Occupational stress

It is known that excessive levels of occupational stress affect professionals' technical and non-technical skills and surgeons are no exception. However, very few studies address this problem in neurosurgeons. A system for monitoring cardiovascular strain and autonomic imbalance during intracranial aneurysm procedures is proposed in order to obtain overall cardiac measures from those procedures. Additionally, this study also allowed to detect stressful events and compare their impact with the surgeon's own appraisal. Linear and nonlinear heart rate variability (HRV) features were extracted from surgeon's electrocardiogram (ECG) signal using wearable ECG monitors and mobile technology during 10 intracranial aneurysm surgeries with two surgeons. Stress appraisal and cognitive workload were assessed using self-report measures. Findings suggest that the surgeon associated to the main role during the clipping can be exposed to high levels of stress, especially if a rupture occurs (pNN20 = 0%), while the assistant surgeon tends to experience mental fatigue. Cognitive workload scores of one of the surgeons were negatively correlated with AVNN, SDNN, pNN20, pNN50, 1 V, 2 L V, SD2 and CVI measures. Cognitive workload was positively related with stress appraisal, suggesting that more mentally demanding procedures are also assessed as more stressful. Finally, pNN20 seems to better mirror behavior during stress moments than pNN50. Additionally, a sympathovagal excitation occurs in one of the professionals after changing to main role. The present methodology shows potential for the identification of harmful events. This work may be of importance for the design of effective interventions in order to reduce surgeons stress levels. Furthermore, this approach can be applied to other professions [1)].

1)
Pimentel G, Rodrigues S, Silva PA, Vilarinho A, Vaz R, Silva Cunha JP. A wearable approach for intraoperative physiological stress monitoring of multiple cooperative surgeons. Int J Med Inform. 2019 May 31;129:60-68. doi: 10.1016/j.ijmedinf.2019.05.028. [Epub ahead of print] PubMed PMID: 31445290.