



Case Report

Case report: Paradoxical manifestation of covid 19 induced thyroiditis in the unvaccinated patient

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ABSTRACT

Introduction and importance: Subacute thyroiditis (SAT) is a self-limiting viral or post-viral thyroid illness with triphasic clinical history of thyrotoxicosis, hypothyroidism and restoration to normal thyroid function. COVID-19 have wide range of clinical manifestation involving both respiratory and non-respiratory symptoms. Subacute Thyroiditis is one of the emerging symptoms of COVID-19 infection. We reviewed various articles from different online platforms and found that viral antigen binds to HLA B35 molecules on the macrophages which activates cytotoxic T lymphocytes which damage the thyroid follicular cells by binding to ACE2 receptors.

Case: We presented a case of COVID-19 induced subacute thyroiditis in an unvaccinated male patient whose physical symptoms manifested in the second week of infection. He presented with History of difficulty breathing associated with increased perspiration, generalized body weakness.

Clinical findings and investigation: His clinical Findings and laboratory finding were suggestive of subacute thyroiditis.

Intervention and outcome: The patient had been followed for a period of 15 days and was treated effectively with steroids which improved his symptoms. He was also counseled for vaccination.

1. Introduction

1.1. Background and rationale

Subacute thyroiditis (SAT) is a self-limiting viral or post-viral thyroid illness. A triphasic clinical history of thyrotoxicosis, hypothyroidism and restoration to normal thyroid function is typical of SAT, also known as de Quervain thyroiditis. From a clinical standpoint, SAT causes neck pain with radiation to the ears, as well as a wide range of systemic symptoms such as fever, asthenia, and malaise. Many individuals experience clinical and/or biochemical manifestations of mild-moderate thyrotoxicosis in the early stages, such as tremors and palpitations [1]. Thyroid follicles are invaded, causing the basement membrane to burst and the follicles to rupture. The detection of viral and cell antigens by cytolytic T-cells is assumed to be the cause of this damage [2].

Several respiratory infections have been linked to the development of SAT, including coxsackievirus [3], mumps [4], Epstein-Barr virus [5], cytomegalovirus [6], and influenza virus [7,8].

High titers of virus-specific antibodies or positive virus swabs were found in patients with SAT, and an association between the presence of antibodies to specific viruses and SAT was found, but virus culture from thyroid tissue and viral RNA identification from thyroid cytological samples yielded conflicting results.

Guidelines: SCARE 2020 paper [9].

This case report has been reported in line with the SCARE Criteria.

In this paper, we describe a patient who had subacute thyroiditis as a result of a COVID-19 infection.

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2. Case presentation

2.1. Patient information

2.1.1. Demographics and presentation

A 45-years old male from the western part of Nepal presented on the 8th day of difficulty breathing. It was associated with increased perspiration, generalized body weakness, sore throat, difficulty swallowing food, and loose motion. He also had a complaint of bounding of the chest and insomnia. He had anorexia.

2.1.2. Past medical and surgical history

He had no significant medical or surgical history.

2.1.3. Drug and allergy history

No h/o of long term medication and no known allergies till date.

2.1.4. Family history

He denied history of similar illness in family as well.

2.1.5. Social history

He is a non-smoker and drinks alcohol occasionally. He was not vaccinated for Covid 19.

2.2. Clinical findings

On examination, he was anxious with mild difficulty breathing. His BP was 120/80 mm of Hg, Pulse 113bpr, spo2 93% on room air, temperature oral 95F (97.2–98.6 °F) and axillary 94F (96.6–98 F), RR 27/min. On physical examination, the patient had mild pallor, mild dehydration, and anterior neck pain. On chest auscultation, mild inspiratory crackles were heard on the left lower lobe. The bilateral opacity was found on CXR (Fig. 1). S1S2 was heard without a murmur. He had no pedal edema and no skin changes.

2.3. Diagnostics assessment and interpretation

All the relevant investigations were sent in first visit and subsequent visit (Table 1).

2.4. Intervention

Our patient was unvaccinated and his clinical manifestations, physical examination and lab findings were directed towards the diagnosis of Subacute Thyroiditis. His IgM and IgG for Covid 19 infection were positive. The patient had been followed for a period of 15 days and was

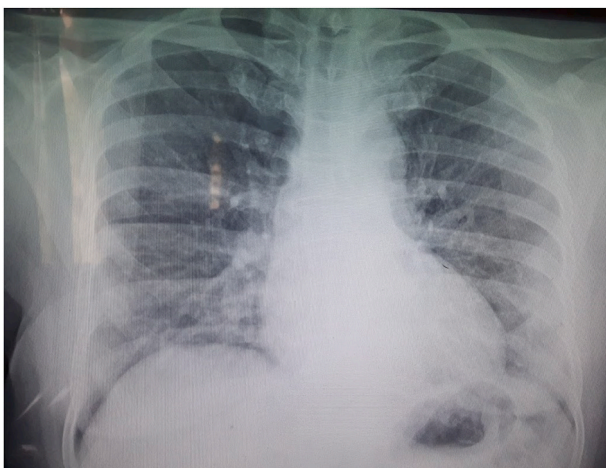


Fig. 1. Chest X-ray showing bilateral opacities.

Table 1

Table showing progression of hormone level in subsequent visit.

Investigation	Reference Range	1st visit	2nd visit (2 weeks)	3rd visit (4 weeks)
TSH	0.4–4.2pg/ml	2.4	3.3	3.1
fT4	8.0–17.2pg/ml	21	15.3	12.0
fT3	2.4–4.2pg/ml	3.4	3.3	3.0
Hb	12–17 gm%	11.6	13.0	13.8
Total count	4000–11000	4100	7900	6000
D-dimer	<0.40 µg/ml	1.06	0.7	0.3
ESR	<25mm per hour	46mm per hour	28mm per hour	15mm per hour
CRP	<10mg/l	60mg/l	26mg/l	5mg/l

treated effectively with steroids which improved his symptoms. He was also counseled for vaccination. With our study, we concluded that physicians should be aware of screening for subacute thyroiditis in patients with Covid-19 infection.

3. Discussion

Subacute thyroiditis, a self-limited disease is one of the most common causes of anterior cervical pain and is associated with thyroid dysfunction. It is an uncommon disease that has a high prevalence among middle-aged females and constitutes 5% of thyroid disease. Viral Infection is the most likely cause [10]. Many viruses like enterovirus (being the most common), influenza virus, coxsackievirus, mumps, measles, and other viruses predispose to upper respiratory tract infection as one of the secondary causes [11–14].

It is a self-limited condition with a triphasic clinical course, hyperthyroidism, hypothyroidism, and euthyroidism which returns to the normal thyroid function. Around 15–20% of the patients may have hyperthyroidism and around 10% might have hypothyroidism [15].

Subacute thyroiditis is genetically influenced and is associated with HLA B35 and the susceptibility is more when accompanied by viral infection [12]. Genetically susceptible individuals carry human leukocyte antigen haplotype. Viral antigen binds to HLA B35 molecules on the macrophages activating cytotoxic T lymphocytes which damage thyroid follicular cells [13]. On palpation, the thyroid is painful, tender, and enlarged. ACE 2 and Transmembrane protease serine 2 receptors which are expressed in different tissues are involved in the pathogenesis of covid 19. Thyroid Follicular cells which express ACE2 make it more susceptible to injury due to Covid 19 [16]. It could be either a direct or immune-mediated injury of the thyroid gland where thyroid hormones activate signal pathways that control the transcription of genes involved in anti-apoptotic, angiogenic, and ultimately cell proliferation, by binding to integrin receptors [16]. The severe form of Covid 19 is interlinked with several cytokines, chemokines, and several viral proteins, which may aggravate the underlying subacute thyroiditis with increased IL-6 and TNF alpha levels [16].

Most of the prior limited reported cases of subacute thyroiditis after Covid 19 infection worldwide occurred in females contrasting to our male patients [17]. In one of the studies done among 27 patients majority of 25 (92.6%) presented with anterior neck pain, followed by palpitation in 22 (81.5%) patients, viral prodrome in 20 (74.1%) patients, and one with a new onset of atrial fibrillation [18]. The mean days for covid 19 infection and the occurrence of symptoms onset for SAT was a minimum of 5 days and a maximum of 42 days.

Symptoms of hyperthyroidism correspond with the lab findings with low TSH, elevated t3 t4, and thyroid USG finding of poorly defined hypoechoic areas, USG of the thyroid was not done in our patient. Elevated inflammatory markers like ESR and CRP were also seen.

There were excellent treatment outcomes in all the 21 cases in one of the systematic review studies with steroid and anti-inflammatory drugs [18]. With all literature reviews, it is crucial to understand that patients may either present with predominant Covid 19 features or SAT features

and it is essential to take a good history with a physical examination to differentiate SAT with respiratory symptoms of Covid-19 [19].

SAT is diagnosed clinically with positive lab and imaging findings. Our patient came positive after 8 days of negative Rapid antigen test had clinical features and lab findings suggestive of Covid 19 induced SAT, imaging could not be done because of lack of easy accessibility to the nearest facilitated health care center.

4. Take away lesson

This case report presents thyroiditis as a manifest of a COVID-19 infection. Also, with this report, we want to address if the patient has clinical features and lab findings suggestive of hyper or hypothyroidism manifesting in SAT, it should be managed vigilantly without over-treating patients with hormones (thyroid supplements or antithyroid medication).

Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Provenance and peer review

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Author contributions

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Please state any conflicts of interest

There is no any conflicts of interest with this article.

Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

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Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104204>.

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