

# Papillary thyroid carcinoma: pathophysiology, treatment and prevention



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## Introduction

You have cancer! The word “ Cancer”, might be the most frightening word in medicine. Life changes suddenly and profoundly after a cancer diagnosis. Initially, the shock phase overwhelms every emotion and touches every area of one’s life. Although many things will be out of control, newly diagnosed cancer patients must strive to control what they can and play an active role in their treatment plan. This paper examines the pathophysiology of papillary thyroid cancer (carcinoma), current research, treatment plans and prevention strategies. It also focuses on one particular individuals lived experience, from the moment of being diagnosed to dealing with life after cancer.

### Papillary Thyroid Carcinoma: Pathophysiology, Treatment and Prevention

#### Pathophysiology

Papillary thyroid carcinoma (PTC) is the most common of all thyroid cancers and is associated with an excellent prognosis. Being the most curable thyroid cancer, its overall survival rate is more than 90%. It is estimated that 44, 670 new diagnosis of thyroid cancer (10, 740 men 33, 930 women) were made in the USA in 2010 (Liebner & Shah (2011)). Thyroid cancer is a form of cancer that develops from the tissues of the thyroid gland. The thyroid is a butterfly-shaped gland located in the neck just below the larynx. It is composed of two lobes that lie on either side the trachea, below the thyroid cartilage (also known as the Adam’s apple). The thyroid gland produces and releases several important hormones, including two potent hormones, thyroxine (T<sub>4</sub>) and triiodothyronine (T<sub>3</sub>). Thyroid hormones are vital for growth,  
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maturation, and proper function of cells and tissues. It is required for metabolism and normal muscle functioning. They also influence brain function including intelligence and memory, neural development, dentition, and bone development (Huether & McCance, 2017).

Papillary carcinomas are slow growing, differentiated cancers that develop from follicular cells and can develop in one or both lobes of the thyroid gland. Papillary thyroid cancer typically starts within the thyroid as growth, or bump (nodule) on the thyroid that is usually single, firm, and freely movable during swallowing and is not distinguishable from a benign nodule. It is common for PTC to spread into the lymph nodes of the neck before the cancer is discovered and diagnosed because it usually has no symptoms. Some symptoms which may occur with the diagnosis of papillary thyroid cancer may include changes in the quality of voice, difficulty swallowing or breathing, and pain or tenderness in or around the neck or ear. Hoarseness, dysphagia, cough, and dyspnea may suggest advanced stages of the disease (Schlumberger, 2004).

Papillary thyroid cancer is increasing in its incidence both in the United States and globally—it is one of the few cancers that are becoming more common, but with an unknown reason as to why this is happening. Some risk factors include, having a family history of thyroid cancer or goiters, radiation exposures, high iodine intake (PTC), westernized life style or unknown environmental pollutants. Having high thyroid stimulating hormone (TSH), the presence of Hashimoto's thyroiditis or obesity are also likely causes of cancer. In addition, researchers believe that changes in certain genes cause thyroid cells to abnormally develop and divide, and this may cause the <https://assignbuster.com/papillary-thyroid-carcinoma-pathophysiology-treatment-and-prevention/>

development of papillary thyroid cancer. The most common rearrangements concern RET gene, RAS mutations and B-RAF mutation (Kim, 2015).

### Literature Review

Significant progress has been made in the last few years with respect to the development of new and targeted therapies for thyroid cancer on the basis of the underlying molecular pathophysiology.

A healthcare physician will conduct a complete physical exam, order an array of laboratory tests and get diagnostic imaging to begin the process of making a cancer diagnosis. Ultrasound guided fine needle biopsy is a common procedure to determine if the nodule is cancerous. If malignant growth is suspected in the lymph nodes in the neck, they will also be biopsied (Kim, 2015). Treatment for cancer is highly complex and individualized. Developing a cancer treatment plan will depend on many factors, including the type of cancer, its location, stage of development and individualized state of health.

Initial treatment for PTC is surgery and/or radioactive iodine (RAI) treatment. There is continuing debates on optimal surgical extent or optimal radioiodine dose in individual patient setting. The main goal of surgery is to remove all cancerous tissue in the neck. This includes the thyroid gland and any affected surrounding lymph nodes. There are two types of surgical options and the right option is determined by a medical expert. The first one is removal of about half of the thyroid gland called thyroid lobectomy or partial thyroidectomy. The other one is a total thyroidectomy, which is removal of the entire thyroid gland. Radioactive iodine (RAI) treatment is commonly <https://assignbuster.com/papillary-thyroid-carcinoma-pathophysiology-treatment-and-prevention/>

used postoperatively for early stage of cancers to more advanced and aggressive tumors. RAI is a safeguard treatment to decrease recurrence and ensure any remnant thyroid tissue is destroyed. Areas of distant spread that do not respond to RAI may need to be treated with external beam radiation therapy, targeted therapy, or chemotherapy. RAI is usually administered 4-6 weeks after surgery and during this period no thyroid hormone treatment is given (Schlumberger, 2004). The main goal of withholding hormone therapy is to elevate the TSH level and make the patient hypothyroid. Additionally, papillary thyroid cancer patients must be on a low iodine diet for a minimum of two to four weeks to starve their body of iodine. Thyroid cells are the main cells in the body that can absorb iodine, so no other cells are exposed to the radiation. When the cancerous cells absorb the radioactive iodine, they are damaged or destroyed (Clayman, 2018). One dose is usually enough to kill the remaining thyroid fragments and cancer cells. Radioactive iodine therapy can take anywhere from a few weeks to a few months to fully eliminate all papillary thyroid cancer cells. There are a number of precautions after RAI treatment to prevent radiation exposure to others. For example, it is important to sleep alone for about 3-5 days after treatment and not share anything. It's also a good idea to avoid public places, drink plenty of water to flush the radiation out of the body, wash your hands often and flush the toilet twice after voiding. Some common side effects may include nausea, swelling/pain in the neck where thyroid cells remain, dry mouth, temporary loss of smell and/or taste (Endocrineweb, 2018).

As mentioned earlier, thyroid surgery is the first line treatment for papillary thyroid cancer. Lifelong thyroid hormone replacement therapy will be

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required to treat the effects of hypothyroidism after surgery. Thyroid hormone replacement therapy is a very individualized treatment process, and it is highly effective when prescribed properly. To prevent PTC from recurring and to catch it early, it is important to follow up with an endocrinologist and get the necessary treatment to manage hypothyroidism adequately. Generally it is recommended to repeat labs and a neck ultrasound every 6 months or as needed to check for a therapeutic dose for thyroid replacement therapy (Endocrineweb, 2018).

### Interview Findings

There were many similarities when comparing my interview findings to the literature findings. To begin, I like to give a quick background of the individual I interviewed, my husband, who at the time of diagnosis was only 32 years old. Past medical history includes seasonal allergies, sleep apnea and hypertension. He is currently 6 feet 2 inches and 185 pounds. He was diagnosed with sleep apnea when he was 31 years old and weighed 210 pounds at the time. Within the year of being diagnosed with sleep apnea and hypertension, he has taken a proactive role in being healthy. He lost weight, started exercising and incorporated a healthy diet.

His initial symptoms to see his primary physician included mild difficulty swallowing, as if there is something stuck in the throat. An ultrasound of the neck/thyroid gland was obtained. He was recommended to see a specialist to discuss the results of the ultrasound. To begin, the Ear Nose and Throat specialist recommended a fine needle biopsy to check if the nodule found on the ultrasound was benign or cancerous. We received the results within

minutes that it was indeed cancerous cells detected. Every treatment option from the beginning to the end was comparable to my literature findings. His treatment plan included removing the entire thyroid neck (total thyroidectomy) with a central neck lymph node dissection, RAI treatment few weeks after surgery and close monitoring of thyroid hormones. He had many of the side effects of RAI treatment as well. My husband was started on thyroid replacement therapy a few days after the RAI treatment. The most difficult part he experienced was doing a low iodine diet for two weeks. At this point, the thyroid gland is out and he is experiencing all clinical signs of hypothyroidism. But he got through every hurdle with lots of support, boxes of matzo crackers and determination.

## Conclusion

In conclusion, papillary thyroid cancer is one of the most common types of thyroid cancers. From being diagnosed to completing treatment is a stressful and challenging time. Significant progress has been made in the last few years with respect to the development of new and targeted therapies for thyroid cancer. To summarize, the wide array of treatment options for PTC includes surgery, radioactive iodine and thyroid hormone suppression of TSH. Treatment is individualized depending on patient factors, stage of disease, and most importantly the decisions of the patient and healthcare team.

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