

Painless Thyroiditis after Covid-19 Vaccination: A Case Report

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Background: Subacute thyroiditis is an inflammatory disease associated with vaccinations. There have been reports of subacute painful thyroiditis following SARS-CoV-2 vaccination. However, only a few cases of painless thyroiditis have been reported and mostly were after mRNA vaccine. The authors presented a case of painless thyroiditis after viral vector SARS-CoV-2 vaccine.

Case Report: A 60-year-old woman, who had no prior history of thyroid disease, presented with atrial fibrillation and no enlarged thyroid gland or neck pain. She had received ChAdOx1 nCoV-19 vaccine from AstraZeneca two weeks prior to the onset of symptoms. Her blood tests revealed primary thyrotoxicosis, and thyroid uptake confirmed thyroiditis.

Discussion: Vaccine-induced thyroiditis has been reported in viral vaccines. The pathophysiology of SARS-CoV-2 vaccine-induced thyroiditis is still unknown. It is possible that the immune response to the SARS-CoV-2 vaccine will also cross-react and cause thyroiditis.

Conclusion: It is possible that SARS-CoV-2 vaccine can cause painless thyroiditis.

Keywords: Covid-19; SARS-CoV-2; Thyroiditis; Vaccine

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Following the emergence of Covid-19 infection, vaccines have been developed all over the world to combat it. Vaccines with various mechanisms have been studied and used in the general population. However, because vaccines are involved in human immunity, one possible side effect is an autoimmune and inflammatory response. There have been case reports of thyroiditis following covid vaccination, but the majority of them involve subacute painful thyroiditis. The present paper described a patient who developed subacute painless thyroiditis two weeks after receiving AstraZeneca's ChAdOx1 nCoV-19 vaccine.

Case Report

A 60-year-old woman presented to the emergency

room after experiencing severe palpitation for half a day. She stated that she had no symptoms of chest pain or dyspnea, no neck pain, and no prior history of thyroid disease or weight loss. Her underlying disease was essential hypertension, and her only medication was losartan 100 mg/day. Due to the Covid-19 vaccine regimen in Thailand, she had received CoronaVac vaccine four weeks prior and then ChAdOx1 nCoV-19 vaccine from AstraZeneca two weeks prior to the onset of the symptoms. She denied any sign of infection before this event. She was a non-smoker and there was no history of thyroid disease in her family.

Her vital signs were body temperature 36.4°C, pulse rate 151 bpm, respiratory rate 18 tpm, and blood pressure 151/109 mmHg. Her initial examination in the emergency room revealed normal size thyroid gland, firm, and not tender. The cardiovascular examination showed atrial fibrillation with rapid ventricular response. After the arrhythmia was terminated with intravenous digoxin 0.25 mg, she was admitted to the semi-intensive care unit for additional monitoring.

Her blood tests revealed primary thyrotoxicosis as well as an inflammatory marker with elevated C-reactive protein (CRP). Other blood tests revealed that everything was within normal limits (Table 1). Her nasopharyngeal swab polymerase chain reaction

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Table 1. Basic laboratory results at the admission

Measures	Reference ranges	Results
BUN (mg/dL)	6 to 20	15.6
Creatinine (mg/dL)	0.51 to 0.95	0.68
Sodium (mEq/L)	136 to 145	140
Potassium (mEq/L)	3.5 to 5.0	4
Bicarbonate (mEq/L)	23 to 30	20.1
Chloride (mEq/L)	98 to 106	104
Calcium (mg/dL)	8.6 to 10.0	10.0
Phosphorus (mg/dL)	2.7 to 4.5	3.0
Magnesium (mg/dL)	1.6 to 2.6	2.0
Albumin (g/dL)	3.5 to 5.2	4.3
Hemoglobin (g/dL)	12.0 to 14.3	12.6
Hematocrit (%)	36.0 to 47.7	38.3
White blood cell count (/uL)	4,600 to 10,600	5,470
Platelet (/uL)	173,000 to 383,000	322,000
CRP (mg/L)	0 to 4.99	8.29

BUN=blood urea nitrogen; CRP=C-reactive protein

(PCR) for SARS-CoV-2 was negative. Anti-TSH receptor antibody, thyroid peroxidase antibodies (Anti-TPO), and anti-thyroglobulin antibodies (Anti-Tg) were all found to be negative (Table 2). Due to laboratory limitation, the authors did not perform test for Covid-19 antibody level. Following her admission, a thyroid uptake was performed, which revealed that the 4-hour radioiodine uptake was 3.3%, where the normal range is 6% to 18%, and the 24-hour radioiodine uptake was 6.8%, where the normal range is 15% to 45%, confirming the diagnosis of thyroiditis. After three days of admission, she did not experience any symptoms and was discharged. Two weeks later at the follow-up visit, her electrocardiography showed a normal sinus rhythm, and her blood tests revealed euthyroid without the use of medication.

Discussion

Vaccine-induced thyroiditis has been reported in

viral vaccines, including the influenza vaccine and the hepatitis B vaccine⁽¹⁾. It is hypothesized that the vaccine may trigger an autoimmune response to the thyroid gland, resulting in thyroiditis. SARS-CoV-2 vaccine-induced thyroiditis has also been reported in the Covid-19 era across all vaccine types^(2,3). The majority of cases presented with neck pain and mild thyroiditis, indicating subacute painful thyroiditis⁽⁴⁾. There are also case reports of painless thyroiditis after Covid-19 vaccination with mRNA vaccine^(5,6). In the present case report, the authors described a case of painless thyroiditis following ChAdOx1 nCoV-19 vaccination. The authors confirmed the diagnosis of thyroiditis with a thyroid uptake, and the patient remained euthyroid without the use of any antithyroid medication. Due to the absence of thyroid gland biopsy, the authors could not conclusively determine the type of painless thyroiditis presented in this patient. The authors suspected of Hashimoto's thyroiditis. Antibody negative Hashimoto's thyroiditis occurs in roughly 5% of all cases and is typically characterized by minor symptoms⁽⁷⁾. Nonetheless, the patient's long-term management will include clinical and thyroid function tests to monitor for hypothyroidism.

The ChAdOx1 nCoV-19 vaccine is composed of a replication-deficient chimpanzee adenoviral vector ChAdOx1, which contains the SARS-CoV-2 structural surface glycoprotein antigen gene⁽⁸⁾. In phase 3 study, the incidence of immune-mediated diseases was comparable between the vaccinated and the placebo groups⁽⁹⁾. It is worth noting, however, that thyroid dysfunction was not included in the study, implying that the incidence may be too low to encounter in a small number of patients.

The pathophysiology of SARS-CoV-2 vaccine-induced painless thyroiditis is thought to be the cross-recognition between the thyroid target protein and the modified SARS-CoV-2 proteins in vaccines

Table 2. Thyroid function tests and antibodies

Measures	Reference ranges	17 October 2021	3 November 2021	1 December 2021
Free T3 (pg/mL)	2 to 4.4	12.90	2.57	2.65
Free T4 (ng/dL)	0.93 to 1.7	2.02	1.29	1.25
TSH (mIU/L)	0.2 to 4.2	0.057	2.300	2.060
Anti-TSH receptor Ab (IU/L)	0 to 1.74	1.04	-	-
CRP (mg/L)	0 to 4.99	8.29	-	-
Anti-TPO (IU/ml)	0 to 35	-	-	9.71
Anti-Tg (IU/ml)	0 to 115	-	-	24.0

Free T3=free triiodothyronine; Free T4=free thyroxine; TSH=thyrotropin; CRP=C-reactive protein; Anti-tg=thyroglobulin antibodies; Anti-TPO=thyroid peroxidase antibodies

results in autoimmune thyroiditis⁽¹⁰⁾. Since there have been reports of thyroiditis as a result of Covid-19 infection⁽¹¹⁾, it is possible that the immune response to the SARS-CoV-2 vaccine will also cross-react and cause thyroiditis as well, however, more research is needed to understand the mechanism.

Lastly, it is critical for clinicians to be on the lookout for and report on side effects of new vaccines. Nonetheless, the side effect should not be an impediment to the control of a global pandemic.

What is already known on this topic?

Vaccine-induced thyroiditis has been reported in viral vaccines. It is possible that vaccine may trigger an autoimmune response to the thyroid gland.

What this study adds?

It is possible that SARS-CoV-2 vaccine can induce both painful and painless thyroiditis.

Authors' contributions

CP physically examined and performed all laboratory test of the patient. DS did the literature research and wrote the manuscript.

Conflicts of interest

The authors declared that they have no conflict of interest.

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