Thyroid Case Study

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**Case Summary**

 This is the case of a female patient who is 29 years old and who came to the clinic for routine screening tests. The laboratory results indicated hypercholesterolemia and due to that, a full clinical assessment was conducted. Based on that, the following elements were identified

* The skin is dry
* The patient declared she gain over 10lb in the past period
* She has regular menses but they are heavy
* Patient declares she presents with frequent bruises
* Milky discharges from the breast
* Fatigue

 The patient is only taking oral contraceptives and multivitamins. The purpose of this assignment is to be able to correctly diagnose the patient's conditions and to determine what would be the upcoming steps.

**Question 1 – Further Laboratory Tests**

 Before ordering other laboratory tests it is important to indicate a possible pathology that would cause all her mentioned symptoms. Based on her affirmations and her clinical picture, the most suspected cause would be an underactive thyroid also referred to as *hypothyroidism* (Morey,Boggero,Scott,2015). This pathology tends to affect women more frequently than the other gender. In some scenarios, patients present with no evident clinical signs and symptoms and the condition is discovered through routine screening. Due to the fact that the patient also declared she had passed through a stressful period, the secretion of stress hormones might have triggered the condition known as *Hashimoto's disease*. The etiology of this pathology is not currently fully understood, but it might seem that some psychological stressors might lead to immunological modifications which would make the symptomatology more evident (Mincer,Jialal,2020). There are no doubts that stress can affect the immune system in both and indirect manners, especially through the endocrine and nervous systems. Due to this, in the case of patients who are predisposed, the immune modulation process might trigger different autoimmune pathologies. Due to that, the latest researches try to prove that stress can be one of the major environmental factors when it comes to autoimmunity pathologies such as Hashimoto's condition. (Mincer,Jialal,2020)

Hashimoto thyroiditis is categorized as an autoimmune pathology that leads to reduce the production of hormones from the thyroid. From a biochemical perspective, we expect to see increases levels of TSH with low T4 (total or free). This confirms the clinical picture of primary hypothyroidism. There are some practitioners who also recommend testing the values of free and reverse T3 but the Western medical practice does not support it.

Another important element is to prove the autoimmunity of the condition. Due to that, determining ant-thyroglobulin and anti-thyroid peroxidase antibodies would suggest this condition. However, it is essential to keep in mind that there is approximately 10% of the population have a negative antibody test. (Akamizu,Amino,2017)

 Due to the fact that this pathology can interfere with the functionality of other organs, it is important to evaluate other parameters too such as cholesterol level ( LDL, HDL, total cholesterol), triglyceride levels, blood glucose values and even order a blood count test (due to the fact that 30% of the patient with Hashimoto's can also present signs of anemia).

 The table provided below this paragraphs represents a list of the laboratory test I would order together with their normal values which would help us confirm our suspicion.



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| Recommended Laboratory Tests |
| Test | Normal Value |
| TSH |  0.5 – 4.7 mU/L |
| Free T4 | 10.3-35 pmol/L |
| T4 | 58-140 nmol/L |
| Free T3 | 0.22-6.78 pmol/L |
| T3 | 0.92- 2.78 nmol/L |
| Anti-Thyroglobulin antibodies | Negative |
| Anti-Thyroid peroxidase antibodies | Negative |
| Total cholesterol  |  < 200 mg/dl |
| LDL | 60-130 mg/dl |
| HDL | 60 mg/dl |
| Radio Cholesterol/ HDL | 4.0 |
| Triglycerides  | <150 mg/dl |
| Hemoglobin  | 12-15.6 g/100ml |
| RBC | 3.9-5.2 millions/ml |
| Hematocrit | 36-48% |
| Platelet | 1.4-4.0 \* 105 /ml |

\*Optionally, a thyroid ultrasound can be conducted even though the findings might not be specific elements for this condition.

**Question 2 –Laboratory results and the grieving process**

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| Mary T’s Lab Results |
| Result | Patients Result | Significance |
| Cholesterol  | 267 | Elevated |
| LDL  | 178  | Elevated |
| Triglycerides  | 167 | Elevated |
| TSH | 20 |  Elevated  |
| Hemoglobin | 11 | Low |
| Hematocrit | 33.4 | Low |

 Body Mass Index will also be calculated based on patients height (61 inches) and current weight (145 pounds). Based on the calculus, she has a BMI of 27.1 which would classify her into the overweight category (25-29.9)

There are no doubts that losing loved ones can have a serious impact not only on a mental level but also on a physical one. Due to the imbalances which arise in the body of the patients, many pathologies can actually decompensate during this stage. Even so, this can be seen as a physiological experience in human life that should be overcome eventually. In the case, the signs and symptoms persist, the physician might refer to a state of pathological grief.

 Even though there are no major studies on this aspect, it is considered that due to the hormonal release, it can actually modify the immune system and leaving the patient vulnerable to different pathogens. It also tends to increase the blood pressure (even though it is not the case of our patient) and the risk for thrombosis. In our scenario, the most important aspect is the way the grief process can interfere with the immune response and how it can affect the functionality of the exocrine and endocrine glands. (Morey,Boggero,Scott,2015)

 There are also multiple studies that support the idea that psychological stress can be a risk factor for disorders when referring to the lipid panel. On the other hand, the lack of activity in that period also diminishes the protective effect.

 Based on the patient's history, she went through a lot of stressful situations which leads to an explosion of stress hormones, such as cortisol, in her body. These hormones won't be able to cause any thyroid disorder but can exacerbate if the condition already exists. High level of stress hormones might slow down the production of thyroxine and triiodothyronine which would lead to the clinical signs the patient are experiencing such as fatigability, weight loss, dry skin, mood swings, poor memory and concentration, and hair loss. The patient needs to also be tested for her blood glucose levels because the increased level of glucocorticoids will lead to insulin resistance.

**Question 3 – Differential Diagnosis**

 The patient presents with multiple signs and symptoms which create a clear clinical picture. Even so, other pathologies which can share the same S&S should be taken into consideration.

*Thyroid Cancer* - the major sign is represented by a lump at the cervical level. This can be misdiagnosed with an enlarged thyroid. We expect to see abnormal TSH but normal T3 and T4. On the other hand, the ultrasound or the CT scan will show that there is actually a tumoral formation which based on different criteria can be classified as benign, most probable benign, most probable malignant or malignant (Mincer,Jialal,2020).

 *Hypopituitarism* - its signs and symptoms may mimic the ones which are presented with Hashimoto's condition and due to that it can be hard to differentiate between the two of them. The measurement of the tropic hormones which are released from the pituitary gland can help the differentiation. Sometimes a CT/MRI can indicate an enlarged pituitary gland.

*Graves Disease* - same as in the case of Hashimoto's condition this is an autoimmune pathology which also presents with an enlarged thyroid. There is also a formation of thyroid-stimulating immunoglobulin which will act on the TSH receptors. As a result of this, the patient will present with low levels of TSH and a high level of T3 and T4 (Mincer,Jialal,2020).

*Euthyroid sick syndrome* - the patient even though has a euthyroid state, presents with low values of T3 and T4. The diagnosis is made by excluding the possible causes of hypothyroidism and the treatment's purpose is to treat the underlying condition.

*Depression* - this is a very important differential diagnosis because it can actually be a symptom of Hashimoto or a totally different condition. It is important to be able to first make sure that the patient is stable from a mental perspective before starting treatment. (Mincer,Jialal,2020)

**Question 4 – Explaining the findings**

 I would try to be as transparent as possible with the patient because I strongly believe it is essential for her to understand her current condition. I would show her the lab values and state which ones are abnormal. I would focus on stating that even though the grieving process might have exacerbated her condition, it is most likely she has an underlying thyroid pathology which was exacerbated due to this stressful period. Even so, her abnormal lab values put her at different risks and because of that measures need to be taken. I would explain to her that based on the TSH level, she is most likely dealing with a hypothyroidism condition but it is important to take other tests too in order to confirm it. I would also emphasize the importance of lowering cholesterol values as they are at an alarmingly high level. In the beginning, I would recommend her to do the tests monthly in order to be able to see how it progresses.

 When communicating with the patient I would try to use common words and not very medical ones due to the fact that many people are not able to understand them. I strongly believe that it is important to keep the sentence as clear as possible so once she leaves my office she understands her condition. I might use analogies which will help her remember the information easier. In the scenario she still does not understand, I can present her different drawings.

**Question 5- Follow Up Labs**

 The first step would be to identify the impact her previous experiences had on her clinical signs and symptoms. In case the patient is still in a grieving state, I would recommend her to visit a psychologist, at least for a few appointments. I would focus on making the patient feel better in order to see how her body will react once she is back in a normal state. Once the patient is feeling better, I would redo the laboratory tests which were mentioned above in order to determine how much they are caused by her thyroid pathology and how much they were caused by the hormonal imbalance due to stress conditions. In case they are still abnormal, I would also ask to determine the levels of T3 and T4 in order to confirm my suspicions. (Sheehan,2016)

 As it was mentioned in the previous part, there is a tight relation between depression and Hashimoto's condition. It is important to be able to differentiate between the two of them. Sometimes this is impossible because mood alteration can also be a direct result of thyroid pathology.

**Question 6- Treatment of hypercholesterolemia**

The first thing I would impose is some lifestyle changes for the patient. I would ask her to schedule some psychotherapy appointments in order to be able to reduce her current level of grief. In the same period, I would recommend her to try to be more active from a physical point of view and try to eliminate any types of food which might increase her cholesterol levels. Due to the fact that the patient is very young, I would try to avoid treating her hypercholesterolemia at this state. I would try to make her interested in trying a Mediterranean style diet and instruct her which types of food she should avoid. The patient should follow a diet with is high in fruits, vegetables, and whole grains. She should limit her intake of sugar-sweetened beverages and red meat. nevertheless, she should reduce the calories which come from saturated fat and also the intake of trans fast. I would instruct her to follow an aerobic physical activity guide for at least 3 to 4 sessions weekly. This might not only help her with her high level of cholesterol but might also reduce the symptoms of her anxiety/depression. In case her values remain high after months of following this guide, cholesterol drugs such as statins might be indicated. Even so, it should be taken into consideration that this is a very young patient and under methods should be used. That's why, from my perspective, I strongly believe that drug therapy should only be imposed when there are no other alternatives. (Ibrahim,Jialal,2020)

 On the other hand, if it is proven that the patient has also Hashimoto's disease, treating the underlying condition for hypercholesterolemia can also reduce their abnormal values.

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