Factors Associated with Development of Pressure Ulcers in Patients Installed with Assist Device Tubes in ICUs

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Purpose of the study

Critically ill patients are a high risk group for pressure sores due to insufficiency of blood perfusion and oxygenation. Particularly, patients in the cardiovascular surgery department have a significantly higher incidence of pressure ulcers than those in other departments due to poor blood circulation in combination with physical constraints caused by assist device tubes. Patients with heart failure need to be installed with the tubes of the following assist devices: intra-aortic balloon pump (IABP) and extracorporeal membrane oxygenation (ECMO) or ventricular assist device (VAD). Cardiac surgery ICUs provide care for patients after various major cardiac surgeries as well as IABP depending on the severity of the patient’s conditions to reduce cardiac afterload and increase myocardial blood flow, or install ECMO for the patient’s heart to recover and to gain time for treatment. Whether in the case of heart failure caused by sudden acute myocardial infarction, awaiting a heart transplant due to chronic heart failure, or acute heart failure following an open-heart surgery, ECMO and VAD can be used when IABP assist fails to bring about any improvement. Although both being machine-assisted circulation systems, IABP and ECMO differ in timing of use and effectiveness. Therefore, choices still depend on patient needs. Assist systems are relied upon to allow the patient’s heart and lungs to rest and gain time to treat the patient’s disease itself. The purpose of this study is therefore to investigate factors associated with development of grade 1-2 pressure ulcers in patients installed with assist device tubes in cardiovascular surgery ICUs.

Method

This study was conducted using case analysis and review of medical records over the period between January 2012 and March 2016. The sample consisted of 139 patients who had experienced pressure ulcers in cardio surgery ICUs. An analysis table for causes of pressure ulcers was developed based on the proof from the literature. With the analysis table, 33 patients who were installed with the tubes of assist devices (IABP, ECMO and VAD) and developed pressure ulcers were selected for the investigation of factors associated with development of pressure ulcers in patients installed with assist device tubes and data analysis using SPSS.

Results

During the study, 33 of the 139 patients who had experienced pressure ulcers in cardiovascular surgery ICUs developed pressure ulcers due to installation of the tubes of assist devices (IABP, ECMO and VAD) required for their conditions, constituting an incidence of 23.74% (33/139). Factors associated with development of pressure ulcers in patients installed with assist device tubes include demographical variables, such as gender and age, surgical wounds with males accounting for 84% and average age at 62, surgical wounds (90%). The analysis of associated factors reveals variables to be: cachexia (diabetes, kidney disease, anemia etc.) (75.7%), limb edema (81.8%) surgical wounds (90%), no and incorrect anti-pressure measures (33.3%). In the Braden Scale for Predicting Pressure Ulcer Risk, patients with pressure ulcers scoring equal to or greater than 16 account for 15.1%, those scoring 4 in sensory perception for 15.1%, and those with malnutrition for 48.4%.

Conclusion

This study shows that factors causing development of pressure ulcers in patients installed with assist device tubes are: cachexia, score of 4 in sensory perception, malnutrition, no and incorrect anti-pressure measures. Patients in cardiovascular surgery ICUs have a significantly higher incidence of pressure ulcers than those in other departments due to heart failure in combination with poor blood circulation, poor nutrition, pains from surgical wounds and physical constraints caused by the installation of assist device tubes on lower limbs or the chest. It is therefore suggested that further research should focus on enhancing education on preventive measures for pressure ulcers and knowledge of care associated with assist device tubes for medical staff and improving alertness in nursing staff for development of pressure ulcers in patients installed with assist device tubes to prevent this problem.

IABP=Intra-aortic Balloon Pump
ECMO=Extracorporeal Membrane Oxygenation
VAD=Ventricular Assist Device