

# Bilateral Nasolacrimal Duct Obstruction after Adjuvant Radioactive Iodine (I-131) Therapy for Thyroid Cancer

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**Chief complaint:** bilateral tearing

**History of Present Illness:** A 53-year old female presents for evaluation of bilateral tearing that has worsened over the preceding year. She describes tears that run down the front of her face and denies any ocular irritation. The tearing has begun interfering with her ability to work—especially with reading as her vision is blurrier when she looks down.

**Past Ocular History:** none

**Past Medical History:** Thyroid cancer in 2009 s/p thyroidectomy treated with adjuvant high dose radioactive iodine I-131

**Medications:** levothyroxine

**Allergies:** none

**Family History:** non-contributory

**Social History:** Non-smoker, denies alcohol abuse

**Review of systems:** Pertinent findings are within the HPI

## Ocular exam:

**Visual Acuity:** 20/20 OD/OS

**Pupils:** 5 mm (dark), 3 mm (light), brisk, equal, no RAPD

**Extraocular movements:** full

**Confrontation visual fields:** full

**Punctal examination and canalicular probing** was normal on both sides.

**Irrigation of the lacrimal system:**

- Right: Partial obstruction
- Left: Complete obstruction

**Slit Lamp Exam:**

- Lid/Lashes: Normal OU
- Conjunctiva/Sclera: Clear and quiet OU
- Cornea: Clear OU
- Anterior Chamber: Deep and quiet OU
- Iris: Normal architecture OU
- Lens: NS
- Vitreous: Clear OU

**Course:** The patient was felt to have functional obstruction on the right even though the system was patent with forced irrigation. There was total obstruction on the left with reflux of fluid through the superior punctum on irrigation. She underwent successful bilateral dacrocystorhinostomy with placement of Crawford stents.

**Diagnosis:** Bilateral Nasolacrimal Duct Obstruction related to high dose I-131 therapy

## **Discussion:**

Though primary acquired nasolacrimal duct obstruction (PANDO) constitutes the majority of nasolacrimal duct obstructions (unilateral or bilateral), it is relatively uncommon in patients younger than 60 years of age (Tucker, 1997). Bilateral PANDO is especially unusual in this age group and the presence of a bilateral obstruction demands careful consideration to rule out the possibility of an underlying systemic etiology. Systemic disorders implicated in bilateral obstructions in patients younger than 60 years of age include sarcoidosis, Wegener's granulomatosis, chronic lymphocytic leukemia, and very rarely solid neoplasms—all with potential to inflict significant morbidity or mortality. Epiphora may be the sentinel symptom for such disorders and it behooves the ophthalmologist to be aware.

Iodine-131 associated nasolacrimal duct obstruction (NLDO) typically presents bilaterally within 6-18 months of initiating radiotherapy (Burns, 2004). Though in our experience the duct is most frequently involved, obstruction of the upper lacrimal drainage structures has also been observed (*Ibid*). Incidence of lacrimal obstruction (upper and lower) was found to be 4.6% among patients who have undergone high dose I-131 therapy, but may prove to be higher as awareness of the I-131-NLDO association grows. The average age at presentation was 53 years in Burns' series and affected women outnumbered males two to one, which is not surprising given that the incidence of thyroid carcinoma is also higher in women. The relationship between radioactive iodine and NLDO was only recently described by Kloos in 2002, and has since been reported with increasing frequency. This growing awareness may owe in part to a recent rise in the incidence of thyroid cancer by as much as three-fold since 1979 (Davies, 2002).

Iodine-131 is a radioactive isotope taken orally that concentrates in metabolically active thyroid tissue via activity of a sodium-iodide symporter. As such, it only has efficacy in hyperthyroid states and highly differentiated cancers that are responsive to thyroid stimulating hormone. The latter tend to be of the epithelioid variety including papillary and follicular adenocarcinomas. A sodium-iodide symporter has been identified in the lacrimal sac and nasolacrimal duct and may be the means by which radioactive iodine is concentrated in the lacrimal drainage system resulting in local tissue damage, fibrosis, and obstruction (Morgenstern, 2005). Primary therapy for epithelioid tumors is thyroidectomy, but large, invasive, or metastatic varieties warrant adjuvant radiotherapy. Obstruction following treatment for hyperthyroidism is not seen, as the dose of radiation is up to twenty times smaller compared the dose used for cancers. A dose of greater than 150 millicuries is felt to be associated with obstruction compared to 4-10 millicuries typically used to treat hyperthyroidism (Burns, 2004). Lacrimal obstruction is not the most common ocular symptom among those undergoing radioactive iodine therapy. Approximately 20% of patients have xerophthalmia (with concomitant xerostomia).

In our experience, a history of I-131 use is relatively easy to elicit as patients are able to recall the rigorous activity restrictions imposed following a therapeutic dose. Guidelines suggest that they remain at least six feet away from all others in their household for at least 24 hours and refrain from kissing, sleeping in the

same bed or sharing cups, utensils, razors, towels, or engaging in sexual intercourse for up to four days after a dose.

**Differential Diagnosis:**

- High dose I-131 therapy
- Primary acquired nasolacrimal duct obstruction (PANDO)
- Sarcoidosis
- Wegener’s Granulomatosis
- Facial trauma
- Localized amyloidosis
- Chronic lymphocytic leukemia
- Solid tumor e.g. lymphoma
- Inflammatory bowel disease

**Diagnosis:**

- History of high dose I-131 therapy
- Lacrimal probing and irrigation

<p><b>Epidemiology:</b></p> <ul style="list-style-type: none"> <li>• 4.6 % incidence in patients undergoing high dose I-131 therapy (includes upper and lower obstructions)</li> <li>• 2:1 Female &gt; Male</li> <li>• Average age = 53 years</li> <li>• 88% bilateral</li> </ul>	<p><b>Signs:</b></p> <ul style="list-style-type: none"> <li>• Increased tear-lake</li> </ul>
<p><b>Symptoms:</b></p> <ul style="list-style-type: none"> <li>• Epiphora</li> <li>• Blurry vision</li> <li>• Difficulty reading</li> </ul>	<p><b>Treatment:</b></p> <ul style="list-style-type: none"> <li>• Probing and stent</li> <li>• Dacrocystorhinostomy</li> </ul>

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