Received: 16 July 2021 | Revised: 17 August 2021 | Accepted: 25 August 2021

DOI: 10.1002/ccr3.4812

CASE REPORT

Clinical Case Reports Open Access WILEY

Subacute thyroiditis following COVID-19 vaccination

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Abstract

Physicians should be alert about the possibility of subacute thyroiditis (SAT) being induced by COVID-19 vaccination. SAT may present with anterior neck pain, extended fever or palpitation in recently vaccinated patients, which should not be easily dismissed as expected post-vaccination flu-like symptoms, thereby, facilitating in time diagnosis and treatment.

KEYWORDS

adverse effects, COVID-19, COVID-19 vaccines, SARS-CoV-2, side effects, subacute thyroiditis, thyroiditis

1 | INTRODUCTION

Subacute thyroiditis (SAT), also known as De Quervain's thyroiditis, is a self-limited inflammatory thyroid disorder presenting with radiating neck pain, fever, and a cluster of symptoms resulting from the thyrotoxicosis caused by destruction of follicular epithelium and loss of follicular integrity. Upper respiratory tract viral infections antecede most SAT cases; supporting a post-viral inflammatory response origin. Many viruses, such as influenza, adenovirus, and Coxsackie virus have been identified as responsible pathogens.[1–4] With the COVID-19 pandemic taking the world by storm, there have been a few case reports on SAT following severe acute respiratory syndrome coronavirus 2 (SARSCOV-2) infection.[1,2] To our knowledge, SAT has not yet been reported as a result of COVID-19 vaccination in an otherwise healthy individual, regardless of the vaccine type. Here, we describe a case of SAT post-COVID-19 vaccination.

2 | CASE

A 34-year-old woman, with negative history of previous proven or suspicious COVID-19 infection, received her first dose of COVAXIN (The Bharat Biotech COVID-19 Vaccine) on April 3, 2021, with onset of expected symptoms, mainly fatigue, myalgia, and mild fever about 12 h post-injection, gradually resolving over the next 72 h. During the 5th–7th day post-vaccination, she experienced gradual onset of intermittent mild fever, palpitation, and radiating anterior neck pain, which she initially thought of as extended post-vaccination symptoms. She consulted an internal medicine specialist due to persistence of symptoms, 11 days post-vaccination. At physical examination, the thyroid gland was tender to touch and mildly enlarged, with no palpable thyroid nodule. The patient had no history of prior thyroid disorder or any type of high iodine exposure. She was referred for 99mTechnetium-pertechnetate thyroid scintigraphy

on the same day, demonstrating global, moderate to severely decreased radiotracer uptake of the thyroid gland, and increased background activity, compatible with subacute thyroiditis (Figure 1). The subsequently performed ultrasound examination revealed heterogeneity and decreased vascularity of the thyroid gland. The simultaneously acquired laboratory data portrayed thyrotoxicosis with suppressed thyrotropin (TSH) and elevated thyroxine (T4), triiodothyronine (T3) levels. Erythrocyte sedimentation rate and C-reactive protein levels were high and borderline upper limit of normal, respectively (Table 1). Subacute thyroiditis was confirmed; however, the patient had no history upper respiratory tract infection or otherwise viral infection symptoms during the past 3 months (except for the previously described post-vaccination symptoms), she had no history of recent travel during the past couple of months and followed the social distancing rules vigorously, having had no close or unprotected contact with any known or suspected SARSCOV-2-positive case. Her concurrent chest CT scan indicated that her lungs were clear with no sign of any current or prior sequels of COVID-19 infection or other causes of pneumonia. Therefore, it is logical to assume that in this case, SAT developed following the inflammatory response to COVAXIN. The patient was treated with oral prednisolone, 15 mg/day, with a taper of 5 mg every 2 weeks, continuing for a total of 6 weeks. She also received oral propranolol, 20 mg, twice per day; which was discontinued 2 weeks later due to significant resolution of symptoms. The thyroid function tests were repeated 7 weeks after initiation of treatment (one week after discontinuation of oral prednisolone); TSH, T4 and T3 were within normal limits, indicating a euthyroid state. Patient follow-up continued up to 4 weeks after completion of treatment, during which she did not experience any relapse in symptoms or further complications.

3 | DISCUSSION

Having been associated with various strains of viruses, SAT is recognized to have a viral, or to be more specific, post-viral inflammatory response, origin.[1–4] To this date, a few cases have been reported of SAT developing after influenza and H1N1 vaccination in healthy individuals with no history of prior viral upper respiratory tract infection, suggesting that attenuated/inactivated viral vaccines may rarely trigger SAT onset as well.[3,4] The ongoing COVID-19 pandemic has urged countries all over the world to eagerly pursue national vaccination programs, with multiple pharmaceutical companies vigilantly developing, testing, and modifying new vaccines every day.[5] While there have been a few reports on COVID-19-associated SAT,[1,2] no similar observation has been reported so far for COVID-19 vaccines, regardless of vaccine type. The chronological events of our case suggest that COVID-19 vaccination, in this case first dose of COVAXIN administration, may be held accountable for SAT. Considering that more than 15 million doses of COVAXIN had been administered till mid-April 2021, this side-effect seems extremely rare. Nevertheless, it should be kept in mind, and the fact that SAT is generally an underdiagnosed/misdiagnosed condition becomes more pronounced in vaccine-related cases, since, as in our case, patients are more prone to attribute SAT symptoms to expected flu-like post-vaccination symptoms.[3,4] It is not yet clear whether the type of COVID-19 vaccine, in case of COVAXIN being an inactivated whole-virion vaccine,[5] affects the chances of SAT development

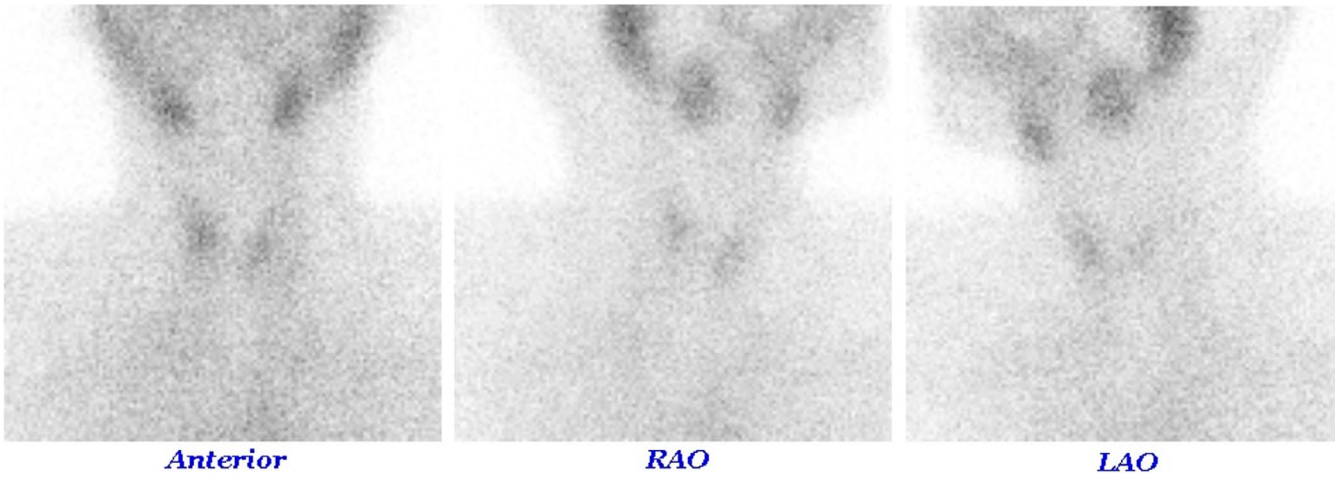

FIGURE 1 Thyroid scintigraphy. Ten minutes after IV injection of 111 MBq 99mTc-pertechnetate, static acquisition of neck was performed in anterior and anterior oblique views, by a dual head Siemens gamma camera with a low-energy high-resolution parallel-hole (LEHR-PAR) collimator (magnification 1; matrix 256 × 256, frame 100 Kc). Study reveals global, moderate to severe decreased thyroid radiotracer uptake accompanied by high background activity, compatible with subacute thyroiditis

TABLE 1 Laboratory results of the patient

Measure	Patient	Reference range
TSH (mIU/L)	0.05	0.36–6.3
T4 (μg/dl)	20.9	4.4–11.7
T3 (ng/ml)	2.7	0.55–1.9
WBC (10^3/mm^3)	8.3	4–9
Neutrophil (%)	72	-
Lymphocyte (%)	25	-
ESR	60	4–9
CRP (mg/L)	9.8	Adult <10

Abbreviations: CRP, C-reactive protein; ESR, Erythrocyte Sedimentation Rate; T3, Triiodothyronine; T4, Thyroxine; TSH, Thyroid Stimulating Hormone; WBC, White Blood Cells.

or not, nor is whether SAT was induced by the attenuated vaccine itself or the autoimmune/inflammatory syndrome induced by adjuvants.[6]

4 | CONCLUSION

We believe physicians should be alerted about the possible association between SAT and COVID-19 vaccination, which even if extremely rare, may translate to significant numbers considering the large vaccinated population. Given that patients frequently experience flu-like symptoms after COVID-19 vaccination, informing them well about the expected nature and duration of symptoms, advising them to consult their physician if experiencing anterior neck pain, extended fever or palpitation would prevent missing cases of vaccine-related SAT, thereby, facilitating in time diagnosis and treatment.

ACKNOWLEDGMENT

We thank the patient who graciously collaborated with this study, and her written informed consent was obtained as well.

CONFLICTS OF INTEREST

The authors have no conflict of interest to disclose.

AUTHOR CONTRIBUTIONS

All authors have made substantial contributions to conception and design as well as acquisition of patient's data; have been involved in drafting and revising the manuscript; have given final approval of the version to be published with each of them having participated sufficiently in the work to take public responsibility for appropriate portions of the content; and have agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ETHICAL APPROVAL

This study was approved by the local ethics committee. Since this article is a case report, it does not contain any studies performed on animal or human participants performed by any of the authors.

CONSENT

Patient's written informed consent has been obtained and she has consented to the submission of the case report to the journal.

DATA AVAILABILITY STATEMENT

As no data sets were generated or analyzed in the current study; data sharing is not applicable to this article.

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How to cite this article: Soltanpoor P, Norouzi G. Subacute thyroiditis following COVID-19 vaccination. *Clin Case Rep*. 2021;9:e04812. https://doi.org/10.1002/ccr3.4812