Case Report

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Bilateral Vocal Cord Paralysis following Radiation Therapy for Nasopharyngeal Carcinoma

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Key Words

Radiation therapy
Complications
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Abstract

Cranial nerve palsies are uncommon late sequelae of radiation therapy. We present a rare case of bilateral vocal cord paralysis secondary to radiation-induced recurrent laryngeal nerve paralysis. The exact mechanism accounting for radiation-induced nerve damage is unknown. The complication may occur years following radiation therapy thus making a causal relationship difficult. As there is no treatment available, the therapy should aim to improve the functional impairment produced by the nerve involved.

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Introduction

Paralysis of one or more cranial nerves as a result of direct involvement by the tumor is a frequent finding in patients with cancer of the head and neck region. Radiation therapy, a vital tool in the treatment of head and neck cancers, usually leads to an improvement in the paresis [1]. As the cranial nerves are relatively radioresistant, their presence in a radiation treatment field does not affect the treatment strategy [2]. However, radiation-induced cranial nerve palsies are being observed more frequently in the recent years. Bilateral vocal cord paralysis can be one of its life-threatening complications [3]. Fortunately, involvement of recurrent laryngeal nerves is rare with only 4 cases reported in the English literature [4-7]. We present a case of a 53-year-old gentleman who developed bilateral vocal cord paralysis 3 years following radiation therapy for nasopharyngeal cancer.

Case

A 50-year-old man presented to the ENT service in January 1984 with a 1-month history of a neck mass and epistaxis. On head and neck examination, two lymph nodes 3×4 mm and 5×7 mm were palpated in the cervical region. Endoscopic examination of nasopharynx revealed an ulcerated mass lesion in the nasopharynx. Biopsy of the lesion confirmed it to be a squamous cell carcinoma. CT scan of the head showed no local destruction. Except for the neck nodes, a metastatic work-up was negative. The treatment plan consisted of chemo- and radiation therapy. After chemotherapy with cis-platin, the patient underwent 5,000 cGY of radiation therapy divided over a period of 5 weeks. Therapy was given by means of parallel opposing ports to the nasopharynx. To spare the spinal cord of further exposure, the port was reduced in width after delivering 4000 rad. In addition, he received the same dose at the same rate using an anterior port

to the lower neck nodes down to the infraclavicular area. The midline was blocked on this port to avoid radiation to the spinal cord. Except for some local dermatitis, radiotherapy did not result in any major immediate side effects.

Following treatment, the patient did well until February 1987, when he developed hoarseness of voice and mild exertional dyspnea. A detailed clinical and laboratory work-up did not indicate a local

recurrence or metastatic disease. The hoarseness and exertional dyspnea progressively increased over the next year without an identifiable cause. Subsequently, the patient was admitted to the hospital with an acute episode of dyspnea. On examination, glottic chink was observed to be 3 mm with weak movement of both vocal cords. A tracheostomy was performed to restore airway patency. As the vocal cord mobility failed to improve, a left arytenoidectomy was performed a year later. The procedure resulted in the alleviation of symptoms and an acceptable quality of voice. Eventually, the patient was decannulated.

The patient has been followed regularly over the past 9 years with no evidence of recurrent disease. The vocal cords are still paralysed with borderline airway patency.

Discussion

Radiation therapy is the most suitable and effective mode of therapy available for the treatment of naso-pharyngeal cancer [8]. However, the destructive nature of radiation therapy and the close proximity of the nasopharynx to sensitive structures like eyes, nervous tissue and major blood vessels predisposes to a variety of side effects. Minor problems such as erythema of skin and mucositis usually resolve in few weeks. Radiation-induced cancers and strictures are some of the more serious and potentially fatal complications [3]. Most of the complications occur early but some may occur years after the radiation therapy. These late sequelae include spinal cord myelopathy, necroses with fatal hemorrhage and cranial nerve palsies [3].

Radiation-induced nerve palsies usually become apparent after a latent period of 1-5 years following therapy

[4]. Many studies have reported an inverse relation between the dose and the latent period [2].

The exact mechanism accounting for radiation-induced peripheral nerve damage is unclear [4].

Some authors suggest a direct nerve damage as the possible mechanism. This conclusion is based on short follow-up in experimental studies [9]. Additionally long latent periods observed in clinical situations do not support this theory. A more likely mechanism is the radiation induced fibroses in the vicinity of nerves. The progressive growth of the fibrous tissue may lead to the mechanical compression of the nerves, resulting in permanent functional changes [2].

Tumor-induced nerve damage is a common cause of cranial nerve paralysis in the head and neck region [1]. In our case, a close follow-up did not reveal any local recurrence or distant metastasis. This rules out the possibility of direct damage to the nerve by the tumor. However, a latent period of 2 years supports our diagnosis of radiation-induced recurrent laryngeal nerve paralysis. Bilateral vocal cord paralysis can compromise the airways resulting in a life-threatening situation. As in our case, the airway management may necessitate a tracheostomy. Radiation-induced palsies are progressive and not treatable at present [6]. Given the location and high dose of radiation therapy required in some patients, this complication may not be avoidable. This demands that the physicians be alert to the possibility, even years following the radiation therapy. Radiation-induced recurrent laryngeal nerve paralysis is a rare complication. The common causes of vocal cord paralysis should be ruled out before considering this diagnosis.

References

- Son YH: Effectiveness of radiation therapy in peripheral neuropathy caused by malignant disease. *Cancer* 1967;20:1447-1451. Stoll BA, Andrews JT: Radiation-induced peripheral neuropathy. *BMJ* 1966;1:834-837. Ballantyne AJ: Late sequelae of radiation therapy in cancer of the head and neck with particular reference to the nasopharynx. *Am J Surg* 1975;130:433-436. Takimoto T, Saito Y, Nishimura T: Radiation induced cranial nerve palsy: Hypoglossal nerve and vocal cord palsies. *J Laryngol Otol* 1991; 105:44-45.
- Cheng VST, Schulz MD: Unilateral hypoglossal nerve atrophy as a late complication of radiation therapy of head and neck carcinoma: A review of four cases and a review of the literature on peripheral and cranial nerve damages after radiation therapy. *Cancer* 1975;35:1537-1544.
- Berger PS, Bataini JP: Radiation induced cranial nerve palsy. *Cancer* 1977;40:152-155.
- Westbrook KC, Ballantyne AJ, Eckles NE, Brown GR: Breast cancer and vocal cord paralysis. *South Med J* 1974;67:805-807. Bataini JP, Ennuyer A, Poncet P, Ghossein NA: Treatment of supraglottic cancer by radical high dose radiotherapy. *Cancer* 1974;33: 1253-1262.
- Cavanagh JB: Effect of X-irradiation on the proliferation of cells in peripheral nerves during wallerian degeneration in rat. *Br J Radiol* 1968;85:62-66.