CASE REPORT

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Subacute Thyroiditis Following Third Dose of Pfizer-BioNTech COVID-19 (mRNA) Vaccine in a Patient with Clear Cell Renal Cell Carcinoma: A Case Report

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ABSTRACT

Over 160 cases of subacute thyroiditis (SAT) following COVID-19 vaccination or infection have been reported in the literature. Roughly one-half were attributed to either the first or second dose of the COVID-19 vaccine. We report a rare case of SAT in a 47-year-old male patient with a history of clear cell renal cell carcinoma and advanced chronic kidney disease, among other comorbidities, excluding thyroid disease. After he received the third dose of the Pfizer mRNA vaccine, a deranged thyroid profile was accidentally discovered. His SAT remained asymptomatic and normalized in about six months without treatment. SAT post-COVID vaccination is a self-limiting and rare condition that should be considered in the differential diagnosis of silent thyroiditis.

Many cases of subacute thyroiditis (SAT) have been reported following COVID-19 infections. Rare cases of SAT have also been reported following COVID-19 vaccination.[1] We present a case of 'silent' SAT following the administration of the third dose of the mRNA Pfizer-BioNTech vaccine in a patient with a history of clear cell renal cell carcinoma (ccRCC), chronic kidney disease (CKD), and hypertension (HTN).

CASE REPORT

The patient, 47-year-old man, was diagnosed with ccRCC of the left kidney in April 2021, with a left renal vein thrombus extending into the inferior vena cava. He underwent left radical nephrectomy, adrenalectomy, and cavectomy. His preoperative COVID-19 test was negative, and no COVID-19 infection was documented thereafter. Postoperatively, he did not receive chemotherapy, anti-angiogenic therapy, or immunotherapy, but underwent surveillance every three months by the oncology team.

Seven months after the surgery, he was referred to the nephrology team for management of persistent preoperative CKD and uncontrolled HTN. He had a history of longstanding HTN, and poorly controlled diabetes mellitus. His preoperative HbA_{1c} was 8.6%, which improved to 6.5% postoperatively. He had proteinuric CKD stage IV (urinary polymerase chain reaction = 500 mg/mmol, estimated glomerular filtration rate = 23.7 ml/min) presumed to be secondary to diabetic nephropathy. The patient was a cigarette smoker for two decades and occasionally consumed beer. He was morbidly obese with a body mass index of 43 kg/m^2. He also had obesity-related severe obstructive sleep apnea (apnea-hypopnea index = 41.9) and was not compliant with continuous positive airway pressure ventilation. He suffered from cor-pulmonale and heart failure with reduced ejection fraction, which postoperatively improved from 38% to 69%. There was no medical history suggestive of prior thyroidal illness.

His home medications were nifedipine 90 mg once daily, labetalol 200 mg twice daily, hydralazine 50 mg thrice daily, furosemide 40 mg once daily, darbepoetin alfa injection 30 µg every three weeks, aspirin 100 mg once daily, and one Neurobion Forte tablet (a combination of vitamins B1, B6, and B12) daily.

Despite elevated automated office blood pressure readings in our clinic (average of 155/66 mmHg), the patient seemed to be in good general condition. He did, however, have mild bilateral leg edema as well as

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Table 1: Date-wise summary of the patient's laboratory results.

Date	TSH (N = 0.34–5.60 mIU/L)	Free T4 (N = 7.9–14.4 pmol/L)	TRAb (N = <1.8 IU/L)	Anti-TPO Antibodies (N = <34 IU/mL)	Anti-TGAb (N = <115 IU/mL)	Hemoglobin (N =11.5–15.5 g/dL)	Hematocrit (N = 0.35–0.45 L/L)	Ferritin (N = 24–336 mcg/L)
09/11/2021	–	–	–	–	–	11.7	0.37	–
10/11/2021	3.19 (N)	–	–	–	–	–	–	117.0
21/12/2021	Third dose of Pfizer BioNTech BNT162B2 vaccine							
04/01/2022	–	–	–	–	–	11.0	0.36	–
05/01/2022	0.29 (L)	19.27 (H)	–	–	–	–	–	131.6
24/02/2022	0.02 (L)	19.10 (H)	–	–	–	–	–	–
26/03/2022	0.03 (L)	21.89 (H)	–	–	–	–	–	–
30/05/2022	–	–	< 0.20 (N)	7.46 (N)	16.18 (N)	–	–	–
19/07/2022	1.30 (N)	16.85 (H)	–	–	–	–	–	–

L: low; N: normal range; H: high; T4: thyroxine; TSH: thyroid stimulating hormone; TRAb: thyrotropin receptor antibodies; TPO: thyroid peroxidase; TGAb: thyroglobulin antibodies.

significant acanthosis nigricans in both legs. Thyroid gland palpation revealed a non-tender, normal-sized gland with no signs of hyperthyroidism such as tachycardia or fine tremors. His thyroid stimulating hormone (TSH) level was found to be normal in November 2021 [Table 1]. The patient received appropriate care for his CKD and his blood pressure medications were adjusted accordingly. A 24-hour urine protein excretion test in August 2021 showed 4.6 g per day, corresponding to a protein-to-creatinine ratio of 500 mg/mmol.

The patient was vaccinated thrice against COVID-19 with Pfizer BioNTech BNT162B2 (June, August, December 2021) and did not report any medical concerns following any of the doses. However, two weeks after the third dose, a thyroid function test fortuitously revealed elevated serum free T4 (fT4) with suppressed serum TSH [Table 1].

A score of 7 on the Naranjo Adverse Drug Reaction Probability Scale suggested that the Pfizer-BioNTech COVID-19 vaccine was the most probable cause of SAT.[2] The endocrinology team made a provisional diagnosis of silent thyroiditis associated with recent exposure to an mRNA vaccine and a matching thyroid profile. A thyroid gland ultrasound revealed a normal-looking thyroid gland with a solitary small spongiform nodule in the right lobe, measuring approximately 11 × 10 × 7 mm, and two small spongiform nodules in the left lobe, with the largest measuring approximately 10 × 9 × 8 mm. There was no evidence of enlarged cervical lymph nodes. No treatment was given as the patient was asymptomatic, and the inflammation of the thyroid gland was expected to be transient. He was advised to avoid exposure to iodinated contrast materials and iodine-rich foods.

On a follow-up visit five weeks after receiving the third dose of the vaccine, the patient was free from thyroid disease-related symptoms including pain, goiter, and lymph node enlargement. A follow-up thyroid function test continued to show suppressed TSH and elevated fT4.

On 31 March 2022, a 99-Tc thyroid scan revealed severely low thyroid uptake of 0.1% (Normal = 1–4%). Tests for thyrotropin receptor antibodies, thyroid peroxidase antibodies, and thyroglobulin antibodies yielded negative results [Table 1].

Six months later, our patient continued to be asymptomatic for thyroid dysfunction. He reported no exposure to intravenous iodinated contrast or ingestion of any iodine-rich foods. Repeat thyroid profiling continued to show suppressed TSH and elevated fT4 [Table 1].

In July 2022, during a follow-up visit with the oncology team, another thyroid profile test revealed normal TSH levels. However, his fT4 remained elevated, though lower than earlier. No treatment was given for his subclinical hyperthyroidism throughout the six-month follow-up period. Written informed consent was obtained from the patient.

DISCUSSION

SAT is an inflammatory thyroid disease that may follow an acute symptomatic or asymptomatic viral illness, predominantly an upper respiratory tract infection. The absence of pain (as in our patient) does not rule out the

diagnosis.[3,4] COVID-related thyroid gland involvement may accompany severe COVID-19 infections with multi-organ spreading (most frequently associated with lung involvement) or manifest as an asymptomatic infection, with SAT being the sole manifestation or the initial presentation.[5]

The first cases of SAT associated COVID-19 vaccinations were reported after administration of CoronaVac, an inactivated-virus vaccine.[6,7] Our patient received an mRNA vaccine, which can induce immune responses by activating specific toll-like receptors.[8] A systematic review has suggested that a prior history of autoimmune thyroiditis might also be a risk factor.[9]

The largest literature review of SAT cases following COVID-19 vaccines (on 80 patients) concluded that vaccine-related SAT was typically less symptomatic than other types of SAT, with incidents occurring variably following either the first or second dose of the vaccine within an average of two weeks.[10]

Different pathogenic mechanisms have been hypothesized to explain the development of SAT following COVID-19 vaccinations. One suggests that viral upper respiratory tract infections may trigger SAT in genetically predisposed individuals with specific HLA haplotypes, such as HLA-B*35, HLA-B67, and HLA-Drw8. (This hypothesis is a likely explanation for the development of SAT in our patient, although this test was not conducted on our patient). The proposed mechanism involves the infiltration of the virus into the follicular cells of the thyroid gland, leading to cytotoxic T-cell activation, follicular destruction, and subsequent thyroid dysfunction.[9,11,12]

Another hypothesis centers on the overactivation of the immune system, combined with molecular mimicry between thyroid tissue (specifically thyroid peroxidase peptide sequences) and vaccine components, particularly the spike protein.[5,6] A third hypothesis based on the autoimmune/autoinflammatory syndrome induced by adjuvants (ASIA syndrome), suggests that vaccine adjuvants may trigger an autoimmune thyroid response, leading to an abnormal increase in thyroid hormone levels, particularly in patients at higher risk for coagulation anomalies.[5,6,13] The current case appears to be more in line with the first hypothesis.

In general, COVID-19 vaccine-related adverse effects have observed to be fewer in cancer patients than in those without cancer. Notably, the SOAP-O2 study found lower incidences of local (52% vs. 36%) and systemic (32% vs. 25%) symptoms following the Pfizer-BioNTech vaccine in cancer patients.[14] Among the possible reasons may be higher pain threshold in cancer patients, and overlap between symptoms related to chemotherapy and those related to their chronic illnesses, potentially leading to underreporting and delayed diagnosis.[15]

Another possibility is the lower rates of immunogenicity in cancer patients. This may explain why only three cases of post-COVID-19 vaccination-induced SAT in cancer patients has been reported in three cases, all related to mRNA vaccines. One of these patients had concurrent papillary thyroid cancer and received the Pfizer-BioNTech vaccine, the second patient had colorectal cancer and received the Moderna vaccine, and the third patient had multiple myeloma and received the Pfizer-BioNTech vaccine.[10,16,17]

CONCLUSION

To our knowledge, this is the first reported case of SAT following the administration of the third dose of the COVID-19 Pfizer-BioNTech BNT162b2 vaccine. Furthermore, it represents the first case of SAT following mRNA vaccination in a patient diagnosed with ccRCC. Lastly, this marks the fourth reported case of SAT post COVID-19 vaccination in the cancer population at large. We present this case to contribute to the growing body of evidence in medical literature indicating that, in rare cases, SAT can develop after COVID-19 mRNA vaccination.

Disclosure

The authors declare no conflicts of interest.

REFERENCES

1. Oyibo SO. Subacute thyroiditis after receiving the adenovirus-vectored vaccine for coronavirus disease (COVID-19). Cureus 2021 Jun;13(6):e16045.
2. Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, Roberts EA, et al. A method for estimating the probability of adverse drug reactions. Clin Pharmacol Ther 1981 Aug;30(2):239-245.
3. Franquemont S, Galvez J. Subacute thyroiditis after mRNA vaccine for covid-19. J Endocr Soc 2021 May;5(Suppl 1):A956-A957.
4. Bornemann C, Woyk K, Bouter C. Case report: two cases of subacute thyroiditis following SARS-CoV-2 vaccination. Front Med (Lausanne) 2021 Aug;8:737142.
5. Popescu M, Ghemigian A, Vasile CM, Costache A, Carsote M, Ghenea AE. The new entity of subacute thyroiditis amid the COVID-19 pandemic: from infection to vaccine. Diagnostics (Basel) 2022 Apr;12(4):960.
6. İremli BG, Şendur SN, Ünlütürk U. Three cases of subacute thyroiditis following SARS-CoV-2 vaccine: postvaccination ASIA syndrome. J Clin Endocrinol Metab 2021 Aug;106(9):2600-2605.

7. Şahin Tekin M, Şaylısoy S, Yorulmaz G. Subacute thyroiditis following COVID-19 vaccination in a 67-year-old male patient: a case report. Hum Vaccin Immunother 2021 Nov;17(11):4090-4092.
8. Chung YH, Beiss V, Fiering SN, Steinmetz NF. COVID-19 Vaccine frontrunners and their nanotechnology design. ACS Nano 2020 Oct;14(10):12522-12537.
9. Caron P. Thyroiditis and SARS-CoV-2 pandemic: a review. Endocrine 2021 May;72(2):326-331.
10. Plaza-Enriquez L, Khatiwada P, Sanchez-Valenzuela M, Sikha A. A case report of subacute thyroiditis following mRNA COVID-19 vaccine. Case Rep Endocrinol 2021 Nov;2021:8952048.
11. Kojima M, Nakamura S, Oyama T, Sugihara S, Sakata N, Masawa N. Cellular composition of subacute thyroiditis. an immunohistochemical study of six cases. Pathol Res Pract 2002;198(12):833-837.
12. Ippolito S, Gallo D, Rossini A, Patera B, Lanzo N, Fazzino GF, et al. SARS-CoV-2 vaccine-associated subacute thyroiditis: insights from a systematic review. J Endocrinol Invest 2022 Jun;45(6):1189-1200.
13. Jeeyavudeen MS, Patrick AW, Gibb FW, Dover AR. COVID-19 vaccine-associated subacute thyroiditis: an unusual suspect for de Quervain's thyroiditis. BMJ Case Rep 2021 Nov;14(11):e246425.
14. So AC, McGrath H, Ting J, Srikandarajah K, Germanou S, Moss C, et al. COVID-19 vaccine safety in cancer patients: a single centre experience. Cancers (Basel) 2021 Jul;13(14):3573.
15. Monin L, Laing AG, Muñoz-Ruiz M, McKenzie DR, Del Molino Del Barrio I, Alaguthurai T, et al. Safety and immunogenicity of one versus two doses of the COVID-19 vaccine BNT162b2 for patients with cancer: interim analysis of a prospective observational study. Lancet Oncol 2021 Jun;22(6):765-778.
16. Alkis N, Baysal M. Subacute thyroiditis after SARS-CoV-2 BNT162b2 vaccine in a multiple myeloma patient. SAGE Open Med Case Rep 2022 Apr 24;10:2050313X221091392.
17. Sigstad E, Grøholt KK, Westerheim O. Subacute thyroiditis after vaccination against SARS-CoV-2. Tidsskr Nor Laegeforen 2021 Oct;141(2021-14).