

## The Impact of Specialized Tracheostomy Care Team

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**Background:** Tracheostomy care begins in the intensive care unit (ICU) and after stabilization, the patient is transferred to a general ward, decannulated or discharged. Insufficient experience of staff caring for tracheostomy patients may lead to suboptimal care and increased morbidity.

**Objective:** To assess the impact of a specialized multidisciplinary tracheostomy team on tracheostomy care.

**Design:** A Retrospective Cohort Study.

**Setting:** ENT Department, Salmaniya Medical Complex, Bahrain.

**Method:** The data was collected from the ICU and medical wards from January 2009 to December 2014. Criteria assessed were tracheostomy tube used, decannulation time and incidence of tracheostomy-related complications.

**Result:** Six hundred forty-four patients post-tracheostomy were reviewed. One hundred twenty-nine (20%) patients were decannulated between one month to 3 years; 28 (4.3%) patients had complications. No death was recorded due to tracheostomy-related complications.

**Conclusion:** There was a significant reduction in tracheostomy complications due to specialized tracheostomy team. The decannulation time was successfully reduced and an increased number of decannulated patients.

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Tracheostomy is a frequently performed procedure in critically ill patients whether in the ICU or chronically intubated patients in the medical or surgical wards. It is performed for several indications, mostly due to prolonged ventilation or toileting of bronchial secretions. Tracheostomy could be performed either as an open procedure in the theater or as percutaneous. Ward staff are required to give regular tracheostomy care. However, there are several complications which could be immediate, early or late including hemorrhage, pneumothorax, tube blockage and granulation tissue formation<sup>1</sup>. Specialized tracheostomy teams have been created to follow-up patients who need regular tube care, wound care, suctioning, education, decannulation and management of complications.

There has been an increase in the number of hospitalized patients with tracheostomy tubes in situ, with a subsequent increase in the number of tracheostomized patients on general wards since the development of percutaneous tracheostomy. The continued care of patients with tracheostomies requires a degree of specialist knowledge in terms of tube care, wound care, suction, education, advice and prompt intervention in cases such as tube blockage and dislodgement<sup>2-4</sup>. In situations such as general wards where this knowledge may be sparse,

a structured support network for the ongoing care of the tracheostomized patient is required. It should be imperative that the perioperative and early care of patients with tracheostomies is carried out in a dedicated and structured manner.

Previous studies of the impact of multidisciplinary tracheostomy teams for tracheostomy care have shown a significant reduction in time of decannulation and postoperative tracheostomy complications and management. A study by Norwood showed promising results in which fewer patients were discharged from the ICU to the wards with tracheostomy tubes and the number of tracheostomy related complications on the wards were significantly reduced due to the follow-up by multidisciplinary tracheostomy teams<sup>5</sup>. A study by Charles de Mestral et al concluded that standardized care provided by a specialized multidisciplinary tracheostomy team was associated with fewer tracheostomy-related complications and an increase in the use of a speaking valve<sup>6</sup>. Another study showed that an intensivist-led tracheostomy team is associated with shorter decannulation time and length of stay which may result in financial savings for institutions<sup>7</sup>.

The aim of this study is to assess the impact of a specialized multidisciplinary tracheostomy team on tracheostomy care.

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## METHOD

A multidisciplinary tracheostomy team was established in 2009. The team follows the patients until decannulation or discharge. The team is comprised of an ENT surgeon, a specialist nurse, respiratory therapist and speech therapist. Regular change of tracheostomy tubes, care of tracheostomy tubes, decannulation and management of complications are all dealt by this team.

A review of tracheostomy patients from 1 January 2009 to 31 December 2014 was conducted. Patients were referred from ICU, medical and surgical wards for tracheostomy procedure. Data documented were age, gender, type of tub, type of procedure, the indication for tracheostomy, complications and the outcome. Data was analyzed using SPSS system.

## RESULT

Six hundred forty-four patients had tracheostomy (open or percutaneous) from 2009 to 2014; 91 (14.1%) in 2009, 107 (16.6%) in 2010, 121 (18.8%) in 2011, 92 (14.3%) in 2012, 143 (22.2%) in 2013 and 90 (13.9%) in 2014. Forty-five (7%) non-Bahraini patients were repatriated after tracheostomy and stabilization; therefore, follow-up was not possible for this group. The mean age was 54 with SD of 24.1. Three hundred eighty (59%) patients were males and 264 (41%) were females. Pediatric group age is included, see table 1.

Three hundred ninety (60.6%) had open procedure and 254 (39.4%) percutaneous procedure. The tubes used were as follows: Shiley, 270 (41.9%), Portex, 368 (57%) and metal tubes, 6 (0.9%), see table 1.

Indications included respiratory failure, 417 (64.8%), ischemic stroke, 72 (11.2%), trauma, 61 (9.5%), cerebral hemorrhage, 15 (2.3%), respiratory obstruction, 45 (7%), cardiac causes, 14 (2.2%) elective head and neck procedures, 6 (0.9%), brain tumor, 8 (1.2%), prolonged intubation, 5 (0.8%) and missing, 1 (0.2%). These patients were mainly from ICU, see table 1.

One hundred and twenty-nine (20%) patients were decannulated from 2009 to 2014. The time of decannulation ranged from 1 month to 36 months; the highest was between 1 to 4 months, almost similar result in patients with Shiley and Portex tubes, see table 1.

Eighty-three (12.9%) patients had no complications. Twenty-eight (4.34%) patients had complications post-tracheostomy; 11 (1.7%) failed decannulation, 6 (0.9%) had granulation tissue formation, 5 (0.8%) had tube dislodgement, 1 (0.2%) had the tube blocked and 4 (0.6%) had bleeding from the tracheal stoma. Five hundred thirty-three (83%) patients had no documentation of complications; 350 (54.3%) had died from natural causes, and 45 (6.9%) had been repatriated to their country. Two (0.3%) had re-tracheostomy. The six (0.9%) patients who developed granulation tissue were using Portex tube. Two hundred thirty-two (36%) patients were discharged from ICU either decannulated or repatriated their countries or followed up in outpatient clinics.

**Table 1: Characteristics and Study Outcome Measures**

VARIABLES		Group (n= 644)
<b>Mean Age</b>		54 ± 24.10
<b>Gender</b>	Male	380 (59%)
	Female	264 (41%)
<b>Total</b>		<b>644</b>
<b>Procedure</b>	Open	390 (60.6%)
	Percutaneous	254 (39.4%)
<b>Total</b>		<b>644</b>
<b>Tube Type</b>	Portex	368 (57.1%)
	Shiley	270 (41.9%)
	Metal	6 (0.9%)
<b>Total</b>		<b>644</b>
<b>Cause of Tracheostomy</b>	Respiratory Failure	417 (64.8%)
	Ischemic Stroke	72 (11.2%)
	Respiratory Obstruction	45 (7%)
	Trauma	61 (9.5%)
	Cerebral Hemorrhage	15 (2.3%)
	Cardiac Causes	14 (2.2%)
	Elective Head and Neck Procedures	6 (0.9%)
	Brain Tumor	8 (1.2%)
	Prolonged Intubation	5 (0.8%)
	Missing	1 (0.2%)
<b>Total</b>		<b>644</b>
<b>Complication</b>	None	83 (12.9%)
	Failed Decannulation	11 (1.7%)
	Granulation	6 (0.9%)
	Tube Dislodged	5 (0.8%)
	Tube Blocked	1 (0.2%)
	Bleeding	4 (0.6%)
	Missing (due to being sent abroad or death)	533 (82.8%)
<b>Total</b>		<b>644</b>
<b>Outcome</b>	Decannulation	129 (20%)
	Death (due to natural causes)	350 (54.3%)
	Repatriated	45 (7%)
	Follow-up OPD	58 (9%)
	Re-tracheostomy	2 (0.3%)
	Inpatient	44 (6.8%)
Missing	16 (2.5%)	
<b>Total</b>		<b>644</b>

## DISCUSSION

In an effort to reduce tracheostomy-related complications, many acute care facilities had established specialist tracheostomy teams. Previously, there were no dedicated services for patients with tracheostomy tubes. Regular input from ICU wards was

taken for tracheostomy care and from general medical and surgical wards. However, since tracheostomy teams have been implemented, specific guidelines were established leading to a reduction in the number of complications due to better tracheostomy care and regular follow-up.

This study showed reduced decannulation time and reduced complications rate. The deaths were only due to natural causes and not as a direct result of tracheostomy complications. A large number of patients discharged are on regular outpatient follow-up. Tracheostomy team has been found to be of high value in providing education to staff and families.

This study used a single large group of patients involving only post-tracheostomy patients, compared to previous studies, which included patients pre and post-tracheostomy team development; it showed similar results of reduced complications in this group<sup>3,5</sup>.

This study showed that the most common indication for tracheostomy was respiratory, cerebral and post-trauma. This study revealed that the use of Shiley tracheostomy tubes superseded the use of Portex tubes.

The study is limited because of using a single large group due to insufficient data pre-tracheostomy services; therefore, comparison could not be made. We had no exclusion criteria. There was no follow-up of decannulated patients. However, no complication was documented post decannulation. Another important limiting factor in our study was the inability to follow-up expatriate patients repatriated to their countries.

## CONCLUSION

**Implementation of tracheostomy service has reduced the number of complications due to better education of the staff, regular follow-up by the team and early identification of complications. Tracheostomy service has led to reduced decannulation time and allowed early discharge of patients on tracheostomy tubes.**

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**Competing Interest:** None.      **Sponsorship:** None.

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