

Development of parotitis after radioiodine therapy in a differentiated thyroid cancer patient: Case report

Diferansiye tiroid kanser hastasında radyoiyot tedavisi sonrası parotit gelişimi: Olgu sunumu

*Zekiye Hasbek, **Kasım Durmuş, ***Aynur Engin, **Emine Elif Altuntaş

*Cumhuriyet University, School of Medicine, Department of Nuclear Medicine, Sivas

** Cumhuriyet University, School of Medicine, Department of Otolaryngology, Sivas

***Cumhuriyet University, School of Medicine, Department of Infectious Diseases and Clinical Microbiology, Sivas

Corresponding author: Dr. Zekiye Hasbek, Department of Nuclear Medicine, Cumhuriyet University, TR-58140 Sivas.

E-mail: hasbekz@yahoo.com

Received/Accepted: September 08, 2015 / January 04, 2016

Conflict of interest: There is not a conflict of interest.

SUMMARY

In this article, we report a 51 years old female patient treated with radioactive iodine (RAI-¹³¹I) treatment for thyroid papillary carcinoma and developing parotitis on the 24 hour following treatment. Sialoadenitis after high dose ablative therapy with ¹³¹I is a relatively common complication with a low clinical impression. Taste alteration or loss, and nausea and vomiting due to radiation sickness are the other most frequent side effects. Xerostomia is an important problem increasing morbidity of the patients. For this reason, it is important to prevent xerostomia by following serum amylase levels in symptomatic patients. By taking into account that not only bacterial and viral factors but also radiation may cause sialoadenitis, one has to rule out other parotitis possibilities by clinical and laboratory findings before claiming that salivary gland enlargement developing after radioiodine is a complication of radiation. Moreover, history of RAI treatment should be given importance in patients applying either to emergency services or to Ear Nose Throat and Infectious Diseases Department with dry mouth.

Keywords: Radioiodine therapy, differentiated thyroid carcinoma, parotitis

ÖZET

Bu makalede, diferansiye tiroid papiller karsinom nedeniyle radyoaktif iyot (RAI-¹³¹I) tedavisi verilen ve tedavinin 24. saatinde parotitis gelişen 51 yaşındaki kadın hastayı sunduk. ¹³¹I ile yüksek doz ablasyon tedavisi sonrası siyaloadenit, düşük klinik izlem ile birlikte rölatif olarak sık bir komplikasyondur. Radyasyon hastalığı nedeniyle tat alma bozukluğu veya kaybı, ve bulantı ve kusma diğer en sık yan etkilerdir. Kserostomi hastaların morbiditesini artıran önemli bir problemdir. Bu nedenle, semptomatik hastalarda serum amilaz düzeylerinin takibi, kserostominin önlenmesi için önemlidir. Bakteriyel ve viral etkenler dışında radyasyonun da sialadenit yapabileceği dikkate alınarak, radyoaktif iyot sonrası gelişen tükürük bezi büyümesinin, radyasyon komplikasyonu olduğunu söylemeden önce, klinik ve laboratuvar bulgularla birlikte diğer parotit olasılıklarının da ekarte edilmesi gereklidir. Bunun yanı sıra, gerek acil servislere gerekse Kulak Burun Boğaz (KBB) departmanlarında ağız kuruluğu ile başvuran hastalarda, hikayede mutlaka RAI tedavi öyküsünün de sorgulanması önemlidir.

Anahtar sözcükler: Radyoiyot tedavi, diferansiye tiroid karsinom, parotit

INTRODUCTION

Radioiodine (^{131}I) concentrates in thy-roid cells and it can destroy thyroid cells. So, in differentiated thyroid can-cer patients, radioiodine therapy can be used to destroy any thyroid tissue not removed by surgery or to treat spread to lymph nodes and other parts of the body [1]. For an effective RAI therapy, thy-roid-stimulating hormone (TSH) levels of the patients should be high. TSH stimulates thy-roid tissue (and cancer cells) to take up radio-active iodine. Serious acute complications are extremely rare during RAI therapy. However, some early complications can be seen. Short-term side effects of RAI treatment may include neck tenderness and swelling, nausea and vom-iting due to radiation sickness, swelling and ten-derness of the salivary glands, dry mouth, and taste alteration.

Following RAI administration, ensuring hydra-tion, drinking lemon juice, suck-ing lemon candies, treating constipation with laxatives, and using antiemetics help both remission of symptoms and decrease the exposure of blad-der, sali-vary glands and colon to radioactivity. We present a case where the patient developed radiation sialadenitis after radioactive iodide therapy for thyroid papillary cancer that result-ed in a high level of serum amylase and severe parotid swelling.

CASE REPORT

A 51 years old female patient undergoing total thyroidectomy for thyroid papillary carcinoma was re-ferred to the Nuclear Medicine Depart-ment of Cumhuriyet University for radioactive iodine (RAI) treatment with ^{131}I . In her neck ultrasonography before ablation therapy with RAI, a few lymph nodes were observed in both cervical chains. Moreover, a thrombosed ap-pearance originating from the left ex-ternal carotid artery of the left thyroid gland with a blind ending at the thyroid gland, and a throm-bosed appearance of the superior thyroid artery with min-imal arterial flow at the lumen area were observed. There was no hypere-mia, edema or heat increase in the pa-rotid region before starting the treat-ment.

Her thorax X-ray was normal. Thyroid scintig-raphy performed with $\text{Tc}99\text{m}$ pertechnetate before ablation revealed a miminal residual thyroid tissue uptake at the left lobe of the thyroid gland. During her hospitalization, thy-

roid function tests revealed: fT_3 :1.52 pg/mL, fT_4 : 0.23 ng/dL, TSH: 96.93 $\mu\text{IU/mL}$, Anti-thyroglobulin antibody (Anti-Tg Ab): 0.001 IU/mL, thy-roglobulin (Tg): 0.51 ng/mL. Fol-lowing oral administration of 100 mCi ^{131}I capsule, the patient was isolated in an iodine room. The patient was recom-mended to drink plenty of water, suck candy and eat lemon. Twenty four hours after the RAI therapy, the patient was found to have a bilateral parotid hardening and swelling. The patient had no additional symptoms such as pain, fever, etc. Her history was re-examined.

It was learned that the patient had a complaint of dry mouth after total thyroidectomy. The patient had no history of tumor or medications affect-ing salivary glands such as antihista-mines, anticholinergics or antispasmodics. Thus, a consultation was re-quested from the Ear Nose Throat and Infectious Diseases (ENT) Department. ENT consultation revealed bilateral parotid gland swelling prominent on the right side while anterior rhinoscopy showed a normal bilateral space. The oral mu-cosa appeared normally moist and not in-flamed. Autoscopic examina-tion showed that the bilateral external auditory canal was natural and bilateral tympanic membrane was intact. The systematic examination of the patient was normal and there was no fever. Infectious dis-eases consultation showed a parotid swelling and endurance with-out any infectious cause. Examinations revealed leukocytosis with a leukocyte value of 12.14 where neutrophils ac-counted for 90%, lymphocytes for 7% and mon-ocytes for 1.7%.

Her blood amylase level was found to be above the normal level, namely 1595 U/L. An infec-tious dis-eases consultation revealed that mumps-specific IgG antibody was posi-tive and IgM antibody was negative. No additional recommendations were made to increase the fluid support of the patient. Approxi-mately 30 hours after ^{131}I administration, the parotid swelling of the patient disappeared. On the post-operative 8th day, ^{131}I whole-body scintigraphy (WBS) was per-formed using large field-of-view, dual-head gamma camera (GCA7100-Toshiba) equipped with high ener-gy parallel-hole collimator. WBS (whole-body scintigraphy) revealed increased iodine uptake at the right parotid area and an uptake focus compatible with the residual thyroid tissue at

the neck region (Figure 1). Hemogram and serum amylase levels were measured again. After seven days, serum amylase was in normal values (95U/L). Also hemo-gram levels were normal. The patient was evaluated as having parotitis due to radioiodine.

DISCUSSION

Radioiodine is concentrated and secreted into the saliva. Thus, salivary gland dysfunction is the most frequent complication of ablation therapy with radioiodine. Due to deep hypothyroidism, glomerular infiltration is decreased at the time of ablation therapy. For this reason, radioiodine is cleared from circulation much later and causes stasis of radioiodine in the salivary glands. In the literature, the ratio of sialadenitis has been reported to be between 2.8% to 33% after RAI therapy [2]. Dose related damage to the salivary parenchyma results from the ¹³¹I irradiation [Jeong]. Transient sialadenitis is rare with smaller doses of radioactive iodine [3].

Salivary gland dysfunction is more common after repeated ¹³¹I administration [4]. Swelling and pain of salivary gland are the most common symptoms in early sialadenitis while xerostomia is the most prominent symptom in chronic sialadenitis after RAI therapy. An YS et al. [5] found the ratio of late-phase (mean 338 days) symptomatic sialadenitis as 10% after RAI therapy. Early sialadenitis occurs in a short time after RAI therapy with swelling and pain symptoms and usually subsides over a few days spontaneously. Sialogogues, warm compress, steroids and cholinergic medications may be necessary. In recent studies, use of sialendoscopy has been reported in severe and refractory cases [6].

When compared to mucous cells, serous cells have a greater ability to trap iodide. Parotid gland involvement is observed more frequently as it contains more serous cells than mucous cells [7]. Moreover, high mucin secretion in the submandibular glands protect these glands from exposure to radiation [5]. Interestingly, although its reason has not been fully explained yet, there are studies reporting that the right parotid gland is affected more [5]. Moreover, Jeong et al. [8] found that xerostomia is most frequently associated with submandibular gland dysfunction. Mandel et al reported that, in conjunction with the radiation sialadenitis, secondary complications may include

xerostomia, taste alterations, infection, increases in caries, facial nerve involvement, stomatitis, candidiasis, and neoplasia [9]. Adequate hydration, sucking sweets or lemon juice advocates to reduce radiation damage to the salivary glands.

In a study conducted by Solans et al. [10] on 79 patients, 32.9% of the patients had subjective xerostomia and 25.3% had subjective xerophthalmia after radioiodine treatment. They found that xerostomia persisted to the second year of follow-up in 20.3% of the cases and was still present >3 y after the last dose of radioiodine in 15.2% of cases while xerophthalmia persisted to the second year of follow-up in 17.7% of cases and was still present in the third year of follow-up in 13.9% of cases. They also reported that salivary gland dysfunction was relatively frequent after RAI therapy and this was transient in most cases but persisted for a long period in some patients.

In ablation therapy with ¹³¹I, Rosário et al. [11] found that hyperamylasemia and symptoms of acute sialoadenitis occurred in 36.6% of the patients receiving recombinant-TSH (rhTSH) and 80% of the patients prepared by levothyroxine withdrawal. So, they reported a lower radiotoxicity with rhTSH.

Differentiated thyroid cancers are a relatively uncommon type of cancer but are the most common cancers of the endocrine system, and their incidence has been rapidly increasing [12]. Differentiated thyroid cancers are treated with high doses of ¹³¹I after total thyroidectomy. For this reason, history of RAI treatment should be given importance in patients applying either to emergency services or to ENT polyclinics with dry mouth.

In our patient, serum amylase level was measured as 1595 during the acute phase. Xerostomia is an important problem increasing morbidity of the patients. For this reason, it is important to prevent xerostomia by following serum amylase levels in symptomatic patients. Similar to bacterial parotitis and viral parotitis, serum amylase level increase is observed in parotitis occurring due to ablation therapy with ¹³¹I. Before claiming that salivary gland enlargement developing after radioiodine is a complication of radiation, one has to rule out other parotitis possibilities by clinical and laboratory findings.

REFERENCES

1. Mazzaferri EL. The Diagnosis and imaging of Thyroid Cancer. In: Amdur JA, Mazzaferri EL, editors. Essentials of thyroid cancer management. Springer Science+Business Media, Inc. 2005; p: 39-120.
2. Almeida JP, Sanabria AE, Lima EN, Kowalski LP. Late side effects of radioactive iodine on salivary gland function in patients with thyroid cancer. *Head Neck* 2011; 33: 686-90.
3. Lee HN, An JY, Lee KM, Kim EJ, Choi WS, Kim DY. Salivary gland dysfunction after radioactive iodine (I-131) therapy in patients following total thyroid-ectomy: emphasis on radioactive iodine therapy dose. *Clin Imaging* 2015; S0899-707: 324-6.
4. Hyer S, Kong A, Pratt B, Harmer C. Salivary gland toxicity after radioiodine therapy for thyroid cancer. *Clin Oncol (R Coll Radiol)* 2007; 19: 83-6.
5. An YS, Yoon JK, Lee SJ, Song HS, Yoon SH, Jo KS. Symptomatic late-onset sialadenitis after radioiodine therapy in thyroid cancer. *Ann Nucl Med* 2013; 27: 386-91.
6. Prendes BL, Orloff LA, Eisele DW. Therapeutic sialendoscopy for the management of radioiodine sialadenitis. *Arch Otolaryngol Head Neck Surg* 2012; 138: 15-9.
7. Mandel SJ, Mandel L. False-positive xerostomia following radioactive iodine treatment: case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007; 103: e43-7.
8. Jeong SY, Kim HW, Lee SW, Ahn BC, Lee J. Salivary gland function 5 years after radioactive iodine ablation in patients with differentiated thyroid cancer: direct comparison of pre- and postablation scintigraphies and their relation to xerostomia symptoms. *Thyroid* 2013; 23: 609-16.
9. Mandel SJ, Mandel L. Radioactive iodine and the salivary glands. *Thyroid* 2003; 13: 265-71.
10. Solans R, Bosch JA, Galofré P, Porta F, Roselló J, Selva-O'Callagan A, Villardell M. Salivary and lacrimal gland dysfunction (sicca syndrome) after radioiodine therapy. *J Nucl Med* 2001; 42: 738-43.
11. Rosário PW, Borges MA, Purisch S. Preparation with recombinant human thyroid-stimulating hormone for thyroid remnant ablation with ¹³¹I is associated with lowered radio-toxicity. *J Nucl Med* 2008; 49: 1776-82.
12. Pacini F, Schlumberger M, Dralle H, Elisei R, Smit J, Wiersinga W. European consensus for the management of patients with differentiated thyroid carcinoma of the follicular epithelium. *Eur J Endocrinol* 2006; 154: 787-803.