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CASE REPORT

Kashima Operation: An Endoscopic Phonosurgery by LASER for Bilateral Vocal Cord Palsy

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ABSTRACT

Complete or partial restriction of the vocal cords usually occurs due to cancer, neurologic causes or mechanical causes like huge neck mass, trauma to the neck, viral infection, and sometimes iatrogenic during surgery. Bilateral vocal cord palsy is a severe condition that can lead to significant problems in breathing, speaking, and swallowing. If any patient presents with stridor, it requires urgent surgical airway management followed by specific treatment. A case of viral bilateral abductor vocal cord palsy in a 41-year-old female is reported here. The patient presented with stridor, and immediate tracheostomy was done. The stridor developed first 3 months earlier followed by cold and fever for a week. The stridor worsened gradually and leads to a state of commencing immediate tracheostomy. There was no history of trauma to the neck or any neck surgery. All basic laboratory blood test was within the normal limit. The laryngoscopic examination showed both vocal cords were immobile and almost median position with a small gap at the posterior commissure. Chest and neck plain X-ray along with computed tomography scan of neck was normal which ruled out the other causes of bilateral vocal cord palsy. The patient subsequently underwent successful left posterior cordectomy by laser, and decannulation of tracheostomy was done, known as Kashima operation.

INTRODUCTION

Numerous surgical approaches are described in different works of literature to treat the patient with bilateral vocal cord palsy (BVCP).

All methods were intended to enlarge the glottic gap to facilitate normal breathing. Dennis and Kashima described a novel approach in 1989, of posterior cordectomy using laser which is popularly known as Kashima operation. By using carbon dioxide (CO_2) laser a partial posterior cordectomy is done in this procedure. Aim of the surgery is to re-establish the compromised airway due to bilateral VC palsy with minimum loss of normal vocal cord structures and preservation of quality of the voice. Kashima operation is an endoscopic technique using laser to do posterior cordectomy to re-establish breathing through paralyzed vocal cords. This surgical procedure is executed in patients with respiratory difficulty due to bilateral abductor vocal cord palsy (Brigger & Hartnick, 2002). If the nerves supplying the laryngeal muscles are affected on both sides, it may result in BVPC, causing weakness or total loss of movement of the laryngeal muscles (Hazarika et al., 2002). It usually occurs due to laryngeal and other head-neck cancer, viral infection, trauma, thyroid, other head-neck surgery, etc.

CASE PRESENTATION

A 41-year-old female presented with gradually worsening stridor for the last three months. She had a history of a common cold with fever for one week before this problem. Initially, she suffered from uncomfortable breathing with dysphonia, followed by recurrent attacks of strained or strangled breath during sleep for one month. She also complained of fatigue and lethargy but no history of weight loss or dysphagia. The patient did not have any previous history of surgery or trauma or mass in the neck. During the initial presentation in the hospital, the patient had stridor with tachypnoea but no cyanosis.

Fibre optic laryngoscopy revealed immobile and almost median positioned vocal cords with a small gap at the posterior commissure (Figure 1). There were no polyps, nodules, or any other mass seen. A computed tomography (CT) scan of the head and neck region, including thorax, was advised to exclude other causes of bilateral vocal cord palsy but declined by the patient as it was not affordable for them in a private set up. However, X-ray chest and X-ray neck AP and the lateral view was done in which no abnormality was seen.

Urgent tracheostomy was done to relieve her breathing difficulties. A diode laser-assisted Kashima operation on the left vocal cord was performed in this case two weeks later (Figure 2). Universal precaution for laser surgery was taken using a laser-compatible endotracheal tube, wearing laser-compatible goggles by surgeons and others inside the room, putting "Laser on" signage outside the operation theatre, etc. The surgery was uneventful, and the patient recovered from her breathing difficulties. The patient was prescribed a short course of oral steroid postoperatively and managed well in the otolaryngology department's general ward. Six weeks after the Kashima operation, the tracheostomy was weaned off, and the wound was closed when the epithelialization was completed. She was able to speak with mild hoarseness, and there were no episodes of aspiration.

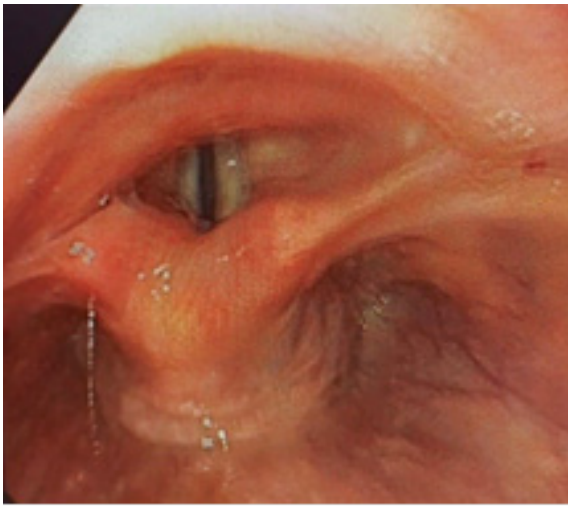

Figure 1 Pre-operative view showed bilateral vocal cords in almost median position with little phonatory gap

Figure 2 Postoperative view of left posterior cordectomy/ Kashima operation

DISCUSSION

The vocal cords or folds are "V" shaped bands of smooth muscle in the larynx, which abduct to open during respiration, adducts to close while swallowing and vibrate to produce the sounds while talking. Multiple intrinsic muscles control the movement of the vocal folds, innervated by recurrent laryngeal nerve and superior laryngeal nerve branch of the vagus nerve. Any lesion or injury in the vocal cords or their nerve supply may compromise breathing and speech. Paralysis of the vocal cords may lead to aspiration, which may end up developing pneumonia. If one side of the vocal cord is affected, the other side may compensate. Bilateral vocal cord palsy can be incomplete and complete. Incomplete bilateral vocal cord palsy means damage to abductor fibres bilaterally. Here the natural adductor fibres draw the cords in the midline. During inspiration, the abduction does not occur, and vocal cords cannot open, which results in severe respiratory distress. Hence it is dangerous than complete BVCP. Again, during phonation, the vocal cords remain closed. So, the patient still manages to talk (Brigger & Hartnick, 2002).

On the other hand, complete BVCP, both the abductor and adductor fibres, are affected. So, the adductor fibres cannot close the vocal cords fully. There will always be a small phonatory gap, which, during inspiration, increases little more (Hazarika et al., 2002). Thus, it does affect the voice more than respiration. In this case, there was gradually worsening towards incomplete BVCP based on the history given by the patient and clinical findings.

Acute BLVC palsy may lead to stridor, which may be life-threatening, requiring emergency intervention by the otolaryngologist. In severe bacterial infection of the upper respiratory tract, oedematous swollen vocal folds may develop, which may create airway obstruction (Lisowska et al., 2015). This patient developed recurrent stridor while sleeping due to abductor palsy bilaterally for three months but could tolerate the condition except for few constitutional symptoms. Her condition worsened three days before admission. Endotracheal intubation failed due to a lack of enough intralaryngeal space, so tracheostomy was performed as a life-saving measure. This case is unique because the infective cause of BVCP is rare, and facilities of Kashima operation in the developing countries are not common.

In the place where endoscopic procedure with laser is not available, lateralization of vocal cord with different suturing techniques, arytenoidopexy and/ or permanent tracheostomy are the treatment options. Managing a permanent tracheostomy at home is tedious, requires proper training for regular suction, cleaning, humidification and changing the tube. With tracheostomy, the patient will have difficulties while speaking. They need to occlude the tube externally while speaking or may use expensive speaking valves. With advanced technological support and well-trained personal, an endoscopic laser-assisted posterior cordectomy is a better option in this condition (Oswal & Gandhi, 2009).

In 1989, the posterior cordectomy was first proposed by Kashima and Dennis (Brigger & Hartnick, 2002). This procedure is done to

reestablish adequate airway for breathing through the natural way while reimbursing proper phonation. Currently, this technique became the treatment of choice, as it is valid and gives better salvage of the patient's symptoms and fewer complications. The repeatable procedure also can be performed if needed for recurrence. In this patient, the posterior third of the left vocal cord was ablated with diode laser until a desired 'C' shape of the airway was created. Approximately 4 mm ablation was done laterally to ensure the airway for breathing. The basic idea of classic Kashima operation is based on soft tissue resection and transection of conus elasticus to release the tension of the glottic sphincter, followed in this case. Skilled techniques are required to avoid over ablation, which will create unwanted wide spacing predispose to aspiration. To prevent this complication, some surgeons advocated unilateral cordectomy, on the other hand, few centres provide safe bilateral procedure simultaneously. A success rate of 92% with good airway and voice quality with bilateral posterior cordectomy in 22 patients with bilateral vocal cord paralysis in Egypt was reported (Hazarika et al., 2002). The common complications of aspiration, deglutition, or granuloma formation were not reported.

Unnecessary or over ablation or burn of undesired parts can be avoided with well-trained personal. One of the advantages of laser surgery is less chance of bleeding, which reduces the risk of aspiration of blood during and postoperatively as laser ablates the tissue, not cut with a cold instrument. But so far, not many similar procedures were reported. Oswal and Gandhi (2009) reported a retrospective study in India of subtotal arytenoidectomy with endoscopic laser surgery in 48 patients with bilateral abductor palsy. Saetti et al. (2003) reported a case of 34 patients with bilateral vocal cord palsy in Italy who underwent a modified Dennis-Kashima posterior cordectomy. A retrospective study between 1998 and 2014 in Poland reported about 270 patients with bilateral vocal cord palsy, who undergone laser arytenoidectomy with posterior partial cordectomy (Lisowska et al., 2015). All the studies concluded that this rapid and straightforward technique was effective, reliable for reestablishing enough glottic space for respiration, preserving good phonation quality without hampering swallowing, and low-risk complications and permits revision surgery if needed (Lisowska et al., 2015; Oswal & Gandhi, 2009; Saetti et al., 2003). If the airway space is not adequate, a repeat procedure can be done on the opposite vocal cord (Khlifa, 2005; Segas et al., 2001). Few other studies also reported satisfied postoperative outcomes with bilateral vocal fold paralysis that underwent laser posterior cordectomy (Céspedes et al., 20016; Ferri & García Purriños, 2006; Luczaj et al., 2008).

CONCLUSION

Bilateral vocal cord palsy is a rare but life-threatening condition. A well-equipped otolaryngology centre with laser facilities would be able to offer the best treatment and an excellent postoperative outcome. Laser-assisted posterior cordectomy has been widely performed in developed centres and developed countries with the advancement of facilities currently, which can be done in developing countries in a few centres.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written consent was obtained from the patient to publish the case with some related pictures. A copy of the written consent is available for review by the Chief Editor.

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