Delirium is an important syndrome in intensive care unit (ICU), and the pathophysiology is considered to be related to the systemic inflammatory process. It has been reported that the neutrophil-lymphocyte ratio (NLR) can be obtained relatively easily and can serve as a valuable marker for systemic inflammation [1]. Previous investigations have suggested that neutrophil-lymphocyte ratio (NLR) may be a marker of inflammation associated with delirium [2,3]. However, the studies included few patients with delirium, and did not examine the serial changes of this newly proposed inflammatory markers. Therefore, it is still questionable whether the inflammatory markers are truly related to delirium or it is more useful than traditional inflammatory markers like C-reactive protein (CRP).

A retrospective chart review was conducted for all patients admitted to ICU of Gangnam Severance Hospital, a tertiary referral hospital, from January 1, 2015 to December 31, 2016. In this ICU, confusion assessment method for ICU (CAM-ICU) was performed by nurses for all patients. For patients suspected of delirium by CAM-ICU, final delirium diagnoses were made according to the DSM-IV criteria at the time of daily rounding (10:00 AM) by psychiatrists. Delirium severity was also investigated by Korean version of Delirium Rating Scale (K-DRS). The patients who were diagnosed with delirium at least once during the ICU stay were classified into delirium group, and those who were not diagnosed with delirium at all were considered as non-delirium group. In delirium group, we found the lab results including neutrophil-lymphocyte ratio (NLR) and C-reactive protein (CRP) conducted on the day of ICU admission and on the day of delirium. If no lab results available on the day, we utilized the results performed within 24 hours. However, if there is no lab results available, we excluded the patients.

A total 1445 patients were found during the period, and finally 1292 patients were evaluated by psychiatrists. Among them, 396 patients were classified as delirium group, and 651 patients were considered as non-delirium group. 245 patients were continuously sedated patients during the ICU care. Among the patients with delirium, 198 patients (120 males, age: 67.39 ± 15.61) had whole WBC, NLR, and CRP data on the day or within 24 hours of admission and delirium.

After paired \( t \)-test, we found that NLR \( (t = 4.200, p < 0.001) \) and CRP \( (t = 2.738, p = 0.007) \) were significantly higher on the day of delirium \( (16.6 ± 15.0 \text{ and } 113.5 ± 86.2) \) than their initial admission day \( (11.8 ± 11.0 \text{ and } 93.3 ± 91.5) \). However, we could not find any significant difference in WBC results. When we focused on medical patients \( (n = 111) \) while excluding surgical patients \( (n = 87) \), significant differences in CRP disappeared as well.

We elucidated that NLR and CRP were increased in delirium state, suggesting that they could be potential biomarkers for delirium state. Our results also showed that delirium is closely related to the inflammatory response. It is suggested that NLR may be more effective in evaluating delirium-related inflammation than CRP in certain patient groups such as medical ICU patients.