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Thank you for entrusting in the compounding services at Madison Medical Compounding Pharmacy to help meet the unique medication needs of your patients. We are excited to share our monthly newsletter with you and look forward to working with you. Please don't hesitate to let us know how we can assist you and your practice.

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Thyroid Therapy: Essential for Hormone Balance

More than half of all people affected by thyroid disease are unaware of their condition. Thyroid disorders affect far more women than men, and the risk increases with age. While both men and women experience stress and exposure to environmental toxins, women are more vulnerable to thyroid imbalances due to hormonal changes throughout their lifetime (puberty, birth control pills, pregnancy, menopause, HRT). Many symptoms of hypothyroidism and menopause overlap. While hormone replacement therapy often focuses on estrogens, progesterone, DHEA and testosterone, optimal hormone balance cannot be achieved without correcting thyroid hormone imbalances.

Thyroid hormone (T4; thyroxine) is produced by the thyroid gland in response to the release of thyroid stimulating hormone (TSH) from the pituitary gland. T4 is converted in other parts of the body to T3 (triiodothyronine), the form of thyroid hormone that cells use most effectively. Thyroid hormone helps the body convert food into energy, regulates body temperature, and impacts reproduction and many other hormonal functions. In hypothyroidism (underactive thyroid), either the thyroid's ability to make and release T4 or the body's ability to convert T4 to T3 becomes compromised, often showing up in the form of elevated TSH. When thyroid hormones are not available in the proper form and amount, many bodily functions are disrupted. For example, thyroid imbalance has a profound effect on cardiovascular fitness because thyroid hormone helps control heart rate and blood pressure. Under hypothyroid conditions, the heart rate can slow substantially, arrhythmias

may develop, and blood pressure may fall significantly. Hypothyroidism also weakens muscles including the diaphragm; as a result, breathing can become less efficient. Snoring may start or become worse. With impaired respiration and reduced availability of oxygen, muscles do not strengthen in response to exercise and stamina does not improve. Fatigue is extremely common, and muscles and joints may ache.

People with hypothyroidism have an increased risk of kidney disease, and chronic kidney disease can affect the production and breakdown of thyroid hormones. When thyroid hormone levels drop, the liver no longer functions properly and produces excess cholesterol, fatty acids, and triglycerides, which increase the risk of heart disease. Hypothyroidism is the second leading cause of high cholesterol, after diet. High cholesterol may also increase the risk of Alzheimer's disease, and severe hypothyroidism can cause symptoms similar to those of Alzheimer's disease.

Hashimoto's disease is the most common cause of hypothyroidism in the United States. This autoimmune disease causes inflammation that often leads to an underactive thyroid gland. It primarily affects middle-aged women, but also can occur in men and children. Hashimoto’s typically progresses slowly over years and causes chronic thyroid damage, leading to a drop in thyroid hormone levels. Without treatment, signs and symptoms gradually become more severe and the thyroid gland may become enlarged (goiter).

Treatment of Hashimoto's disease with thyroid hormone replacement is usually effective. Some Hashimoto’s patients are not able to properly and efficiently convert T4 to T3. Stress is a common cause of low T4 to T3 conversion, and under stressful situations, T4 may be converted to reverse T3 (R-T3) instead of T3. R-T3 is an inactive molecule related to T3, but without any physiological activity. Therefore, combination T4/T3 therapy may be needed. Vitamin D deficiency has been reported to be prevalent in several autoimmune diseases including Hashimoto's thyroiditis, and vitamin D supplementation should be considered.

As people age, they often experience changes in thyroid physiology and function. In some cases, there may be a reduction in thyroid iodine uptake, and less free thyroxine and free triiodothyronine production. T4 may convert to R-T3. Testing is needed to determine the problem and the most appropriate treatment.

The original form of thyroid hormone replacement was Desiccated Thyroid Extract (DTE) from the thyroid glands of animals which contained both T4 and T3; this was the only available treatment for hypothyroidism for almost 50 years. Levothyroxine sodium (synthetic T4) has replaced DTE as the most common treatment for primary hypothyroidism.

Despite apparently adequate replacement therapy with levothyroxine, some hypothyroid patients remain symptomatic. Studies suggest that therapy with levothyroxine alone does not ensure normal thyroid hormone levels in all tissues, and that a combination of levothyroxine and T3 may be required for optimal thyroid replacement therapy. Patients with specific genetic polymorphisms that affect thyroid hormone transport may benefit from combination T4/T3 therapy, and those who continue to have thyroid symptoms despite having normal TSH levels may benefit from a trial of T3 in addition to T4 medication.

However, the only commercially available form of T3 is immediate release of liothyronine sodium which is rapidly absorbed and metabolized, requires multiple daily doses, and can cause serious side effects including heart palpitations. Research indicates there is a need for sustained-release T3 preparations.

Benefits of Compounding

Some patients feel best when taking medications that do not contain excipients such as lactose, corn starch, and gluten, which represent some of the most common food sensitivities in people with Hashimoto’s. Ingesting even small portions can exacerbate symptoms. In some cases, removing these substances from medications and diet may reverse the formation of thyroid antibodies.

Natural DTE products are only available in a standard physiologic ratio. Compounding

enables physicians to prescribe thyroid hormone therapy in a custom T4:T3 ratio when needed, and to order T3 as a sustained release preparation to avoid cardiovascular side effects associated with immediate-release liothyronine.

Our compounding professionals work together with patients and their healthcare providers to customize medications in the specific strength and dosage form that is most appropriate to meet each patient's specific needs and solve medication problems.