



## Subacute thyroiditis after SARS-CoV-2 vaccination: a report of two sisters and summary of the literature

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Subacute thyroiditis (SAT), an inflammatory disorder of the thyroid gland, is often self-limiting [1]. There are only a few cases in literature in which SAT is related to the SARS-CoV-2 vaccination [2]. Herein, we report the cases of two sisters presenting with SAT a few days after receiving the COVID-19 mRNA vaccine, and summarize the relevant data reported in the literature.

**Case 1** A 35-year-old female, non-smoker, presented to the outpatient clinic due to acute neck pain radiating to the jaw and ear, fatigue, and rare palpitations. As regards her family history, her mother had been diagnosed with Hashimoto's thyroiditis 20 years previously. The patient had tenderness on palpation over the thyroid area. She received the SARS-CoV-2 vaccine several days before the appearance of the symptoms (specifically, 12 days before she received the first dose). The patient's biochemical parameters and thyroid functional tests are presented in Table 1. Thyroid sonography revealed increased gland dimensions with heterogeneous appearance and with hypoechogenic regions. The technetium pertechnetate (<sup>99m</sup>TcO<sub>4</sub>) thyroid scan showed low uptake from the thyroid parenchyma with irregular gland margins. Prednisolone treatment was initiated [3].

**Case 2** A 32-year-old female, sister of case 1, non-smoker, presented with neck pain radiating to the jaw and ear, and mild fatigue. She had had an endometritis infection 1 month earlier, which was treated with doxycycline and

roxithromycin. The patient had tenderness on neck palpation. She had received the second dose of SARS-CoV-2 vaccine 4 days before the symptoms appeared. The patient's biochemical parameters and thyroid functional tests are presented in Table 1. Thyroid sonography revealed increased gland dimensions with heterogeneous appearance and hypoechogenic regions. The <sup>99m</sup>TcO<sub>4</sub> scan showed low uptake from the thyroid parenchyma with irregular gland margins. Prednisolone treatment was initiated [3].

SAT has previously been described as a complication following administration of other vaccines, such as the influenza and hepatitis B vaccines, but there are only a small number of reports in the literature regarding SAT after SARS-CoV-2 vaccination. Iremlı et al. describe three cases of female patients presenting with SAT a few days after receiving the inactivated SARS-CoV-2 vaccine (Coronavac) [4]. Oyibo S.O. reports a case of a 55-year-old female with SAT some days subsequent to administration of the adenovirus-vectored COVID-19 vaccine (Oxford-AstraZeneca) [5]. Tekin et al. describe the case of a 67-year-old male patient presenting with SAT several days after receiving the second dose of Coronavac [6]. Finally, only one case of SAT occurring following the mRNA SARS-COV-2 vaccine has been reported that concerned a 42-year-old female patient with SAT onset soon after administration of the Pfizer/BioNTech mRNA vaccine [7].

The exact pathogenetic mechanism underlying incidence of SAT as a complication following the SARS-CoV-2 vaccination is as yet unclear. Adjuvants in the vaccines or crosstalk between the coronavirus spike protein target and antigens from thyroid cells may cause inflammatory or autoimmune reaction. In our cases, the fact that SAT occurred in two sisters points to the potential role of genetic predisposition, which remains to be further investigated. We present these cases in order to raise awareness of the possible association between the SARS-CoV-2 vaccination and

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**Table 1** Patient's biochemical parameters and thyroid functional tests

|   | Authors                           |                                   |                                   |  |  |                                   |
|---|-----------------------------------|-----------------------------------|-----------------------------------|--|--|-----------------------------------|
|   | Tekin et al                       |                                   | Oyibo S.O                         | Iremli et al   |  | Franquemont et al                 |
|   | Our cases                         | Case 1                            | Case 2                            | Case 1   | Case 2   | Case 3                            |
| Type of vaccine                                 | SARS-CoV-2 mRNA (Pfizer/BioNTech) | SARS-CoV-2 mRNA (Pfizer/BioNTech) | SARS-CoV-2 mRNA (Pfizer/BioNTech) | SARS-CoV-2 Vaccine (Vero Cell), Inactivated (CoronaVac®, Sinovac Life Sciences, Beijing) | SARS-CoV-2 Vaccine (Vero Cell), Inactivated (CoronaVac®, Sinovac Life Sciences, Beijing) | SARS-CoV-2 mRNA (Pfizer/BioNTech) |
| Time lag (vaccination to disease manifestation) | 12 d (after 1 <sup>st</sup> dose) | 4 d (after 2 <sup>nd</sup> dose)  | 18 d (after 2 <sup>nd</sup> dose) | 21d (after 1 <sup>st</sup> dose)   | 4d (after 2 <sup>nd</sup> dose)  | 5d (after 1 <sup>st</sup> dose)   |
| Age   | 35y.o                             | 32y.o                             | 67y.o                             | 55y.o  | 35y.o  | 34y.o                             |
| Symptoms  | Neck pain, fatigue, palpitations  | Neck pain, fatigue                | Fever, weight loss, neck pain     | Neck pain, swelling, headache, sore throat, palpitations, generalized aches              | Neck pain, palpitations  | Neck pain, fatigue, weight loss   |
| TSH   | ↓                                 | ↓↓                                | ↓↓                                | ↓  | →  | ↓↓                                |
| FT4   | ↑                                 | →                                 | ↑                                 | ↑  | →  | →                                 |
| Anti-TPO  | Negative                          | Negative                          | Negative                          | Negative   | Negative   | Negative                          |
| Anti-TG   | Negative                          | Negative                          | Negative                          | -  | Negative   | Negative                          |
| TRAB  | Negative                          | Negative                          | Negative                          | -  | Negative   | Negative                          |
| WBC   | →                                 | →                                 | -                                 | →  | →  | -                                 |
| ESR   | 75                                | 40                                | 134                               | 56,6   | 53   | 19                                |
| CRP   | 498                               | 10                                | 53,9                              | 87   | 100,5  | 6                                 |
| Type of therapy                                 | Prednisolone                      | Prednisolone                      | Ibuprofen                         | Ibuprofen, paracetamol, propranolol  | Methylprednisolone   | No treatment                      |

Abbreviations: TSH: → within n.v, ↓ 0.01–0.2 μIU/ml, ↓↓ <0.01 μIU/ml, FT4: → within n.v, ↑ increased, ↓ decreased, ESR n.v <20 mm/hr, CRP n.v. <5mg/L

thyroid disorders, in particular, subacute thyroiditis, so that early recognition of the condition can lead to successful management.

**Author contribution** All authors had access to the data and a role in writing the manuscript.

## Declarations

**Ethics approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from the individuals included in the study.

**Conflict of interest** The authors declare no competing interests.

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