Introduction:
Ventriculostomy-related infection (VRI) is a serious complication in patients with hemorrhagic stroke. In such patients, diagnosis of VRIs is complicated by blood contamination of CSF following ventricular hemorrhage. We aimed to evaluate the diagnostic potential of white blood cells count (WBC), C-reactive protein (CRP), and procalcitonin (PCT) to identify VRIs in patients with hemorrhagic stroke during the time of external ventricular drain (EDV) in situ.

Methods:
This retrospective study was conducted at the Neurosurgical-ICU, University Hospital of Zurich. A total of 347 patients with hemorrhagic stroke and an external ventricular drain (EVD) were admitted over a 6 years period at the ICU. Of those, 14 patients with VRIs (“VRI”), defined by positive CSF bacterial culture and increased WBC in CSF (>250/ul), and 115 patients without VRIs and with serial CSF sampling (“no-VRI”) were analyzed. Patients with CSF-contamination or suspected VRI (negative CSF cultures but antibiotic treatments) were excluded. WBC, CRP, and PCT were measured daily. CSF was sampled routinely twice a week or by T>38°C. For the analysis, mean peak values of WBC, CRP, PCT during the time of EVD in situ were compared between groups (t test). Data are expressed as mean with CI 95%.

Results:
Between groups, WBC and CRP were similar (WBC: 15.13 G/L and 14.55 G/L, p=0.68 and CRP: 115.93 mg/l and 129.44 mg/l, p=0.56 in the group VRI and no-VRI, respectively) (Figure 1, panel A and B). In the group VRI, PCT was low and significantly lower than in the group no-VRI (0.16 ug/l and 2.61ug/l, p=0.03 in the group VRI and no-VRI, respectively) (panel C). WBC in CSF were similar between groups (710.14/ul and 675.16/ul p=0.93 in the group VRI and no-VRI, respectively).

Conclusion:
In this study, serum-inflammatory markers were not able to screen patients with VRIs. Their routine measurement should be carefully evaluated.

Image:
Box-plots of WBC (panel A), CRP (panel B), and PCT (panel C) in the groups