Sternoclavicular Osteomyelitis: A New Complication of Misplaced Tracheostomy Tube

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We report a patient who presented with erythema and swelling over the chest and neck several days after the placement of a tracheostomy tube. Sternoclavicular osteomyelitis and anterior mediastinal abscess occurred, as complications of inadvertent pretracheal tracheostomy tube placement, which were treated with right sternoclavicular resection and mediastinal drainage.

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M isplacement of the tracheostomy tube can have fatal complications. Several factors increase the likelihood of tracheal tube misplacement and displacement after correct insertion. We report a case of misplacement of a tracheostomy tube into the pre-tracheal space and its adverse consequences.

A 70-year-old man presented with a 1-year history of change in his voice and difficulty breathing. The patient had a tracheostomy tube, which was placed at an outside hospital for worsening dyspnea. Laryngeal cancer was suspected, and therefore, a triple endoscopy with a biopsy of the laryngeal mass extending into the trachea was performed. After the triple endoscopy, the patient’s tracheostomy tube was reinserted. He also underwent percutaneous endoscopic gastrostomy tube placement secondary to swallowing difficulty. After these procedures, he had a fever overnight to 38.7°C. The patient was afebrile the next morning. He was discharged from the hospital pending the biopsy result. Biopsy result subsequently showed the mass to be squamous cell carcinoma. Total laryngectomy with partial tracheal resection was planned for the T3N1M0 laryngeal cancer. Ten days later, the patient presented with a 3-day history of worsening chest pain and a gradually expanding right supraclavicular erythematous mass for which the cardiothoracic surgery team was consulted. On physical examination, the right supraclavicular mass was 5 × 5 cm. It was erythematous, indurated, fluctuant, and warm on palpation. His white count was 15.4 × 103/L; other laboratory results were within normal limits. The patient was admitted, started on intravenous antibiotics, and a computed tomographic neck and thorax scan with intravenous contrast was performed for further evaluation. Figures 1 and 2 show the computed tomographic scans.

A computed tomographic scan showed that the tracheostomy tube was misplaced into the pre-tracheal space. There was a 7.3 cm × 6.4 cm soft tissue mass swelling adjacent to the first right costochondral junction and sternoclavicular joint with extension into the superior mediastinum and right anterior neck. There was also articular surface disruption at that costochondral junction and between the manubrium, first rib, and right clavicle. Presumptive diagnosis was septic arthritis, osteomyelitis, and superior mediastinitis; however, neoplastic origin could not be excluded. The patient underwent exploration of the right neck and mediastinum with resection of the right medial clavicle and manubrium with placement of a wound vacuum assisted closure. The surgical pathology report of the supraclavicular mass was negative for malignancy. A blood and wound culture was positive for streptococcus viridans. Ten days later, further debridement and right pectoralis myocutaneous flap closure of the wound was performed.

Comment

Tracheostomy can be a lifesaving operation. However, it has morbidity and mortality associated with it. Some studies suggest that the postoperative complication rate is as high as 19.6% [1]. Common complications associated
with a tracheostomy include stomal infections, stomal hemorrhage, pneumomediastinum, pneumothorax, and occasionally death. Displacement of a tracheostomy tube soon after insertion is rare, but the consequences can be disastrous if the patient has complete obstruction of the upper airway. Tube displacement is a less frequent complication with percutaneous dilatational tracheostomy when compared with surgical tracheostomy [1]. Although the incidence of tracheostomy tube displacement is only ~1.5%, the associated mortality is very high. Surgical emphysema and fatal hemorrhage are among the few devastating complications of tube misplacement and displacement after correct placement. However, if the patient has an intact or at least a partially open upper airway, the displaced tube may not cause an immediate problem or be detected.

Several factors contribute to the risk of tracheal misplacement and displacement after correct insertion. These include short neck, obese patient, and large goiter obscuring the normal anatomy [2]. Excessive coughing may also cause the tube to be dislodged from the trachea into the interstitial tissue. Furthermore, low and off-midline tracheostomies are at increased risk of displacement. The risk also increases if the thyroid isthmus is retracted as opposed to being divided. Some other risk factors are loose tracheal tapes, positive pressure ventilation with noncompliant lungs, and traction on the tubes by ventilators or humidification attachments, or both. De-cannulation of the tracheostomy tube within the first 7 days of tracheostomy may also increase the likelihood of misplacement at the time of replacement. However, some reports in the literature suggest that false channels may be created, even when dealing with mature tracts [3]. Stay sutures, cotton tapes, and Velcro tapes (Velcro USA Inc, Manchester, NH) decrease the risk of displacement of the tracheostomy tube. Among the other techniques described to reduce the risk of misplacement are replacement over a fiberoptic endoscope, the nasogastric tube guidewire technique [4], and the use of airway exchange catheters [5].

Nontraumatic sternoclavicular pathologies are relatively rare and often present problems in diagnosis. Most patients with sternoclavicular osteomyelitis present with neck and shoulder pain; moreover, clinical signs of infection, such as fever and leukocytosis may be absent. Clinical duration of the infectious process may range from 2 weeks to 1.5 years and radiographic findings are also varied; the lesion being sclerotic in some patients and lytic in others [6]. This disease should be suspected in patients with a history of immunosuppression, head and neck surgery, irradiation, and subclavian vein catheterization. Sternoclavicular osteomyelitis often occurs concurrently with sternoclavicular joint septic arthritis. Intravenous drug use is the most common risk factor (21%), followed by upper extremity infection (15%), diabetes mellitus (13%), trauma (12%), and subclavian catheters (9%). However, in almost one quarter of the patients with sternoclavicular septic arthritis, the disease is idiopathic [7]. Misplacement of the tracheostomy tube as a cause of sternoclavicular osteomyelitis has never been reported in the literature.

Optimal therapy for the surgical management of sternoclavicular osteomyelitis remains controversial. Puri [8] retrospectively compared conventional open debridement with flap closure technique for sternoclavicular joint infection. They concluded that the open group had a lower incidence of wound complications, reoperation, and length of hospitalization compared with the flap group. They also reported that the open group required prolonged wound care in comparison with the flap group. Eventual wound healing was satisfactory in both groups. In our patient wound vacuum assisted closure therapy was shortly followed by pectoralis myocutaneous flap closure to minimize the healing period and allow the early institution of radiation therapy for the patient’s laryngeal malignancy.

References