Postural orthostatic tachycardia syndrome (POTS) and other autonomic dysfunction following COVID-19 infection: incidence, characteristic and associating factors

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Background: Long-COVID syndrome has become a new health concern. Many major clinical centers worldwide have experienced more patients with symptoms suggestive of autonomic dysfunction especially Postural Orthostatic Tachycardia syndrome (POTS). These patients were previously diagnosed with COVID19. However, there is lack of incidence and associating factors in Asian population.

Objective: This study investigated the incidence, associating factors and clinical features in patients with new-onset symptoms suggesting POTS or other autonomic disorders following COVID-19 infection.

Methods: We conducted a retro-prospective study to evaluate patients from COVID-19 outpatient clinic who have symptoms suggestive of POTS or other autonomic dysfunctions. These symptoms must last at least three months after PCR proven COVID 19 infections. Exclusion criteria were age < 18 years old, pregnancy and pre COVID-19 infection symptoms. Patients with symptoms severity score greater than two were assessed with blood tests, 24-hour Holter, 24-hour ambulatory blood pressure, echocardiogram and underwent head-up tilt table (HUTT).

Results: 793 patients were interviewed at a mean of 146±37 days after COVID-19 infection. Majority of patients are middle-aged female. 15 patients with symptoms severity score >2 were investigated. Out of those 15 patients, 12 have positive HUTT (1 demonstrating POTS, 10 neuro cardiogenic syncope, and 1 orthostatic hypotension). Among those positive HUTT patients, C-reactive protein (CRP) is significantly higher (OR 1.01; p-value 0.041). Fatigue and orthostatic intolerance are the two most complaint symptoms. All patients with positive HUTT have non dipping pattern on 24-hour ambulatory BP monitoring.

Conclusions: This study demonstrates incidence of 1.5% (12 out of 793) autonomic dysfunction and 0.1% POTS (1 out of 793) among post COVID-19 outpatient cases. Associating factor includes high CRP during infection. Most complaint symptoms are fatigue and orthostatic intolerance.

Patient flow diagram

Enrolled patients (N=793)

patients with VAS score > 2 (N=15)

POTS (N=1)

Vasovagal syncope (N=10)

Orthostatic hypotension (N=1)

Normal (N=2)

AF (N=1)

Fourteen out of fifteen patients with severity score more than 2 underwent HUTT with 1 demonstrating POTS, 10 with vasovagal syncope, 1 exhibiting orthostatic hypotension, and 2 with a normal respond. One patient was firstly diagnosed with AF.

VAS score = visual analog score, HUTT = head-up tilt table, POTS = postural orthostatic tachycardia syndrome, AF= atrial fibrillation
Figure 2 shows type and severity of symptoms described by (A) all patients (B) patients with positive HUTT.

Type and severity of symptoms