

Difficult Tracheostomy in Calcified Tracheal Rings - Surgical Case Series

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ABSTRACT

Background: Surgical airway management in an acute setting of road traffic accident can be difficult, even in the context of an anatomically normal airway. Tracheostomy, as a surgery is dependent on the exposure and removal of upper tracheal rings. When these rings are found calcified, it leads to further difficulties or complications in management, at times even resulting in surgical emphysema.

Methods: A series of 6 adults, all males, aged between 32-45 years, presented to us individually between Nov 2021 to Nov 2022, with history of road traffic accidents causing poly trauma and requiring immediate airway stabilization.

Results: None of them had prior history of neck trauma or endotracheal intubation or chronic cough. Chest x ray was normal in all of these individuals. Elective tracheostomy under general anesthesia was performed on day 5 of endotracheal intubation. During the procedure of conventional tracheostomy, after retracting the thyroid isthmus upwards, and prior to making a tracheal window, tracheal rings 3 and 4 were found to be calcified, which prolonged the time taken to remove a piece of cartilage.

Conclusion: A junior surgeon needs to be well versed with the surgical anatomy of the region, the surgical procedure and management of possible complications with confidence and ease. A lack of knowledge amongst junior medical staff coupled with unskilled assistance when managing such cases lead to increased operative times and hence complications.

Keywords: Tracheostomy, Calcified tracheal rings, adult, surgical

INTRODUCTION

Surgical airway management in an acute setting of road traffic accident can be difficult, even in the context of an anatomically normal airway. Tracheostomy, as a surgery is dependent on the exposure and removal of upper tracheal rings. When these rings are found calcified, it leads to further difficulties or complications in management, at times even resulting in surgical emphysema. We hereby report a series of such cases in adults with no prior laryngeal trauma at a tertiary care hospital.

MATERIALS & METHODS

The case series was carried out for a period of one year from November 2021 till November 2022 in a super specialty hospital in India. A series of 6 adults, all males, aged between 32-45 years, presented to the hospital individually between the study periods. The patients in this study were with history of road traffic accidents causing poly trauma and requiring immediate airway stabilization. Previous history of any trauma especially to neck or history of endotracheal intubation or chronic cough was elicited from the studied patients. Chest x-ray was carried out for the study patients. Elective tracheostomy under general anesthesia was performed to these patients. It was performed on fifth day of endotracheal intubation to the patients. The duration of Elective tracheostomy was timed starting with the skin incision and ending when the tracheostomy tube was fixed in position.

RESULTS

None of them had prior history of neck trauma or endotracheal intubation or chronic cough. Chest x ray was normal in all of these individuals. During the procedure of conventional tracheostomy, after retracting the thyroid isthmus upwards, and prior to making a tracheal window, tracheal rings 3rd and 4th were found to be calcified, which prolonged the time taken to remove a piece of cartilage.

In two of these cases, the tracheostomy tube went into false passage anterior to the trachea and had to be removed and re-inserted. In one among these cases, this led to surgical emphysema involving the neck which later resolved. All other surgical parameters remained within normal limits during the entire procedure. No other complication was noted.

All patients were successfully weaned off ventilator after treatment of primary reason for hospital admission and subsequently decannulated within 4 weeks of the same.

DISCUSSION

Tracheobronchial calcification is a common physiological finding in old age. [1] Likewise, laryngeal calcification in the first decade is also unheard of. [2] In our study, we have found that males are exclusively involved and they are in their 3rd to 4th decade of life. Griffen et al. have reported operating time of 4.3–21 min for percutaneous and 13.5–60 min for open tracheostomy. [3]

Our operating time for conventional tracheostomy is generally 11 min to 20 min. However in these cases, our operating time increased between 20 min to 30 min due to following reasons: -

- (i) Increased time taken to make a tracheal window
- (ii) Difficulty in inserting the tube
- (iii) Tube in false passage
- (iv) Cuff rupture while inserting the tube.

Tracheobronchopathia osteochondroplastica (TPO) is a rare [4] benign chronic disease characterized by the presence of sub

mucosal osseocartilaginous nodules in the tracheobronchial tree. It is usually diagnosed in sixth or seventh decade of life [5] via bronchoscopy or radiologically. However, patients in this case series do not fall into any of this category as they did not undergo either of the two.

Another rare entity to be known is Keutel syndrome, which has abnormal cartilage calcifications and can remain undetected till adulthood [6]. However, these patients did not show any other manifestations of this syndrome such as midface hypoplasia, brachytelephalangism, peripheral pulmonary stenosis and hence this diagnosis cannot be considered.

CONCLUSION

An airway procedure like tracheostomy comes with its own set of complications. Rapid desaturation into hypoxia demands rapid action and converts a technically simple procedure into a stressful event. A junior surgeon needs to be well versed with the surgical anatomy of the region, the surgical procedure and management of possible complications with confidence and ease. A lack of knowledge amongst junior medical staff coupled with unskilled assistance when managing such cases lead to increased operative times and hence complications.

Declaration by Authors

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