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Tracheal resection following prolonged intubation in a COVID-19 patient

To the Editor,

Only six months into the SARS-CoV-2 epidemic in South Africa, we present the first post-coronavirus disease (COVID-19) subglottic stenosis seen at Morningside Clinic. Ten weeks prior to the current admission, this 48-year old patient with diabetes, obesity and hypertension developed severe COVID-19 pneumonia. He was admitted to the intensive care unit (ICU) for 14 days of mechanical ventilation and intermitted prone positioning for optimal V/Q matching.

He became symptomatic two weeks ago with progressive stridor and orthopnoea with poor effort tolerance. This is in keeping with the timeline for the pathogenesis of post intubation tracheal stenosis (PITS) which requires four to six weeks for cicatrisation around the traumatised mucosa of the trachea.[1] Computerised tomography (CT) of the upper airway (Figure 1) shows a subglottic stenotic area of 2.5 cm length and 5 mm in diameter at the bottom edge of the cricoid. And the chest X-ray (figures 2a and b) indicate that he still has some degree of interstitial lung damage.

The patient was stabilised on oxygen, intravenous dexamethasone and steroid nebulisations. Oxygen saturation in the ward was 99% on oxygen. His diabetes and hypertension were respectively controlled on metformin and bisoprolol.

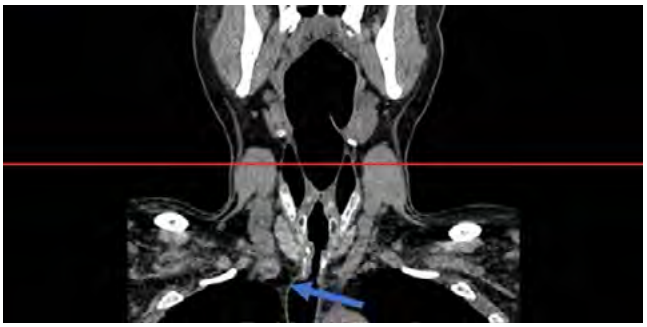

Figure 1: CT – Coronal view of larynx and trachea

Figure 2a: CXR PA

He was still deemed critical due to moderate stridor and two negative COVID-19 tests were obtained 36 and 24 hours prior to being booked for tracheal resection.

Airway management during anaesthesia was done using a three-stage technique:

a. After induction and muscle relaxation with rocuronium, positive pressure ventilation via no 5 LMA® Supreme™ Airway was commenced. Oxygen saturation maintained at 93% and with an 80 ml expiratory leak.[2]
b. This was immediately followed by tracheostomy and insertion of re-inforced no 6.5 endotracheal (ET) tube. A hyoid release and removal of the stenotic area was done. Desaturation to 52% occured within seconds on removal of the ET tube for suturing of the posterior wall of the trachea. Apnoeic time was deemed to be shortened due to residual lung damage, despite a relatively normal preoperative chest X-ray .
c. To allow for anterior tracheal suturing of the end-to-end tracheal anastomosis, an oral ET tube was railroaded through the vocal cords over a soft catheter which had been inserted from the tracheostomy site and pushed upwards into the mouth.

Anaesthesia was maintained with sevoflurane and dexmedetomidine. At the end of the procedure, the patient was placed in a Semi-Fowler position with slight neck flexion, muscle relaxation was reversed and he was extubated. He was transferred to ICU on nasal prong oxygen and 0.2 µg/kg/hr dexmedetomidine, maintaining 99% oxygen saturation.

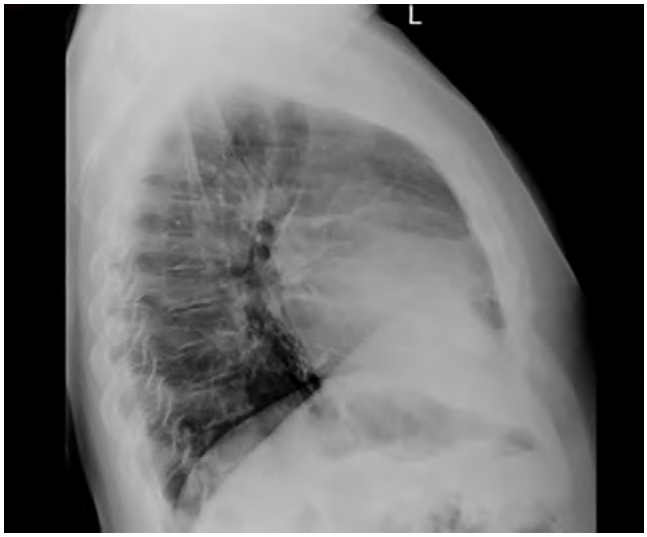

Figure 2b: CXR lateral

In 2008, Noureia et al. estimated that in the UK, one in 200 000 endotracheal intubations resulted in tracheal stenosis.[3] To date there are no South African PITS statistics. We, however, are postulating that post-COVID-19 ventilation there may be an increase in PITS. Risk factors for PITS have been known for decades but in severe COVID-19 pneumonias these risk factors may be exaggerated (Table I).[4-6]

Table I: Risk factors for PITS and impact of COVID-19

Known risk factors	COVID-19 exaggerators
Prolonged intubation	Reluctance for early tracheostomy
High cuff pressure	ARDS may necessitate high cuff pressures for ventilation
Traction on ET tube	Regular proning
Steroids	Dexamethasone – mainstay of treatment
Sepsis	Inflamed respiratory tract mucosa
Diabetes	Comorbidity known to increase risk of ventilation
Poor tracheal perfusion	Myocarditis causing cardiogenic shock
Anatomical tracheal blood supply	Relevant in conjunction with all above factors

This case is reminiscent of the 1950s poliomyelitis pandemic where PITS became a serious clinical entity.[6] Although prolonged ventilation in COVID-19 is known to increase mortality rates, survivors may have a high risk of developing PITS. These patients will require careful preoperative pulmonary, cardiac and psychiatric workup. The anaesthetic management may be complex due to pre- and post-COVID-19 comorbidities and ideally these patients should be done in specialised referral centres. It is also incumbent on the anaesthetist to remind all theatre staff of the significance of an open airway during this epidemic.

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Conflict of interest

The author has no conflict of interest.

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References

1. Grillo H. Development of tracheal surgery: a historical review. Part 2: treatment of tracheal diseases. Ann Thorac Surg. 2003;75:1039-47. https://doi.org/10.1016/S0003-4975(02)04109-7.
2. Nouraei SAR, Giussani DA, Howard DJ, et al. Physiological comparison of spontaneous and positive-pressure ventilation in laryngotracheal stenosis. BJA. 2008;101(3):419-23. https://doi.org/10.1093/bja/aen171.
3. Nouraei SAR, Ma E, Patel A, Howard DJ, Sandhu GS. Estimating the population incidence of adult post intubation laryngotracheal intubaion. Clin Otolaryngol. 2007;32(5):411-2. https://doi.org/10.1111/1.1749-4486.2007.01484.x.
4. Daumerie G, Su S, Ochroch E. Anesthesia for the patient with tracheal stenosis. Anestheisiol Clin. 2010;28(1):157-74. https://doi.org/10.1016/j.anclin.2010.01.010.
5. Miura T, Grillo H. The contribution of the inferior thyroid artery to the blood supply of the human trachea. Surg Gynecol Obstet. 1966;123:99-102.
6. Milner A. Polio, pits and grillograms. JANH. 2018;4(1):30. https://doi.org/10.1016/j.janh.2017.11.014.