OPTIMIZATION OF RADIOIODINE THERAPY OF DIFFERENTIATED THYROID CANCER

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27 Ulusal Nuklear Tip Kongresi, 01-05 Nisan 2015, Adana, Turkey
SEIDLIN SM, ROSSMAN I. Radioiodine therapy of metastases from carcinoma of the thyroid; a 6-year progress report. The Journal of clinical endocrinology and metabolism. 1949 Nov;9(11):1122–37, illust
Patient Name: Irina
Date of Birth: 07.09.1953

Referred by the GP because of thyroid nodules

Concomitant diseases:

• Cardiomiopathy
• Chronic gastritis
• Hypertension
Diagnostic work-up: US, 99mTc scan, FNAB

- Follicular Adenoma: 18mm
- Hurthle Adenoma: 13mm
- Papillary Carcinoma: 11mm
<table>
<thead>
<tr>
<th>Pro</th>
<th>Contra</th>
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</thead>
<tbody>
<tr>
<td>Coexistence of Follicular and Hurtle adenoma</td>
<td>T1 (1cm)</td>
</tr>
<tr>
<td>62 years old</td>
<td>Total thyroidectomy</td>
</tr>
<tr>
<td></td>
<td>Undetectable Tg</td>
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</tbody>
</table>
Dr Suman, North Shore University Health System, Illinois

2014 Annual meeting of the American Thyroid Association

284 635 patients from National Cancer Database

<table>
<thead>
<tr>
<th>Tumor size</th>
<th>&lt; 10 mm</th>
<th>10 -20 mm</th>
<th>21 -40mm</th>
<th>&gt;40mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31%</td>
<td>29%</td>
<td>24%</td>
<td>8%</td>
</tr>
</tbody>
</table>

RAI was associated with improved overall survival for all tumor sizes
IoN (Iodine or Not) study - 2021 UK

Thyroid cancer related molecular gene profiling

Personalized medicine
Diagnostic work-up: US, 99mTc scan, FNAB

Papillary Carcinoma

19 mm
High or Low Dose?

Low versus high radioiodine activity to ablate the thyroid after thyroidectomy for cancer: a meta-analysis of randomized controlled trials.

Low-dose radioiodine can be used in patients undergoing total thyroidectomy. For those who receive insufficient surgical treatment, high-dose radioiodine is more appropriate.
Concomitant diseases:

- Cardiomiopathy
- Chronic gastritis
- Hypertension

Ramipyramyl
Nebilol
Omeprazole
Furosemide
Benzodiazepine
LOW IODINE DIET

Lack of association between urinary iodine excretion and successful thyroid ablation in thyroid cancer patients

EANM guidelines levels of UIE above 150-200µg/L are considered as iodine excess that can influence RAIT.

Severe Hyponatremia Following Radioactive Iodine Therapy in Patients with Differentiated Thyroid Cancer
Kim S et al. Thyroid 2013
THE GASTRIC MUCOSA
$^{131}$I gastric uptake with and without omeprazole in patients undergoing radioiodine therapy for differentiated thyroid carcinoma.

WHAT TO DO WHEN PATIENT IS TAKING PROTON PUMP INHIBITORS?
DIURETICS?

Faster excretion – lower radiation burden?
Unexpected effect of furosemide on radioiodine urinary excretion in patients with differentiated thyroid carcinomas treated with iodine 131.

Lower Urinary Excretion of radioiodine in patients treated with furosemide

Higher blood activity at 72 hours in the same group.
SALIVARY GLANDS

Figure 1. Glands of the head and neck: (1) the parotid, (2) submandibular, and (3) sublingual.

oral cavity & sublingual glands

parotid gland
submandibular gland
thyroid remnant

Source: Thyroid © 2003 Mary Ann Liebert, Inc.
30 –70 % of the patients will present with impaired salivary gland function assessed by salivary scintigraphy

• Difficulties in speech, chewing and swallowing
• Oral infections
• Halitosis
• Teeth decay
DOES LEMON CANDY DECREASE SALIVARY GLAND DAMAGE AFTER RADIOIODINE THERAPY FOR THYROID CANCER?
Nakada et al. JNM. 2005; 46:261 - 266
<table>
<thead>
<tr>
<th></th>
<th>Lemon candy in the first 24 h</th>
<th>Lemon candy after 24 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sialoadenitis</td>
<td>64%</td>
<td>37%</td>
</tr>
<tr>
<td>Xerostomia</td>
<td>24%</td>
<td>11%</td>
</tr>
</tbody>
</table>

**REBOUND EFFECT**
Does lemon juice increase radioiodine reaccumulation within the parotid glands more than if lemon juice is not administered?
Kulkarni K et al. Nuclear Medicine Communications 2014

No rebound effect

The influence of saliva flow stimulation on the absorbed radiation dose to the salivary glands during radioiodine therapy of thyroid cancer using 124I PET/CT imaging
Jentzen W et al. EJNM, 2010

Increased absorbed dose (rebound effect)
Influence of vitamin C on salivary absorbed dose of 131I in thyroid cancer patients: a prospective, randomized, single-blind, controlled trial.


- 4 groups with different protocol regarding the time of stimulation of the saliva secretion.
- 1, 5, 13, 25 hours after RAIT.
- Internal radiation dosimetry of the salivary glands

Salivary stimulation with vitamin C at any time after (131)I administration has only a limited effect on salivary absorbed dose in thyroid cancer patients
OPTIMIZATION OF THE PROTOCOLS FOR THE STIMULATION OF SALIVA FLOW
Amifostine for salivary glands in high-dose radioactive iodine treated differentiated thyroid cancer.
Ma C. Cochrane Database System, Rev.2009 Oct 7;(4)

Does vitamin E protect salivary glands from I-131 radiation damage in patients with thyroid cancer?
SAGPRIT
Multicentric, randomized, interventional, prospective

Lemon Candy
Corticosteroids
Vitamin E

ugrinskaana@yahoo.com
BCNM 2012
Antalya

BCNM 2013 Belgrade

BCNM 2014 Bucharest
4th Balkan Congress of Nuclear Medicine

September 3rd-6th 2015
Ohrid, Macedonia

www.bcnm2015.org