USING AN UNPLANNED EXTUBATION BUNDLE IN A PEDIATRIC CARDIAC CENTER TO REDUCE UNPLANNED TRACHEAL EXTUBATIONS

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Original Abstract

USING AN UNPLANNED EXTUBATION BUNDLE IN A PEDIATRIC CARDIAC CENTER TO REDUCE UNPLANNED TRACHEAL EXTUBATIONS

Background: Unplanned extubations (UE) affect respiratory gas exchange, length of stay (LOS), and ventilator days (VD) unfavorably. UEs in children contribute to consequential morbidity and mortality, with an arbitrary benchmark target of less than 1 UE per 100 ventilator days. Age, gender, increased salivary secretions, intubation duration, nursing attentiveness, endotracheal tube fixation method, and sedation are all contributing factors referenced in the literature. After reviewing our practices in 2018 with a rising UE rate of 0.20/100 VD and in 2019 with a UE rate of 0.22/100 VD, we created a multidisciplinary subgroup to reduce UE in the Cardiac Intensive Care Unit (CICU). We focused our efforts on standardizing a process for preventing UE in the CICU using a UE prevention bundle that included multi-disciplinary elements. A secondary target was to maintain the decrease in UE rates through continuous improvement processes.

Method: In an IRB approved retrospective analysis, data was analyzed from 1/1/2018 to 4/30/2021 for number of UEs per 100 VD. After review in 11/2019, a UE bundle was implemented in 2/1/2020. We placed emphasis on patients ≤5kg, as their UE rate was higher than the unit average (0.44/100 VD). An identification system for high-risk patients was created and included patients with oral endotracheal tubes, less than 2kg, and any barriers to tube securement. The UE bundle components are included in Figure 1 and this was posted at the patient bedside. Nasotracheal intubation was defined as the preferred method for all intubations unless contraindicated. High risk patients were identified with a red bedside sign. Audits were completed twice weekly by RTs to verify compliance to the UE bundle elements. Data and barriers were reported at daily CICU huddles and at the monthly CICU Quality and Safety meeting.

Results: UE rate from 2018 and 2019 was compared to 2020 and 2021 (Table 1). The UE rate for 2018 and 2019 was 0.21/100 VD. In 2020, the CICU UE rate was 0.00/100 VD. The current CICU UE rate (1/1-4/30) for 2021 is 0.037/100 VD.

Conclusion: By utilizing a multi-disciplinary work group and UE bundle in the CICU, UE rate decreased 82.38% (2018/2019 vs. 2020/2021). We continue to use a continuous improvement process to enhance our UE bundle to maintain a goal UE rate of 0.00/100 VD. Further studies must be done to evaluate the effectiveness of these types of interventions in other patient populations.

BACKROUND: Unplanned extubations (UE) affect respiratory gas exchange, length of stay (LOS), and ventilator days (VD) unfavorably. UEs in children contribute to consequential morbidity and mortality, with an arbitrary benchmark target of less than 1 UE per 100 ventilator days. Age, gender, increased salivary secretions, intubation duration, nursing attentiveness, endotracheal tube fixation method, and sedation are all contributing factors referenced in the literature. After reviewing our practices in 2018 with a rising UE rate of 0.20/100 VD and in 2019 with a UE rate of 0.22/100 VD, we created a multidisciplinary subgroup to reduce unplanned extubations in the Cardiac Intensive Care Unit (CICU). We focused our efforts on standardizing a process for preventing unplanned extubations in the Cardiac Intensive Care Unit using a n unplanned extubation prevention bundle that included multi-disciplinary elements. A secondary target was to maintain the decrease in unplanned extubation rates through continuous improvement processes.

METHOD: In an IRB approved retrospective analysis, data was analyzed from 1/1/2018 to 4/30/2021 for number of UEs per 100 VD. After review in 11/2019, a UE bundle was implemented in 2/1/2020. We placed emphasis on patients ≤ 5kg, as their UE rate was higher than the unit average (0.44/100 VD). An identification system for high-risk patients was created and included patients with oral endotracheal tubes, less than 2kg, and any barriers to tube securement. The UE bundle components are included in Figure 1 and this was posted at the patient bedside. Nasotracheal intubation was defined as the preferred method for all intubations unless contraindicated. High-risk patients were identified with a red bedside sign. Audits were completed twice weekly by respiratory therapists (RT) to verify compliance to the UE bundle elements. Data and barriers were reported at daily CICU huddles and at the monthly CICU Quality and Safety meeting.

Figure 1

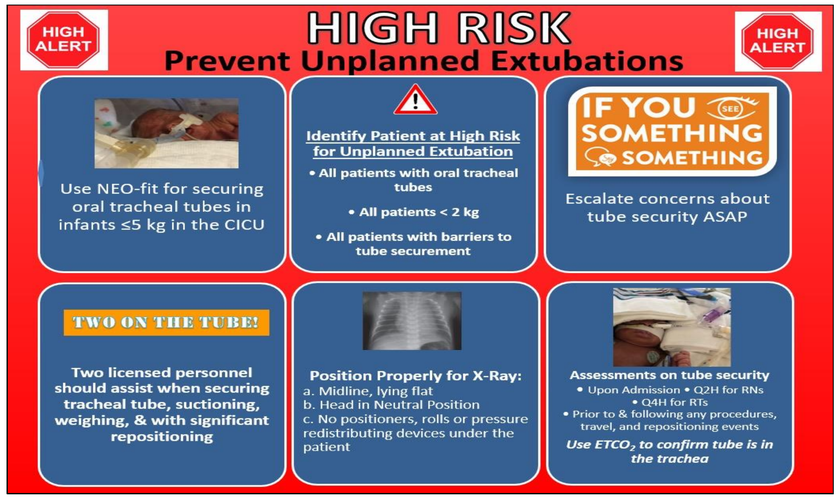

Figure 1: Figure 1 depicts the bedside signage used for high-risk patients with endo-tracheal tubes. This serves to remind bedside staff of UE bundle elements to increase compliance and awareness to the UE risk. For patients deemed not high-risk the signage background color is white.

RESULTS: UE rate from 2018 and 2019 was compared to 2020 and 2021 (Table 1). The UE rate for 2018 and 2019 was 0.21/100 VD. In 2020, the CICU UE rate was 0.00/100 VD. The current CICU UE rate (1/1-4/30) for 2021 is 0.037/100 VD.

Table 1

Year	UE Occurrence	Ventilator Days	UE Rate
2018	3	1494	0.2
2019	4	1832	0.22
2020	0	2008	0
2021 (1/1-4/30)	1	681	0.15

Table 1: Table 1 shows the UE occurrence, ventilator days, and overall UE rate from 2018-current.

CONCLUSIONS: By utilizing a multi-disciplinary work group and UE bundle in the CICU, UE rate decreased 82.38% (2018/2019 vs. 2020/2021). We continue to use a continuous improvement process to enhance our UE bundle to maintain a goal UE rate of 0.00/100 VD. Further studies must be done to evaluate the effectiveness of these types of interventions in other patient populations

References

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