

## ABSTRACT

**Objectives:** Post-operative complications after tracheostomies occur in ~15% of patients.<sup>1</sup> Life threatening complications include tube obstruction and accidental decannulation. Manipulation of tracheostomy ties during the early post-operative period is a potential cause of accidental decannulation. The objective of this study was to decrease the rate of early tie changes to <10% after two PDSA cycles.

**Study Design:** Plan-Do-Study-Act (PDSA)

**Methods:** Two step approach. During the first PDSA Cycle, nursing communication orders were placed and signs were placed over patient beds requesting that tracheostomy ties not be changed prior to the first change by the Otolaryngology service. During the second PDSA cycle a meeting was held with respiratory therapists and nursing managers to discuss mutual concerns and preliminary results. The monthly rate of early tracheostomy tie changes on all tracheostomies performed by the Otolaryngology service was recorded. A run chart was created to analyze our data.

**Results:** Over an 11-month period, 48 tracheostomies were performed by the Otolaryngology service. Prior to any intervention the median rate of early tie changes was 27%. After the first PDSA cycle, the median rate was 20%. After the second PDSA cycle the median rate remained stable at 20%. There were no identified nonrandom patterns on the run chart.

**Conclusion:** Improved and continued communication between providers and ancillary staff is critical to minimizing tracheostomy related complications during the early post-operative period. Continued efforts need to be made to decrease the rate of early tracheostomy tie changes to 0%.

## REFERENCES

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## INTRODUCTION

Post-operative complications after tracheostomies occur in approximately 15% of patients.<sup>1</sup> Early complications include: hemorrhage, infection, pneumothorax, tube obstruction, and accidental decannulation. Of these, tube obstruction and accidental decannulation can result in emergent life-threatening situations. Tracheostomy ties should not be manipulated during the early post-operative period as it is a potential cause of accidental decannulation.<sup>2</sup> Multiple patients whose tracheostomy ties were changed during POD #1 – POD #5 had been identified at our institution. Although no complications arose, there is an unacceptable risk of airway complication.

## OBJECTIVES

The objective of this study was to determine effective interventions that can be implemented and sustained in order to decrease the rate of early tracheostomy tie changes in patients with fresh tracheostomies. The aim was to decrease the rate of early tie changes to <10% after two PDSA cycles.

## METHODS

The Plan-Do-Study-Act design was used to implement changes and monitor outcomes through two cycles. Data was collected from July 2017 - May 2018. The number of tracheostomies performed each month by the Otolaryngology service and the number of early tracheostomy tie changes performed were recorded. A tie change was considered early if performed by ancillary staff prior to the first planned change by the Otolaryngology service (typically POD #5-7).

- PDSA Cycle #1: November 2017
  - A nursing communication order via the electronic medical record that stated "Please do not change trach ties. ENT will change them." was placed. A sign was also placed over patient beds that stated "Please do not change trach ties."
- PDSA Cycle #2: February 2018
  - A meeting was held with respiratory therapy teams and nursing managers to discuss concerns of all caretakers and to discuss strategies to prevent further early tie changes.

Run charts were created to analyze the results.

## RESULTS

| Month     | # Tracheostomies Performed | Rate of Early Tie Change (%) |
|-----------|----------------------------|------------------------------|
| July      | 6                          | 33%                          |
| August    | 2                          | 0                            |
| September | 5                          | 20%                          |
| October   | 5                          | 40%                          |
| November* | 5                          | 20%                          |
| December  | 6                          | 0%                           |
| January   | 9                          | 22%                          |
| February* | 4                          | 0%                           |
| March     | 1                          | 0%                           |
| April     | 2                          | 50%                          |
| May       | 3                          | 0%                           |

Table 1: Number of tracheostomies performed each month and rate of early tie changes.  
 \*Start of PDSA Cycles.

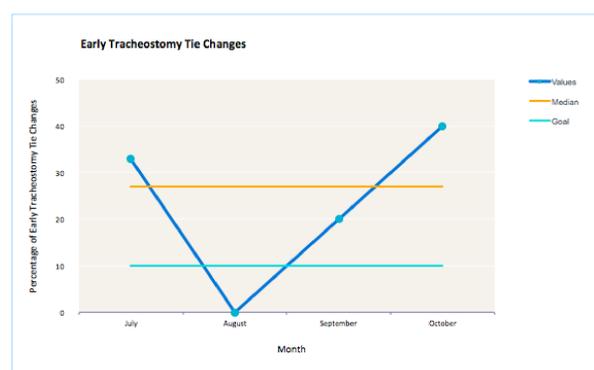


Figure 1: Rate of early tracheostomy tie change prior to intervention. Median rate = 27%.

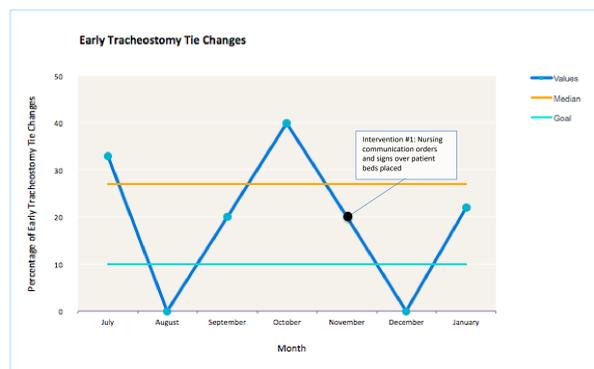


Figure 2: Rate of early tracheostomy tie change after PDSA Cycle #1 (Nov - Jan). Median rate = 20%.

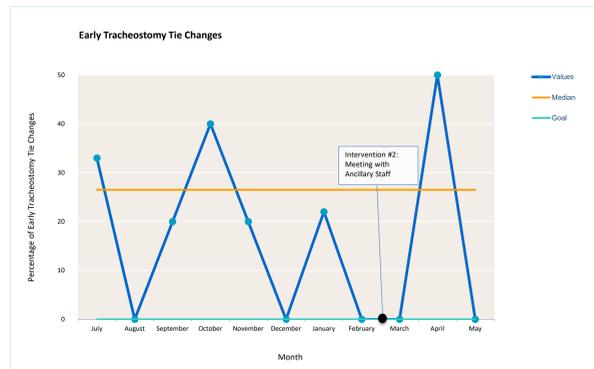


Figure 3: Rate of early tracheostomy tie change after PDSA Cycle #2 (Feb - May). Median rate = 20%.

## RESULTS

The Otolaryngology service performed 48 tracheostomies over an 11 month period. Overall, 9 tracheostomy ties were changed early (18.8%). The range was 0-50% per month. (Table 1) No patients with early tie changes experienced immediate complication (e.g. accidental decannulation).

Prior to initiating any intervention, the median rate of early tracheostomy tie change was 27% (July - Nov).

PDSA cycle #1 was implemented in November. The median rate of early tracheostomy tie change at the end of the cycle was 20% (Nov – Jan).

PDSA cycle #2 was implemented in February. The most commonly reported reasons for early tie changes were patient discomfort from overly tight ties and concern for infection from mucous and blood soaked ties. The median rate of early tie change at the end of the cycle was 20% (Feb- May).

A run chart was created to analyze the results (Figure 1- 3). At the end of 11 months, there were 11 useful data points and 6 runs. There were no shifts, trends, astronomical points, or too many/too few runs to suggest a nonrandom pattern

## CONCLUSIONS

Patients who undergo tracheostomies have multiple providers on their healthcare team, including the primary service, the ICU service, nursing teams, and respiratory therapists. All stakeholders have a unique perspective in patient care. The greatest concern of the primary team is maintaining a stable airway. As a result, lower risk complications such as infection and skin breakdown at the site of the tracheostoma may be overlooked. The most commonly identified reasons for early tie changes by ancillary staff are due to patient discomfort from overly tight ties and concern for infection from mucous soaked ties. Although these are real and valid concerns, the risk of accidental decannulation and airway loss far outweigh the risk of infection. Continued communication between care teams is crucial to minimize the rate of early tie changes.

The Otolaryngology service performs a subset of all tracheostomies performed at our institution. There is currently no hospital-wide protocol for post-operative management of tracheostomies and different services likely have slightly differing protocols. Future discussions between all services who perform tracheostomies and ancillary staff are needed in order to create a more standardized protocol in an effort to minimize both early tracheostomy tie changes and risk of infection.