

Early Mobilization of Patients in the Pediatric ICU on Extracorporeal Membrane Oxygenation to Prevent Pressure Ulcer Development

AUTHORS: ANGELA PROUTY¹, EMILY WARREN², MARGARET BIRDSO³, YUN KIM⁴, JOHN YOUNG⁵, JENNIFER SNIDER⁶ AND MELANIA BEMBEA⁷

AFFILIATIONS: ¹JOHNS HOPKINS UNIVERSITY SCHOOL OF NURSING, BALTIMORE, MD; ²DEPT OF PEDIATRIC NURSING, CHARLOTTE R. BLOOMBERG CHILDREN'S CENTER, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD; ³DEPT OF WOUND CARE, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD; ⁴OCCUPATIONAL THERAPY, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD; ⁵ECMO COORDINATOR, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD; ⁶DEPT OF ANESTHESIOLOGY AND CRITICAL CARE MEDICINE, CHARLOTTE R. BLOOMBERG CHILDREN'S CENTER, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD; ⁷ECMO DIRECTOR, JOHNS HOPKINS HOSPITAL, BALTIMORE, MD

1 Background

Reported incidence of pressure ulcer (PU) development in critically ill infants and children ranges from 18%-27% (Schindler, 2011). The use of extracorporeal membrane oxygenation (ECMO) has been shown to be a significant risk factor for PU development in the pediatric ICU (PICU) (Schindler, 2011). It is well-known that children differ from adults in the anatomical locations for PU development such as the occiput, upper shoulders and behind the ears as well as the sacrum and heels, but little research has been done in the pediatric population in regards to causes and treatments (Butler, 2006; Quigley & Curley, 1996). Mobilization and pressure relieving devices are known to be effective for PU prevention in adult populations but are often not a priority in critically ill children in the PICU (Wieczorek et al., 2016). The goal of this project is to provide more information about the contributing factors for PU development in ECMO patients in addition to describing a quality and safety nursing intervention for mobility of ECMO patients in the PICU to prevent PU development.

2 Objectives

- Retrospectively identify the incidence, location(s) and severity of PU in pediatric ECMO patients.
- Identify potential contributing factors to PU development.
- Collaborate with ECMO leadership and surgeons to determine potential changes in ECMO patient care.
- Create an intervention to be utilized in the PICU by RNs for early and continuous mobilization of ECMO patients.

3 Methods

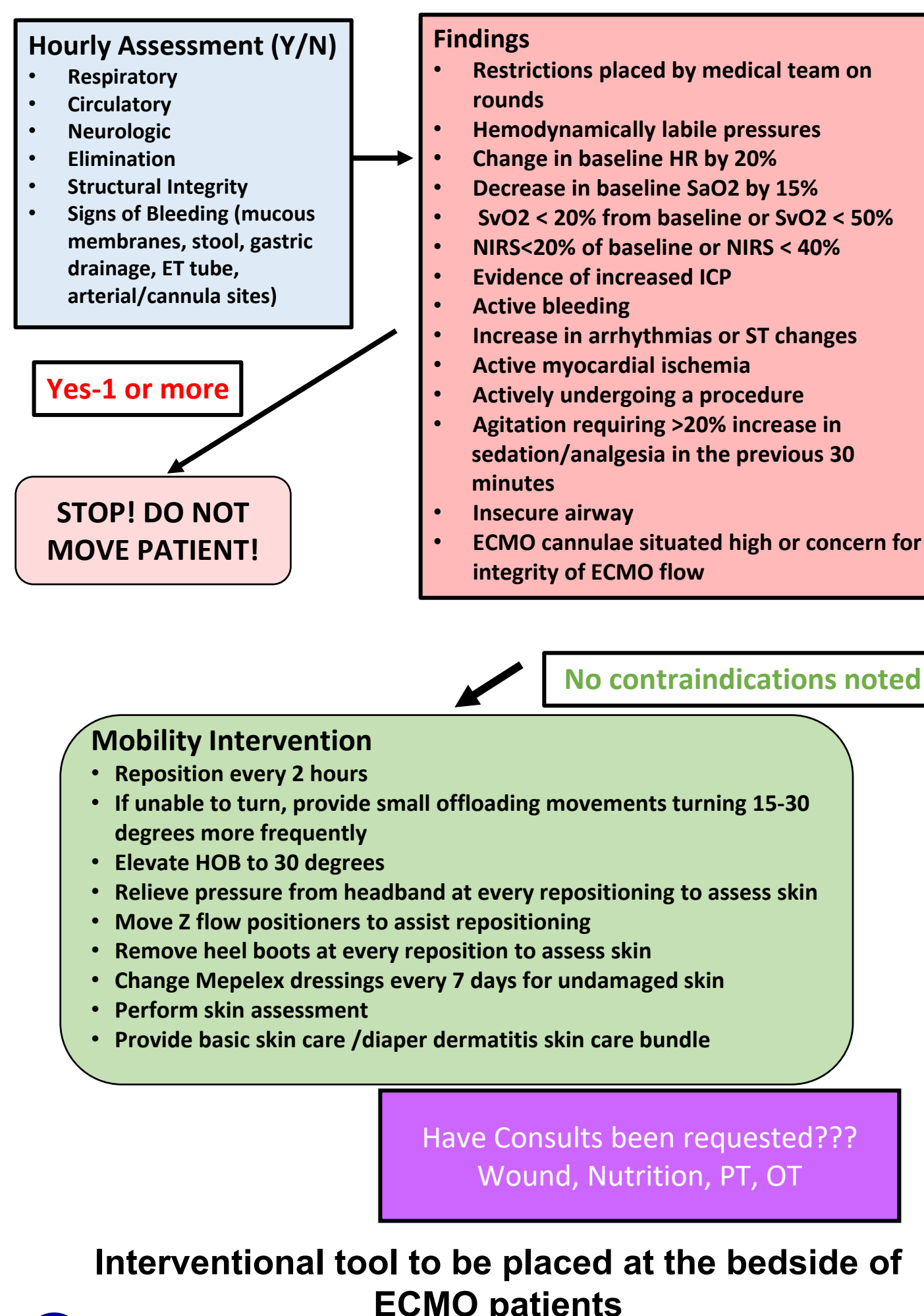
- Conduct a literature review of studies involving prevalence of/risk factors for pressure ulcer development in pediatric patients on ECMO.
- Develop a data spreadsheet for collecting pertinent information regarding PU prevalence/potential risk factors in JHH PICU patients.
- Perform a chart review of pediatric ECMO patients in the previous five years at JHH.
- In collaboration with the ECMO leadership group and Pediatric Comprehensive Unit-based Safety Program (CUSP) PICU Up!: Develop a quality and safety nursing intervention for mobilization of qualified ECMO patients.

Data collected 1 day pre-cannulation, during ECMO run, 14 days post-cannulation:

- Pressure ulcer identified/number/location(s)/Day of treatment
 - List of other noted skin alterations
- Wound consult requested/Interventions implemented
- Patient position in bed/repositioning performed/skin care interventions utilized
- Other consults requested (PT,OT, nutrition, Plastic surgery)
- Nutritional status/diet
- Dialysis

Information collected retrospectively from eHR of PICU ECMO patients 2011-2016

Checklist for Repositioning ECMO Patients



4 Results

- Amendments will be made to the PICU Up! Promoting Early Rehabilitation and Progressive Mobilization protocol removing ECMO as an exclusion to mobilization and outlining permissive activities.
- Amendments will also be made to the "Nursing Management of the Pediatric Patient on ECMO" policy.
- Current early interventional implementation include removal of the shoulder roll 24 hr post cannulation. Cardiac ECHO is utilized to confirm cannula placement.
- Training for the interventional tool shown above will be conducted in March 2017 with implementation at the bedside shortly thereafter.
- Data collection for former ECMO patients is in progress and will be completed in early 2017.

5 Conclusions

This project is in the early stages of development and information is still being collected regarding the prevalence and potential risk factors for PU development in the pediatric ECMO population at JHH. While collecting data retrospectively, mobilization interventions have been developed and will be implemented at the bedside in early 2017. In addition, amendments have been made to the CUSP team PICU Up! protocol for progressive mobilization in PICU patients. Currently JHH surgeons have agreed to remove the shoulder roll 24 hrs post-ECMO cannulation and confirm placement with cardiac ECHO. As these changes are implemented, conclusions can be drawn as to the efficacy of the planned interventions.

6 Future Directions

- Statistical analysis of data on prevalence of pressure ulcers in PICU ECMO patients at JHH.
- Evaluation of nursing intervention to mobilize ECMO patients.
- If mobilization strategy is successful, development of teaching tools and additional steps to promote mobilization.

7 References

- Butler, C.T. (2006). Pediatric skin care: Guidelines for assessment, prevention, and treatment. *Pediatric Nursing*, 32(5), 443-450.
- Quigley, S.M. & Curley, M.A.Q. (1996). Skin integrity in the pediatric population: Preventing and managing pressure ulcers. *Journal for Specialists in Pediatric Nursing*, 1(1), 7-18.
- Schindler, C.A., Mikhailov, T.A., Kuhn, E.M., Christopher, J., Conway, P., Ridling, D., Scott, A.M. and Simpson, V.S. (2011). Protecting fragile skin: Nursing interventions to decrease development of pressure ulcers in pediatric intensive care. *American Journal of Critical Care*, 20(1), 26-34.
- Wieczorek, B., Ascenzi, J., Kim, Y., Lenker, H., Potter, C., Shata, N.J., ..., Kudchadkar, S.R. (2016). PICU Up!: Impact of a quality improvement intervention to promote early mobilization in critically ill children. *Pediatric Critical Care Medicine*, 17(12), e559-e566.

Funding Source:

The Helene Fuld Leadership Program for the Advancement of Patient Care Quality and Safety



JOHNS HOPKINS
SCHOOL of NURSING