Minireview Article

The effects of Hashimoto's thyroiditis on differentiated thyroid cancers

Abstract

Hashimoto's thyroiditis (HT) may affect the epidemiology, pathogenesis, diagnosis, clinical course and prognosis of differentiated thyroid cancers (DTC).In this study, our aim is to increase awareness in these cases by revealing the different aspects of DTCs found with HT compared to only DTCs.

For this purpose, current studies with HT+DTC cases were reviewed, compared, evaluated, and their differences from DTC cases were revealed. It was determined that HT+DTC cases showed different epidemiological features compared to only DTC cases. Ultrasonography is still the most effective noninvasive diagnostic method in HT+DTC cases. Many studies have shown that the presence of HT positively affects the clinical course and prognosis of DTC.

Conclusion

HT+DTCs shows different epidemiological features from DTCs and HT significantly affects the pathogenesis, diagnosis, clinical course and prognosis of DTCs.

Key words: Hashimoto thyroiditis, differentiated thyroid cancers

Introduction

According to the results of many studies, the presence of HT increases the risk of occurrence of DTCs[1, 2, 3, 4].

In a meta-analysis by Abbasgholizadeh et al., the results obtained in 50 studies were compared and evaluated, and the coexistence of HT and DTC was found to be significantly higher than in cases without HT. However, according to the authors, many of these studies are not well designed and have a high risk of bias[5].

In a study conducted by Mackers et al., it was shown that the risk of medullary thyroid cancer does not increase in HT cases, the risk of DTC occurrence is higher, and this risk does not exist in Graves' disease[6].

In a retrospective study by Radetti et al. in 904 pediatric and adolescent HT cases, it was reported that HT causes the formation of new nodules but does not increase the risk of DTC, and the predictive factors of new nodule formation are high fT4 and TPOAb values, and hypoechogenicity on USG [7].

Despite this, in another study by Lee et al., it was reported that the risk of nodule and malignancy occurring in childhood-onset (familial) HT cases was significantly higher than the others[8].

In a study by Penta et al., it was emphasized that HT+DTC cases are more common in children, multiple small nodules on USG, and high serum TSH and antithyroid antibodies (Tg Ab – TPO Ab) levels are important in the differential diagnosis [9].

In HT+DTC cases, there are many other differences, apart from epidemiological features, compared to only DTC cases: In a study by Molnar et al., it was reported that HT is a preneoplastic disease that accelerates thyroid carcinogenesis, and multifocality and high papillary morphology are indicative of a strong relationship between HT and DTC [10].

In a prospective cohort analysis of 21,397 1cm> nodules in 9851 patients by Natalie et al. revealed significantly higher TPOAb in blood and diffuse heterogeneity on USG in HT+DTC cases [1]. In HT+DTC cases, the rate of indeterminate cytology in fine-needle aspiration biopsy (FNAB) is higher than in DTC cases[11]. In the same study, it was reported that ultrasonography (USG) is one of the most effective noninvasive diagnostic methods in these cases, and the PPV and NPV obtained by USG are quite high. In HT+DTC cases, different images can be obtained on USG. The most important of these are the presence of hypoechoic micronodules[12] and more microcalcifications[13].

Many recent studies have shown that molecular markers are of great importance in the early diagnosis of thyroid cancers and many other cancer types [14, 15, 16]. Likewise, the importance of molecular markers in the diagnosis of HT+DTC cases is increasingly understood [17].

In a study by Zhang et al., it was shown that IL-17 and TNF-α mRNA expressions in HT+DTC cases were significantly higher in HT+DTC cases, and the prognosis was worse in the group with relatively higher expressions than in those with lower expressions [18].

Li et al., 40 HT, 37 DTC, 50 HT+DTC cases, miRNA-146b-5p expressions in tissue were investigated by reverse transcription –quantitative polymerase chain reaction (RT-qPCR). miRNA-146b-5p expressions were found to be significantly higher in HT+DTC cases than in other patients and in parastatal tissue [19].

There are different gene expressions in HT+DTC cases. In a study by Liu et al., LTF and CCL21 expressions were shown to be significantly higher in HT+DTC cases than in non-HT patients[20].

The association of FOXE1 was revealed in the DTC - genome wide association (GWAS) studies conducted by Hwangbo et al.[21]. In a study by Roehlen et al., it was shown that the FOX03, rs9400239T and rs4945816C genes are effective in HT+DTC cases [22].

According to a study by Xu et al., autoimmune thyroiditis has a protective effect on DTC, and HT+DTC cases show a less aggressive clinical course than only DTC cases[23].

Although some authors have reported that ACR TIRADS is the most effective method in USG risk scoring in HT+DTC cases[24], some other studies have shown that ACR and ATA methods are equally effective in HT+DTC cases[25]. It has been reported that the CUT scoring method is as effective as the ACR and ATA methods in these cases [26].

In a study by Aydoğan et al., the presence of HT in DTC cases leads to a smaller tumor diameter, less capsular and vascular invasion, a lower tumor stage, and a 50% lower probability of recurrence and persistence of the disease[27].

According to a study by Medeiros et al., the reasons for the effects of HT on the progression and prognosis of DTC at the molecular level have not been fully elucidated yet [28].

However, in many studies, it has been reported that the clinical course and prognosis are better in HT+DTC than in only DTC cases: In a study by Babli et al., it was reported that the disease progresses at lower stages and is less persistent in cases >45 years of age with HT+DTC, whereas in cases <45 years of age, HT+DTC cases show a more aggressive course than DTC alone[29]. In a meta-analysis conducted by Moon et al. on 71 articles and 44,034 cases, HT was detected in 11,132 cases, and it was revealed that lymph node and distant metastases, extrathyroidal invasion and recurrences were less in these cases, and the clinical course and prognosis were better [30].

In a study by Pani et al., it was reported that HT+DTC cases were less aggressive and had a better prognosis than DTC cases, due to anticancer intratumoral mononuclear cell infiltration in these cases[31]. In a study by Shahnawaz et al., they reported that natural killer cells (NK-cells) in HT+DTC cases transformed into M1/killer phenotype with macrophage differentiation, these cells were lethal to cancer cells and this was the reason why HT+DTC cases were less aggressive [32] .

Borowczyk et al. compared clinically and histopathologically in 331 HT+DTC, 576 DTC, a total of 907 cases, and reported that the multifocality was the same in the cases, thyroid capsule invasion was more common in HT+DTC cases, and cervical lymph node and extracapsular invasion were more common in DTC cases [33].
There are very few articles in the literature that the presence of HT adversely affects the prognosis in HT+DTC cases. In a study by Osama et al., it was reported that lymph node metastases and extrathyroidal invasion were more common in HT+DTC cases compared to only DTC cases, and these cases progressed more aggressively[34].
According to the findings obtained in our study, HT+DTC cases show different epidemiological features. Since there are no studies with effective results with noninvasive molecular markers in the diagnosis of these cases, USG is still the most effective noninvasive diagnostic method. According to the results of our study, it has been shown that most of the risk scoring methods in USG are also effective in HT+DTC cases. In most of the studies conducted with HT+DTC cases in the literature, it has been reported that HT affects the clinical course and prognosis positively.

Conclusion

According to results of our study, HT significantly affects the pathogenesis, diagnosis, clinical course and prognosis of DTCs.

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