aimed to determine if the critical care units impacted a nurse’s ability to make decisions during “weaning from mechanical ventilation” (Kydonaki, Huby, & Tocher, 2014, pg. 283). This study took place over the course of five months in “Greece and Scotland”. The researchers observed 19 weaning trials and were able to conduct interviews of healthcare personnel: nurses and doctors. The study determined that there were multiple factors in participation of weaning of patients from ventilations. Some of these were the “relationships, organization of the units, and the role of the weaning protocol” (Kydonaki, Huby, & Tocher, 2014, pg. 283). There are different disciplines involved in weaning, and the nurse has a role in
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this. Sometimes the critical care units can be intense. However, the nurse has an important role as advocate for the patient. She has a role in assessing the patient to make sure they are at optimal level during the weaning trial people.

**Evaluation.** G.R. was alert during the clinical day, but solemn. I tried to talk to her, but it felt as if she were looking through my body; she did not try to respond to my conversation with her, but she responded during assessment when asked to “wiggle toes”. Although she met this goal for the day, her attitude was indicative of depression. She may benefit from a visit from a pastor, friend, or chaplain; she really needed her spirit uplifted. I felt I was unequipped to do so. She maintained an oxygenation saturation of greater than 95 percent during the clinical day. During assessment, rhonchi was auscultated in the upper bases. Thus, suctioning was performed and a follow up assessment showed an improvement in the congestion heard. Additionally, during the day, she was on a weaning trial for four hours. This was evidence that she was progressing towards the long term goal of being on a trial for greater than 12 hour.

**Nursing Diagnosis Three**

Anxiety related to wound care as evidence by eyes widening with tears at the conversation of wound care, solemn facial expressions, blank stares at people, and lack of response to verbal stimuli. I spoke with the nurse I was working with about her receiving a pain medication, Dilaudid, before the procedure. This medication was administered and documented according to hospital policy. Although she received the medication before wound care, she still showed signs of pain by tensing her muscles, and grimacing during the procedure.

**Nursing Diagnosis Four**
Excess Fluid Volume related to damaged kidney tubule cells and decreased filtration in as evidence by blood urea nitrogen level of 91 and creatinine 3.7. These values are increased indicating her kidney’s ineffective filtration status. The intake values available for her indicated an intake of 1,003.99 milliliters in 16 hours. Over these hours, she only had an output of 50 milliliters. Surprisingly, her sodium, potassium, and magnesium levels were within normal limits.

**Nursing Diagnosis Five**

G.R. was at risk for falls. She was very dependent on nursing care, merely due to her medical problems, but also due to her size. Her bed constantly beeped alerting all personnel of the max load of the bed. She had decreased muscle tone as she was confined to her bed for several weeks; she needed help with basic tasks such as lifting her legs and arms. This increases the risk for falls as she would be not used to standing on her feet. Also, she decreased oxygenation of her blood which could make her dizzy with lack of oxygenation to her brain. The goal of this diagnosis was to sustain no fall during hospitalization. At the time of my departure, she was progressing towards this goal.

**Conclusion**

G.R. was a middle aged woman who experienced a multitude of complications due to seemingly minor events. I learned about how the different systems in the body are interrelated; if one system is compromised, it can impact the other systems. In caring for G.R., I learned to prioritize my day as I had to group activities together due to her contact isolation. It also was a wonderful opportunity to work with others; it was valuable to see how other nurses utilize teamwork with other nurses, doctors, and ancillary staff to improve patient outcomes. Also, it
was informative to learn about potential complications that can ensue with an excessive amount of adipose tissue. G.R.’s care required special time, money, and resources that required extensive preparation that is simply unavailable to all patients. It makes me wonder how the rising rates of obesity in the United States will impact health careers on a larger scale in the years to come.
References


