

Recently, it has been suggested that endocrine disruption including the hypothalamic damage might be involved in the underlying mechanism. In the present study, we focused on male hypogonadism, called late-onset hypogonadism (LOH) syndrome. LOH syndrome causes fatigue and metabolic syndrome in middle-aged males. The aim of this study was to clarify the clinical characteristics of patients with LOH syndrome who visited our CAC outpatient clinic. We retrospectively reviewed medical records of all 39 male patients in whom serum free testosterone (FT) level was measured between February 2021 and November 2021 in our CAC outpatient clinic. As a result, 19 patients (48.7%) met the criteria for LOH syndrome (FT < 8.5 pg/mL; LOH group), and 14 (73.6%) of those patients were under the age of 50 years. A weak negative correlation was found between age and serum FT level ($R = -0.301$, $p = 0.0624$). A comparison of the LOH group with the non-LOH group showed that there were no significant differences in the patients' background factors including age (36.0 vs. 37.5 years), acute hospitalization (9 patients, 47.4% vs. 5 patients, 25.0%), and number of days between COVID-19 onset and CAC outpatient clinic visitation (71 vs. 81 days). There were also no significant differences in various laboratory parameters between the two groups. However, symptoms including anxiety, cough and hair loss were more frequent in the LOH group. Compared to the incidence of LOH syndrome in the general population, the present study revealed that there is a relatively high incidence of LOH syndrome in young patients with post COVID-19 condition. Although it is known that gonadal functions are impaired in the acute phase of COVID-19, hypogonadism is also thought to be related to the chronic phase of COVID-19. Leydig cells in the testis may be susceptible to damage by SARS-CoV-2 virus because of the high level of ACE2 receptor expression; however, the underlying mechanisms of LOH syndrome due to post COVID-19 condition have yet to be elucidated.

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Late-Onset Hypogonadism Detected in Young Male Patients Suffering From Post COVID-19 Condition

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At least one-third of post COVID-19 patients suffer from various chronic symptoms, defined by WHO as "post COVID-19 condition". However, the pathogenesis of post COVID-19 condition and its clinical course remain unclear. In February 2021, we set up an outpatient clinic specialized for COVID-19 after care (CAC) in Okayama University Hospital in Japan and we have investigated the clinical characteristics of patients with post COVID-19 condition. Our recent study revealed that general fatigue is the most common symptom in the post COVID-19 condition. Direct effects of viruses on each organ and conditions such as post-intensive care syndrome, post-traumatic stress disorder, and myalgic encephalomyelitis / chronic fatigue syndrome have been considered as possible etiologies.