An unusual cause of difficult weaning in a patient with newly diagnosed small cell lung cancer

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ABSTRACT

We describe a patient with acute respiratory insufficiency and difficult ventilator weaning in the ICU ward, leading to diagnosis of small cell lung cancer with superior vena cava superior syndrome. Bilateral vocal cord paralysis caused his respiratory distress and weaning difficulties. Thyroidectomy and neurological problems (such as Parkinson disease and Guillain Barré syndrome) are more common causes of bilateral vocal cord paralysis. Lung cancer patients are also at risk due to mediastinal invasion. The left recurrent laryngeal nerve is more prone to paralysis because of the typical anatomy. In contrary, bilateral vocal cord paralysis is rare and doesn’t result in speech problems but rather breathing difficulties. Tracheostomy is the classic therapy, but laser cordectomy and Botulinum toxin injection in the laryngeal muscles are alternatives.

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1. Introduction

We present a 57 years old patient, active smoker. He was diagnosed since a few years with low grade COPD GOLD A and treated with a LABA. He had no other relevant medical history or allergies. He needed urgent intubation at home because of sudden respiratory failure. One week prior to this event, he noticed a swelling of his head and neck. This was first attributed to an allergic reaction by the G.P. but was later recognized as a superior vena cava syndrome. On the classical chest X ray, we noticed a vastly broadened mediastinum and densification in the right lung (Image 1). A CT scan of the chest was performed (Image 2) and showed a large mediastinal mass and atelectasis of the right upper lobe. Bronchoscopy revealed an obstructed right upper lobe with extensive external compression even in the main bronchus and distal trachea. Brain and abdominal imaging could not withhold any metastasis. Several biopsies were taken, resulting in the diagnosis of small cell lung cancer: ct4N3 (not histopathologically proven but very suggestive on CT scan) M0.

A stent was placed because of the severity of the superior vena cava syndrome. One day later, our patient received a first cycle of chemotherapy Carboplatinum-Etoposide whilst still being intubated and ventilated. Already after one week the chest X-ray showed remarkable improvement. The ventilation mode could be changed to assisted spontaneous breathing (ASB; with only 5 cm PEEP). The patient was at that time awake, sitting in a chair. Not less than 3 attempts were made to remove the endotracheal tube (ETT) but all of them failed due to immediate respiratory distress with documented desaturation requiring immediate re-intubation. Bronchoscopy was performed showing an early dramatic response, after which was decided to endoscopically extubate the patient. While removing the ETT we noticed bilateral vocal cord paralysis in complete adduction leading to an upper airway obstruction responsible for the acute respiratory distress after every extubation attempt (Image 3).

A percutaneous tracheostomy was placed, so we were finally able to remove the endotracheal tube. He moved to the conventional pulmonology unit and the second cycle of chemotherapy was given 3 weeks after the first. The patient recovered well and was able to speak again after inserting a speech cannula and returned home.

A new CT scan (Image 4) was made before he left the hospital and a very good partial response after two cycles of chemotherapy was seen. After multidisciplinary discussion, we decided to continue the treatment and adding concurrent twice-daily radiotherapy for another two chemotherapy cycles.

Treatment was complicated with several episodes of febrile
neutropenia and mechanical cannula issues (e.g. obstruction due to sputa), so the percutaneous cannula was finally replaced surgically. He finished the four cycles of chemotherapy and radiotherapy resulting in a sustained partial response.

Patient collapsed a few weeks later and died because of respiratory failure (unclear circumstances) at home approximately 5 months after diagnosis.

2. Discussion

A very old but large study of 389 cases (240 adults and 159 children) of bilateral vocal cord paralysis, gives a detailed overview of the different etiologies. In adults, the largest group of patients (138/240) followed thyroidectomy. Fifty-two cases were associated with various neurologic disorders including poliomyelitis, Parkinson’s disease, multiple system atrophy, cerebrovascular accident, Guillain–Barré syndrome, multiple sclerosis, neuroborreliosis, (para)neoplastic and other miscellaneous neurologic conditions. Sixteen cases were due to malignant neoplasms of the neck and mediastinum. The remaining 34 cases constitute a miscellaneous group which includes foreign bodies, bilateral neck dissection, infection, congenital lesions, trauma, and idiopathic paralyses [1,2].

In contrast to unilateral vocal cord paralysis, patients with a bilateral paresis paralysis can often phonate relatively normal but suffer from serious dyspnea/stridor [3]. These symptoms are due to the stationary but midline position of the vocal cords which places them in a phonating position, where they obstruct the airway. Our patient was indeed able to phonate adequately before he needed to be intubated.

The differential diagnosis of bilateral vocal cord paralysis has to be made with arytenoid subluxation, laryngeal synechiae (inter-arytenoid adhesion), posterior glottic stenosis and vocal fold fixation in laryngeal carcinomas [4].

The etiology of the bilateral vocal cord paralysis in our patient is probably the tumor itself which involved the whole mediastinum. Despite remarkable oncologic improvement the vocal cords remained immobile on follow up. The intubation was difficult and repeated several times, which itself can result in a transient vocal cord paralysis but our patient didn’t recovered from it. One case report present a patient also with a small cell lung cancer without mediastinal involvement and bilateral vocal cord paralysis attributed to a paraneoplastic syndrome with production of anti-Hu antibodies [6]. Chemotherapy itself can cause vocal cord paralysis too. We found one case report of a bilateral vocal cord paralysis caused by Platinum chemotherapy, this resolved after the chemotherapy was stopped [7]. Vincristine can also cause a reversible (bilateral)laryngeal nerve paresis even with the possibility to retreat the patient with the same chemotherapeutic drug [8].

Patients with bilateral vocal fold paralysis require immediate therapy such as (temporary) tracheotomy or reversible latero fixation of the paralyzed vocal cord [4,5]. Alternatively a unilateral laser
Cordectomy can be performed. In a case series of 19 patients in Spain, this resulted in a 40.26% average increase in the glottic opening ($p < 0.05$) at one year, allowing for decannulation in 10 (83.3%) of the tracheotomy patients. Patients were able to speak normally [9]. A definitive enlargement of the glottic airway by arytenoidectomy can also be considered [4,5]. Another option is to inject the cricothyroid muscles with Onabotulinum toxin A injection, more commonly used in the pediatric population. This procedure leads to an increase in airway patency and can avert tracheostomy [10]. The best candidates had a trauma to the laryngeal nerve without evidence of cricoarytenoid joint fixation [11].

3. Conclusion

Bilateral in contrast to unilateral vocal cord paralysis, is a rare complication of mediastinal involvement of (small cell) lung cancer. This results in normal phonation but acute respiratory failure needing urgent intubation and difficulties in weaning from the ventilator. Thyroidectomy and neurological diseases are more frequent causes of bilateral vocal cord paralysis.

Tracheostomy is the classic treatment of choice but cordectomy/arytenoidectomy or Botulinum toxin injection of the cricothyroid muscles are valuable alternatives. Chemotherapy in patients with a tracheostomy can result in specific problems related to neutropenic episodes.

Conflict of interest

None.

References

[1] L.D. Holinger, P.C. Holinger, P.H. Holinger, Etiology of bilateral abductor vocal cord paralysis: a review of 389 cases, Ann. Otol. Rhinol. Laryngol. 85 (4 Pt 1) (1976 Jul–Aug) 428–436.
[2] C.D. Martínez-Balzano, B. Greenberg, Bilateral vocal cord paralysis requiring tracheostomy due to neuroborreliosis, Chest 146 (3) (2014 Nov) e153–e155.
[3] R. Reiter, T.K. Hoffmann, N. Rotter, A. Pickhard, M.O. Scheithauer, S. Brosch, Etiology, diagnosis, differential diagnosis and therapy of vocal fold paralysis, Laryngorhinootologie 93 (3) (2014 Mar) 161–173.
[4] José Antonio Pinto, Bilateral vocal fold immobility: diagnosis and treatment, Braz. J. Otorhinolaryngol. 77 (5) (2011) 594–599.
[5] E.J. Damrose, Suture lateralization of the vocal fold for bilateral vocal fold immobility, Curr. Opin. Otolaryngol. Head Neck Surg. 19 (6) (2011 Dec) 416–421.
[6] C.Y. Chang, T. Martinu, D.L. Witsell, Bilateral vocal cord paresis as a presenting sign of paraneoplastic syndrome: case report, Otolaryngol. Head Neck Surg. 130 (6) (2004 Jun) 788–790.
[7] H. Taha, S. Ifan, M. Krishnamurthy, Cisplatin induced reversible bilateral vocal cord paralysis: an undescribed complication of cisplatin, Head Neck 21 (1) (1999 Jan) 78–79.
[8] Z. Sameen, M. Shabbir-Moosajee, Vincristine-induced vocal cord palsy and successful re-treatment in a patient with diffuse large B cell lymphoma: a case report, BMC Res. Notes 7 (2014 May 27) 318.
[9] C. Martínez-Gropeza Ldel, A. González-Ojeda, L.H. Gómez-Camacho, M.D. Macías-Amezcua, C. Puentes-Orozco, Management of bilateral vocal cord paralysis with laser cordectomy, Rev. Med. Inst. Mex. Seguro Soc. 52 (2) (2014 Mar–Apr) 162–167.
[10] S.J. Daniel, I. Cardona, Cricoarytenoid onabotulinum toxin A injection to avert tracheostomy in bilateral vocal fold paralysis, JAMA Otolaryngol. Head Neck Surg. 140 (9) (2014 Sep) 867–869.
[11] J. Ongkasuwan, M. Courey, The role of botulinum toxin in the management of airway compromise due to bilateral vocal fold paralysis, Curr. Opin. Otolaryngol. Head Neck Surg. 19 (6) (2011 Dec) 444–448.