

# Swiss Cheese Trachea: An Unwarranted, Unique Form of Post-intubation Tracheal Stenosis

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## Dear Editor,

Post-intubation tracheal stenosis (PITS) is a serious complication that occurs in patients who undergo endotracheal intubation or tracheostomy. Post-intubation tracheal stenosis is an avoidable complication and owing to advances in critical care complex cases of PITS are not seen very frequently now.

A 44-year-old male presented with noisy breathing for one month. On presentation, he was in respiratory distress with stridor during normal breathing, and room air oxygen saturation was 92%. A respiratory examination revealed bilateral vesicular breath sounds. The patient was operated on for Fournier's gangrene one and a half months back. During the postoperative period, he had sepsis with septic shock, for which he required prolonged mechanical ventilation via an endotracheal tube followed by a tracheotomy tube for the subsequent 12 days. Spirometry showed airflow limitation in inspiration and expiration with classical fixed airway obstruction's box-shaped pattern. Computed tomography (CT) thorax revealed a complex, critical airway narrowing at the upper one-third of the trachea. Bronchoscopy was done, and the upper one-third of the trachea showed a complex web, which had a unique Swiss cheese-like appearance (Fig. 1). Five webs were seen at the same level; even a flexible bronchoscope with a 2.8 mm outer diameter was not negotiable beyond the stenosed area. This kind of multilevel, complex tracheal stenosis is rare in appearance and would have developed due to gross aberrations in the maintenance of endotracheal and tracheostomy tube pressures. The patient was managed with an electrocautery knife incision of the web, followed by balloon tracheoplasty. Post-procedure significant lumen patency was achieved. Diagnosis of PITS requires thorough clinical history taking, CT neck-thorax, and flexible bronchoscopy. The reported incidence of symptomatic PITS ranges from 2 to 8% who had moderate to severe stenosis.<sup>1,2</sup>

Greater than 10 days of intubation before tracheostomy and endotracheal tube cuff pressure  $\geq 30$  mm H<sub>2</sub>O are usually associated with greater rates of subsequent tracheal stenosis.<sup>3</sup> Several other factors may predispose patients to develop stenoses, including age, obesity, or sepsis caused by a local wound infection.<sup>4</sup> A cuff pressure of the endotracheal tube above 30 mm Hg causes mucosal ischemia. Cartilage inflammation due to ischemic injury may be partial or full thickness. The subsequent reparative process in the form of granulation tissue formation and scarring results in lumen stricture and stenosis.<sup>5</sup> Hypovolemia, sepsis, and circulatory collapse may also accentuate ischemia by hypoperfusion. Tracheal stenosis is challenging

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**Fig. 1:** Multiple web-like stenosed areas appear as Swiss cheese pattern

to treat and may require surgical intervention ranging from balloon dilation to tracheal resection and re-anastomosis. Laser therapy, electrocautery, and balloon bronchoplasty should be offered in web-like stenosis, and if recurrence occurs, surgical resection should be considered.<sup>6</sup> What makes this case unique, is the peculiar complex pattern of the stenosis which is unlike the classical cases of PITS described in the literature.

This case is a reminder, that even in today's era of advanced critical care such avoidable complications of intubation do occur. In most situations, PITS is an avoidable complication if proper airway management guidelines are followed. The incidence of

PITS can be reduced by mandatory monitoring of endotracheal tube cuff pressure at least once a day and by preventing trauma during intubation.

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