

Case Report

Endo tracheal intubation (Airway Management) in a patient with Tracheal stent

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Abstract: Tracheal stent is one of the newer modalities of airway management used to manage airway compromise due to tracheal lesion of a malignant or benign disease. Skilful airway management is critical in a patient with a tracheal stent in situ. Any failure in this technique can lead to many complications like displacement of stent, bleeding, perforation which can lead to increase in morbidity and mortality. We present a case of emergency airway management of a patient with a tracheal stent in situ for a malignant mass, which was managed with an awake fiberoptic intubation.

Keywords: Tracheal stent, awake fiberoptic intubation, Airway Management

INTRODUCTION

Airway management is a critical part of anaesthesia in an emergency situation, especially in the cases of tracheal stenosis and tracheal stent. In such situations, a prompt decision to select a technique for skilful airway management can often make the difference between life and death or between ability and disability [1]. In the recent era owing to advancement in technology, treatment strategies and evidence based research in tracheal stent design and materials, significant numbers of patients are being treated with airway stenting. We sought approval from our Medical Research Centre who granted permission to publish this case report.

CASE REPORT

A 37 year old male patient was admitted to our hospital for the second cycle of chemo-radiotherapy for 3 days. Over the course of his admission, he developed breathlessness at rest, fever, and tachycardia and elevated

blood pressure readings. On examination, vital signs were as follows; Heart rate: 145/min., Blood Pressure: 147/80 mm of Hg, Respiratory rate: 28- 30 / min and SpO₂ of 88- 89% on a non-rebreathing mask with 15 litres of oxygen/minute. Bilateral crepitus was present on chest auscultation. Cardiovascular examination revealed tachycardia. Mouth opening, neck movement and mento-thyroid distance was normal. ECG showed sinus tachycardia, Arterial blood gas results; pH: 7.518, pCO₂: 37.7, pO₂: 60.4, SpO₂: 89.7%, BE: 7.07. Chest x-ray showed widening of the superior mediastinum with a tracheal kink to the right. The tracheal stent was visualised in situ. Pulmonary congestion with prominent vasculature was present, blunting of left costophrenic angle was present which was probably due to minimal pleural reaction along with right mid zonal thin fibrotic strand. (Figure1: Chest x-ray with airway stent in situ)(Figure 2: PET CT scans with a deviation of the trachea) He was on Salbutamol + ipratropium nebulisation four times a day.



Fig 1: Chest X-ray with tracheal stent in situ

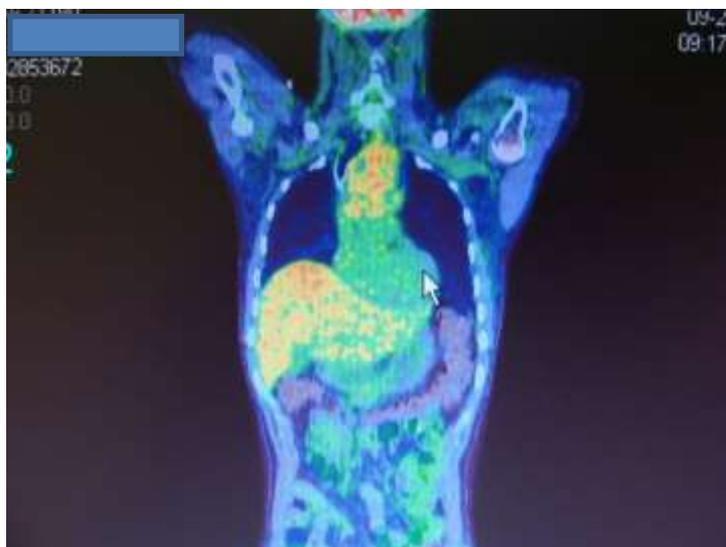


Fig 2: PET CT with mediastinal mass with tracheal shift

Past history showed that he was with of anterior mediastinum mass (Adeno cystic carcinoma). Patient had history of shortness of breath in January 2013. Medical investigations done at that time included chest x-ray, CT scans, PET CT scans, MRI all of which showed the large mediastinum mass of 6.6 x 9.4 x 13.2 cm at its maximal extension in the antero posterior, transverse and craniocaudal dimensions respectively. (CT guided biopsy confirmed with adenocystic carcinoma with liver metastasis). In the Multidisciplinary team (MDT) meeting, it was decided to proceed for the surgical resection of the tumour + thymectomy + sternotomy under GA on 28/ 05/ 2013. Post- operatively, there was right recurrent laryngeal nerve palsy and tracheal mucus plug which led to low oxygen saturation which was treated with flexible bronchoscopy and removal of mucus plug. In the next MDT meeting (post- surgery) it was decided to go with chemo radiotherapy as treatment. First cycle was with Cyclophosphamide, Doxorubicin, and Cisplatin. Second

cycle was delayed due to neutropenia. During these above courses he became orthopnoeic and underwent repeated admissions to MICU. The last admission to MICU was due to sepsis with klebsilla and isolated MDRO during period of 14/09/2013 to 07/10/2013. During this stay he underwent endo tracheal intubation by fibreoptic guidance under sedation and a metal tracheal stent was inserted through flexible bronchoscopy.

Presently after assessing the patient's clinical condition, investigations and airway examination, we planned to do an awake fibreoptic intubation with a smaller size tube according to the tracheal diameter at the kink. We consulted the cardiothoracic surgeon regarding the stent condition, and he suggested that stent remain in position. A plan of intubation and further management was discussed with the oncologist, MICU physician, patient and relatives. A detailed procedure was explained to the patient and the consent was taken for an awake fibreoptic intubation.

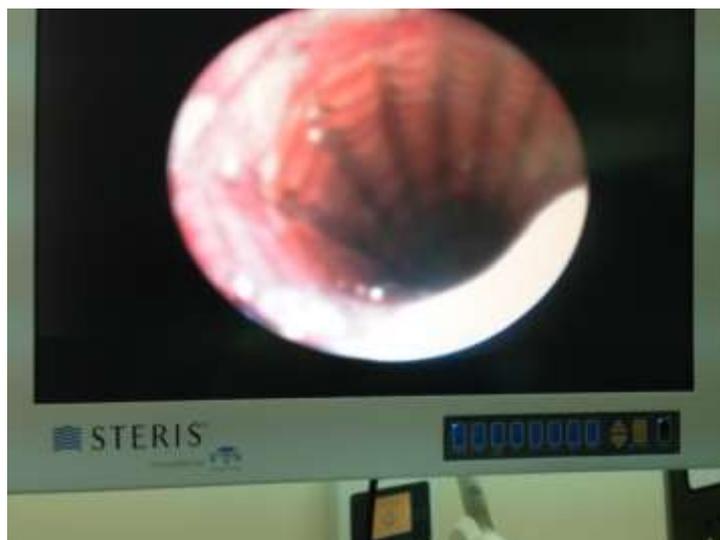


Fig 3: Metal tracheal stent seen through fibroptic scope



Fig 4: ET TUBE just above the tracheal stent

Patient was taken to the operation theatre. 10% lignocaine spray was in into the pharynx three times and we asked the patient to keep it in the mouth and to gargle, and not swallow. All routine monitoring were applied. Difficult intubation cart was kept ready. The Portex endo tracheal tube was loaded on to the well-lubricated Karl Storz® Fiberscope. Fiberscope was advanced through an oral route with the help of an Ovassapian airway. When the larynx was visualized, topical anesthesia was applied to the larynx and trachea by the “Spray as-you-go” technique through the drug channel of the bronchoscope using incremental injections of Lidocaine 2% up to a total volume of 3 ml. The fiberscope was advanced into the larynx gradually. There was a narrowed portion of trachea just above the metal tracheal stent was visualized. (Figure3: Metal tracheal stent seen through fibroptic scope) Fiberscope passed through the stent till the carina was visualised and then moved it backward. The endo tracheal cuff tube no. 6 mm ID was railroaded on that. The endo tracheal tube was gradually advanced through the narrow portion of the trachea and at the same time the fiberscope tip was kept just above metal stent. (Figure4: ET Tube tip

just above the tracheal stent). After confirmation of the position of the ET Tube tip was kept just above the stent in the head flexed position. This was done in order to avoid further advancement of both the endo tracheal tube and stent. At the same time the patient was induced with 100 mg of Propofol and Cisatracurium 0.15mg/kg. The bronchoscope was removed and the tube was fixed after assuring correct tube placement by visualization of the chest movement, breath sounds and ETCO₂ monitoring. The total dosage of lignocaine sprayed was less than 4 mg/kg. Total procedure time was 3 minutes. The patient was shifted under medical ICU care for further diagnosis and management and put on a ventilator and sedation was maintained with Midazolam and Fentanyl infusion. Another Arterial blood gas was done after 2 hours which showed: pH: 7.34, po₂:171 with fio₂ 1.0, pCO₂:52.3, HCO₃:26.9, O₂ sat: 99%. Pulmonary embolism was ruled out by D Dimer test and CT angiography. Septic work up was started at the same time.

DISCUSSION

Advancement in technology and use of interventional management in airway lesions has increased the use of different types of the airway stents irrespective of the type of lesion whether it is malignant or benign. Stents are helpful to improve the quality of life of patient with inoperable lesions with tracheal compression. Different types of the stents are available these days: metal, silicone, hybrid type, self-expandable, flexible, covered and uncovered.

When a patient has a tracheal stent in situ, anaesthetic management depends on multiple issues including the surgery involved, airway related or non-airway related issues, major or minor procedures, patient's co-operation and whether an endo tracheal intubation is needed or not. Preoperative anaesthesia assessment is very important in these cases. Patient has to be evaluated for assessment of the stent insertion, the type of stent, site of stent and whether it is secure or not. Usually stents are placed in situations when malignancies or benign masses compress the airway. When the patient is present for elective surgery under GA, we have to think about its complications like stent migration, stent fracture, granulation tissue formation over the stent and tumour growth through the stent [2].

Our patient had a metal self-expandable stent of size 80mm length and 20 mm diameter as the patient was having obstruction at multiple levels from the carina to above. The patient was complaining of orthopnoea which was suspicious for obstruction in the airway. And if a patient had concomitant radiotherapy and chemotherapy as our patient had, that makes laryngoscopy and intubation more difficult [3].

Communication with the pulmonologist or thoracic surgeon who inserted the stent and comparison with earlier radiological investigations is very important to know whether the stent is in its original place or not. In our case we consulted with a cardiothoracic surgeon, who reassessed the patient, and informed us that there was no change in the position of stent.

In this patient a history of orthopnoea till present despite having a stent, made us suspect the possibility of granulation formation on the stent, tumour regrowth through the stent, stent migration and kink of trachea just above stent as there was too much deviation of the trachea to the right side. The incidence of granuloma formation is 14.6% as demonstrated by Cynthia P Saad et al in their study with self-expandable metallic stent (SEMS). They

believed that the formation of granuloma due to improper size of stent which leads to excessive friction with the mucosa wall in small-sized stent or too much pressure in oversized stent [4]. Brennden P madden *et al*.;demonstrated in their study that if covered type of metallic expandable stent will reduce the formation of excessive granulation tissue and tumour growth through the stent which creates an obstruction of airway [5].

The incidence of infections (Tracheo-bronchitis) is 15.9% as observed by Cynthia P Saad et al in their study with self-expandable metallic stent (SEMS). Infection rate is high because SEMS impairs mucociliary secretion clearance and expectoration, immunosuppression in malignancy and lung transplantation and therefore, there is the need of longer follow-up to detect infections [4].

If surgery is elective, minor, non-airway related with no risk of aspiration and where possible a Laryngeal mask Airway is the best option to avoid multiple complications related to endo tracheal intubation [6].

If elective surgery with endo tracheal intubation is necessary with anticipation of airway compromise, anticipated difficult laryngoscopy and mask ventilation, and unco-operative patient, best option is fiberoptic intubation under general anesthesia (GA) with the proper placement of the tip of tube just above or below the stent as per need. If planning under GA, there may be chances of worsening of hypoxia and hyper carbia due to airway obstruction which can lead to cardiovascular collapse; the central airway syndrome. So the surgeon should always remain present and a rigid bronchoscope should be kept on standby [7].

If there is an emergency situation as was in our case, with a compromised airway requiring emergency surgery, co-operative patient and difficult mask ventilation or difficult laryngoscopy, an awake fiberoptic intubation is the best option. It also prevents complications during the procedure (Table 1: complications during the procedure). An awake fiberoptic intubation is a safe approach always, as we can correctly place the endo tracheal tube and maintain stent integrity and confirmation under vision. N Davis et al recommended that in such situations, a direct endoscopic visualization and awake fiberoptic intubation is the choice of airway management [6, 8]. In our patient upper airway examination was adequate, but orthopnoea suggestive of some airway compromise and too much right shift of trachea, tracheal kink just above stent prompted us to use the fiberoptic awake intubation technique. It helped us to decide the size of the endo tracheal tube.

Table 1: Complications during stent insertion

Procedural Complications	Migration or breakage of the stent Trauma to airway – tracheo bronchial tree Surgical emphysema Tension pneumothorax Bleeding and Hemothorax Infection
Immediate complications	Due to migration - Complete or partial airway obstructions Airway obstruction due to bleeding, mucus plug Bleeding from granulation tissue Difficult visualization and to pass tube due to granulation tissue, bleeding, secretions.

Tracheostomy is one of the gold standard for upper airway abnormalities which leads to difficult intubation and “difficult to ventilate, difficult to incubate” situations. In our patient tracheostomy was not a feasible option as it would have meant the need of a long tracheostomy tube, with excessive too much tracheal shift, positioning the tip of tracheostomy tube would have been more difficult. In addition to that, stent damage, stent migration and bleeding would also make tracheostomy difficult. Davis et al recommended doing rigid bronchoscopy assisted percutaneous tracheostomy which provides excellent visibility, optimal surgical condition and reduction of risk of stent misplacement or damage [6, 9, 10].

CONCLUSION

The potential harm to benefit must always be carefully weighed in patient normally having a burden of disease and co-morbidity that makes no intervention risk free. The key to successful airway management of our patient was to clear the obstruction and establish safe, efficient gas exchange. When intubation is necessary like our case, an awake fiberoptic intubation is the best option. We managed our patient’s intubation successfully through an awake fiberoptic intubation.

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