

# Inactivated Whole Virion Covid-19 Vaccine Induced Painful Subacute Thyroiditis A Case Report

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## Short Report

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# Abstract

Painful subacute thyroiditis (PF-SAT) after viral vaccinations is a rare but often go unnoticed. A viral infection and some viral vaccinations may cause PF-SAT as an undesired consequence. Presenting symptoms are sore throat, weight loss, sleep disturbances and palpitation which all are quite similar to those seen in thyrotoxicosis. In the early phase of the illness, hyper thyroid function is a rule, followed by euthyroid and rarely hypo-thyroid phases. Treatment for SAT is usually successful with a very rare recurrence. Here, we report a case of PF-SAT, after immunization with whole virion inactivated Covid-19 vaccine, in a health care worker.

## Background

Subacute thyroiditis is a rare condition which is seen as a complication of some viral infections, as well as an adverse effect of some vaccines. Vaccine and infection induced SATs are usually painful and patients usually return to normal thyroid functions within several months. It starts with a hyperthyroid phase, subside to normal thyroid functions for a while and a final hypothyroid phase, and usually returns to euthyroid phase again. Obtaining the patient's detailed medical history, careful physical examination and timely treatment with steroid or non-steroid anti-inflammatory drugs are important elements to obtain successful healing without necessitating any further interventions. Here, we report a case of PF-SAT, after immunization with whole virion inactivated Covid-19 vaccine, in a health care worker.

## Case

The patient is 64 year-old male physician (one of the authors). His medical history did not indicate any significant illness other than previous appendectomy and bulging lumber disc removal several years ago. He had no history of thyroid disease. He was not on any medication. He received first dose of SARS CoV-2 whole virion inactivated vaccine (CoronaVac<sup>®</sup>) in last week of January 2021, and the second dose was administrated 4 weeks later. He was tested for spike antibody (ECA, positive with 214 BAU) at the end of March 2021 and all biochemistry lab work results including thyroid functions were within normal limits. Nearly 5 weeks later, he started to complain of burning sore throat, weight loss, tenderness on neck and lower jaw, palpitations, small joint aches, low grade fever and episode of weakness. As commonly done by many physicians, he ignored the low grade symptoms and continued daily activities for nearly 3–4 weeks until 10 kilograms of abnormal weight loss alarmed the patient. May 17th, 2021 blood tests revealed elevated CRP (43 mg/dl) and a high ESR (72 mm/H) level. Evaluation with ultrasound showed tender right thyroid lobe enlargement and some minor involvement on the left lobe with decreased blood supply, which are typical images for SAT (Picture 1). Same day, lab works done for thyroid functions revealed TSH: <0.012uIU/ml, fT4:1.93 ng/dl, fT3:3.65 pg./ml, and negative results of all auto antibodies. He initially started 30 mg/day of deflazakort (Flantadin<sup>®</sup>) that gave him a rapid pain relief within hours. His course of disease was uneventful, and he gradually decreased the dose of steroid day by day down to 6 mg/day in a 10 week time period and then stopped the medication. He was tested 2 weeks after the treatment and mild hypothyroid phase detected (Table-1). He received 25 microgram of thyroxin

(Euthrox<sup>®</sup>) daily and well tolerated the hormone replacement. He gained back nearly eight kilograms of weight gradually.

## Discussion

PF-SAT is mainly seen after upper respiratory tract infections but it is a rare complication. The pathophysiology is based on cross recognition between microorganisms or vaccine induced antibodies against healthy thyroid cells. This phenomena is an auto-antibody immune pathology. Inflammatory response to the vaccine antigens or adjuvans in the vaccine might create some cross reactive auto-antibodies rarely, which result thyroid cell apoptosis and local tissue damaging. Similar mechanism of severe Covid-19 infection also depends on producing a profound host inflammatory response, and induction of apoptosis. The immunopathology of the complications may have some genetic variations and predispositions. This type of idiosyncratic mechanism also may be the reason of vaccine induced SAT as seen in mass vaccination campaigns, and as seen during seasonal influenza shots. It is a usually under recognized disorder because of mild to moderate complains and symptoms. So far, most of the patients with PF-SAT receive superfluous treatments for sore throat, muscle strains and in the worst case, some cardiologic medications and interventions. PF-SAT due to COVID-19 vaccines show a good and rapid response to anti-inflammatory and/or corticosteroid therapies. It is important to have timely diagnosis to start effective treatment based on clinical suspicion and laboratory proof which are supported by ultrasound imaging. So far, a rigorous medical history and a careful physical exam, specifically the thyroid palpation, and proper use of radiological imaging are mile stones of orderly diagnosis. The cases of PF-SAT after an active SARS CoV-2 infection (1) and immunization by m-RNA vaccine and vector born vaccine are publishing while the pandemic still roaring all over the world (2, 3). This case is also another example of PF-SAT patient after the inactivated whole-virion Corona CoV-2 vaccine (4).

## Conclusion

The main weapon of medicine against the deadly Covid-19 pandemic is global mass vaccination campaign. Up to date, nearly 5.5 billion doses of several different Covid-19 vaccine already given to the world population. Minor complications and reversible side effects should not alter the ongoing mass vaccination campaigns. Primary care physicians should be aware of these kind of adverse effects to solve the problem as quickly as possible without harming the final goal of the vaccine induced global herd immunity.

## Declarations

**Conflict of interest:** None.

**Funding:** None.

**Consent for publication:** Approved by the case (one of the authors)

**Ethical Approval:** Not applicable.

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## Table

Table 1  
Laboratory Results of a case

Date 2021	TSH µIU	ft4 ngr/ml	ft3 pg/ml	CPR mg/dL	ESR mm/H	Tg ng/ml	TL mg/dL	TC mg/dL	WBC x 10 <sup>3</sup> uL
18 May	0,012	1,95	3,65	41,76	72	ND	843	236	12,8
18 June	0,709	1,29	2,46	1,19	33	34,44	1284	358	ND
16 July	21,53	0,783	2,41	1,80	36	169	1499	394	5,82

Abbreviations: Tg: Thyroglobulin, TL: Total Lipid, TC:Total Cholesterol, WBC: White Blood Cell Count

## Figures

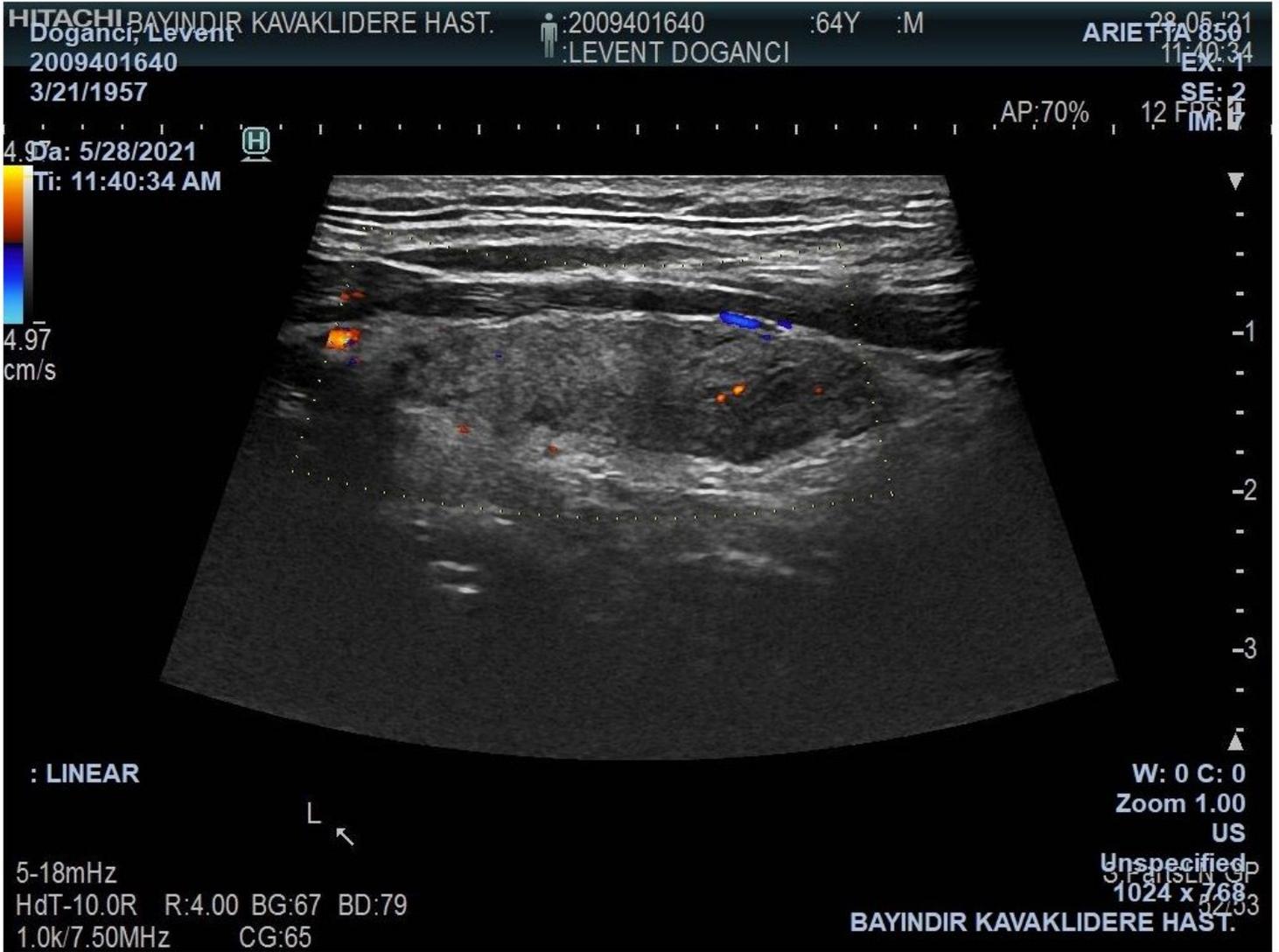


Figure 1

The thyroid ultrasound was indicated PF-SAT