WELL-DIFFERENTIATED THYROID CANCER TREATMENT AND MONITORING

INTRODUCTION

- This handout provides a basic overview of treatment and monitoring for well-differentiated thyroid cancer. For more detailed information, please discuss thyroid cancer with your doctor or see the resources listed at the end of this handout. *Because individual circumstances vary, treatment options for thyroid cancer may be very different from person to person*. The information contained in this handout provides a general outline of therapy for thyroid cancer, but it does not cover every possible situation or treatment course.
- The information presented assumes a basic knowledge about thyroid hormones and hypothyroidism. To learn more, please see the handout "Hypothyroidism," available at www.boulderendo.com/pdffiles/hypothyroidism.pdf.
- There are 4 different types of thyroid cancer – papillary, follicular, medullary, and anaplastic. The two most common types, papillary cancer and follicular cancer, are called "well-differentiated" thyroid cancer and are the focus of this handout. Medullary thyroid cancer and anaplastic thyroid cancer are less common types of thyroid cancer that are evaluated and treated differently than well-differentiated thyroid cancer.

INITIAL TREATMENT OF THYROID CANCER

- Goals for the initial treatment of thyroid cancer are as follows:
    - To remove the primary tumor, and any tumor that involves surrounding tissues or lymph nodes in the neck
    - To facilitate treatment with radioactive iodine, where appropriate
    - To minimize adverse effects of cancer and of treatment
    - To provide accurate information regarding tumor staging
    - To allow accurate long-term monitoring for cancer recurrence
    - To minimize risk of disease recurrence and spread

RESECTION OF TUMOR

- Surgical removal of the thyroid gland is generally the preferred therapy for thyroid cancer. The surgeon will typically perform a "total" or "near-total" thyroidectomy, removing as much thyroid tissue as is safely possible. In experienced hands, this type of surgery is very effective treatment for thyroid cancer and has a low risk of complications. For some people with very low-risk cancer, removal of just one lobe of the thyroid gland may be appropriate.
- In addition to removing the thyroid gland, any other cancerous tissue known to be present, such as lymph nodes in the neck, should be removed surgically if possible. Prior to surgery, your doctor may wish to perform tests (for example, neck ultrasound or chest x-ray) to look for areas that might potentially be affected by cancer. These tests can help the surgeon to know how extensive the initial operation should be.

ABLATION OF THYROID REMNANT AND RESIDUAL TUMOR

- After surgery is complete, many people with thyroid cancer benefit from treatment with radioactive iodine. Radioactive iodine is used to destroy any cancer cells that might remain after initial surgery as well as any normal thyroid cells left behind after surgery.
- The decision to use radioactive iodine is based on the likelihood that the cancer will recur, which can be estimated using clinical information and pathology results. People with low-risk thyroid cancer may not require treatment with radioactive iodine.
- In order for radioactive iodine to work well, the thyroid cells must be "hungry" for iodine. Cells are made "hungry" by 1) following a low iodine diet for 2 weeks before therapy (see www.thyca.org for specific diet information), and 2) allowing the body's TSH level to rise by withholding thyroid hormone for several weeks before therapy. Unfortunately, withholding thyroid hormone results in a temporary hypothyroid (underactive

thyroid) condition. Hypothyroidism is associated with many symptoms, such as fatigue, achiness, and constipation.

- Some people with low-risk cancer *may* be able to be treated without stopping thyroid hormone, using an injectable medication called Thyrogen. Thyrogen is synthetic TSH, thus injection causes the TSH level to rise without having to stop thyroid hormone. Though not yet approved for this purpose by the FDA, Thyrogen appears safe and effective for remnant ablation in clinical studies. Your doctor may discuss this option with you if it is appropriate.
- Radioactive iodine is safe. It has been used for many decades and has a low risk of side effects. Certain precautions must be followed after radioactive iodine therapy (to minimize potential radiation exposure to others), and most people can be treated as an outpatient. Those with small children in the home or those with multiple other medical problems may be better treated in the hospital. Side effects of radioactive iodine can include mild nausea, and pain or swelling in the neck or saliva glands. Men and women treated with radioactive iodine should wait before trying to become pregnant for 6-12 months after treatment.

MONITORING FOR RECURRENCE

- After surgery and/or radioactive iodine therapy, people with thyroid cancer require *lifelong* monitoring for recurrence.
- Approximately 20-30% of people with thyroid cancer will have residual or recurrent cancer after initial therapy. Thyroid cancer can recur many years after initial treatment, but most cases of recurrence occur in the first 5 years after initial therapy. Fortunately, there is effective treatment for most cases of recurrence, and the majority of people with recurrent thyroid cancer can still be cured of disease. Treatment is most effective when recurrence is detected early.
- Monitoring for thyroid cancer is influenced by the risk of recurrence. This risk can be estimated based on clinical findings and the results of pathology after initial surgery. In general, those with a higher risk of recurrence will require more frequent assessment, and will have more testing done at each assessment.
- Tools for monitoring. The first 3 tests listed below are the main tests used in thyroid cancer monitoring. The other tests listed may be used in certain circumstances.
    - *Thyroglobulin*. Thyroglobulin is a protein made by thyroid cells (both cancerous and normal thyroid cells). After surgery and radioactive iodine therapy, the level of thyroglobulin should be very low or undetectable. When initial therapy was with surgery alone, thyroglobulin levels should be low, but likely will not be undetectable. Elevated and/or rising levels of thyroglobulin are concerning for recurrence of cancer.
        - *Stimulated vs. unstimulated measurement*. Thyroglobulin can be measured unstimulated (while TSH levels are low, in people taking thyroid hormone) or can be measured after stimulation (by allowing TSH levels to rise, either by stopping thyroid hormone or by using an injection medicine called Thyrogen). Because stimulated measurements are more sensitive for detecting cancer, your doctor will discuss whether you should have stimulated measurements performed using specific protocols, and how often stimulation testing should be done.
        - *Thyroglobulin antibodies*. Thyroglobulin testing uses antibodies directed against thyroglobulin to detect this protein in the blood. If thyroglobulin antibodies are already present in the blood, which occurs in 25% of people with thyroid cancer, these antibodies interfere with the test result. In this circumstance, the thyroglobulin level is much less helpful to detect cancer. It is still worthwhile to monitor this testing periodically, as the antibodies can disappear over time (and disappearance is generally a good sign that no cancer is present).
    - *Ultrasound*. Ultrasound uses sound waves to take a "picture" of tissues. Ultrasound generates very detailed images of the soft tissues in the neck, and can detect potential recurrence of thyroid cancer, often before any other testing becomes positive.

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- *Whole-body nuclear scan*. Nuclear scans take a picture of the entire body after radioactive iodine is given, either in a large dose for treatment of cancer or in a small dose for diagnostic testing. Testing is usually performed in a "stimulated" condition (while TSH is high, see above) to maximize the ability to detect cancer.
- *CT/MRI scan*. CT scans and MRI scans are special imaging tests that provide detailed images of body tissues. CT scans are often used to take detailed pictures of the lungs, abdomen, or other tissues. MRI scans are especially useful for imaging of the brain and spine. Not every one with thyroid cancer will require these scans. Of note, intravenous (IV) contrast is often given when CT scans are performed. Because this contrast contains iodine, it can interfere with subsequent radioactive iodine treatment for several months. *If you are having a CT scan, please check with your doctor to find out if you should avoid receiving this contrast.* IV contrast given for MRI scans does not cause this interference.
- *PET scan*. A PET scan is a special nuclear medicine test that measures how "metabolically active" tissues are. PET scanning can be used to help locate tumor in those with high thyroglobulin but normal ultrasounds and CT/MRI scans, or can be used to predict risk in those with thyroid cancer that has spread to other tissues in the body.

THYROID HORMONE THERAPY

- Thyroid hormone therapy is initiated after surgery and/or radioactive iodine to replace the hormones no longer being produced in the body. The larger the thyroid hormone dose, and thus the lower the TSH, the lower the risk of thyroid cancer recurrence (but greater the risk of other complications such as heart problems or bone loss). The goal level of TSH will vary depending on the risk of cancer recurrence and time elapsed since initial therapy. Generally, the following levels are used:
  - TSH below 0.1 – active cancer or high risk of recurrence
  - TSH 0.1-0.5 – cancer recently treated, but no evidence of active cancer and not high risk for recurrence
  - TSH approximately 0.5 – low risk of recurrence, no evidence of active cancer, and current assessment (thyroglobulin, ultrasound, and/or whole body scan) without evidence of residual/recurrent cancer

RESOURCES

- Thyroid Cancer Survivors Association. www.thyca.org
- People Living With Cancer. www.plwc.org/thyroid
- American Thyroid Association. www.thyroid.org
- Thyrogen Information. www.thyrogen.com
- Hypothyroidism Handout. www.boulderendo.com/pdffiles/hypothyroidism.pdf
- Thyroid Nodules Handout. www.boulderendo.com/pdffiles/nodules.pdf