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Title: How to assess sensorium in hypercapnic encephalopathy during NIV?

Dr. Raffaele 1393 Scala raffaele_scala@hotmail.com MD ¹, Dr. Uberto 1394 Maccari uberto.maccari@usl8.toscana.it MD ¹, Dr. Carmen 1395 Manta lacamme@yahoo.it MD ¹, Dr. Claudia 1396 Maggiorelli claudiamaggiorelli@gmail.com MD ¹ and Dr. Irene 1397 Di Pierro irenedipierro@libero.it MD ¹. ¹ Respiratory Ward and RIICU, S. Donato Hospital, Arezzo, Israel, 52100 .

Body: Aims. To compare the clinical usefulness of two different tools, Glasgow Coma Scale (GCS) and Kelly-Matthay score (KMS), for the neurological assessment of hypercapnic encephalopathy (HE) during NIV. Methods. We prospectively analysed 101 consecutive patients [age, mean (DS), 76.6 (8.41) yrs; COPD 61.4%; CWD 22.8%; CHF 9.9%; Neuromuscular disorders 5.9%) with HE [GCS, median (IQR 25-75), 9 (6-11); KMS 4 (3-5)] due to acute respiratory failure [(pH 7.23 (0.08); PaO₂/FiO₂ 174 (64), PaCO₂ 87.6 (20.3) mmHg] submitted to NIV in our RIICU in the yrs 2008-2010. Primary end-point: capability of earlier GCS/KMS changes (2-hours) to predict NIV failure; Secondary end-points: 1) sensitivity of GCS/KMS to the earlier (2-hours) and later (24-hours) changes of arterial blood gases (ABG) under NIV; 2) pulmonary and extra-pulmonary determinants of GCS/KMS at baseline. Results. Earlier changes in KMS (>20%) predicted NIV failure (p=0.026) while this is not the case for GCS. Earlier changes in pH and PaCO₂ were significantly correlated with those in KMS (p<0.01) but not with those in GCS, while later changes in ABG significantly correlated with those in both scores (p<0.0001). According to a multivariate analysis, both GCS and KMS showed a significant association with pulmonary (baseline pH) and extra-pulmonary determinants [non-respiratory component of APACHE III score, mean systemic arterial blood pressure, comorbidities ("acute" for GCS, "chronic" for KMS)]. Conclusions. The use of KMS resulted in greater clinical usefulness (correlation with outcome and with earlier ABG changes) than that of GCS to assess and monitor sensorium status in HE patients during NIV. Both scores are influenced by pulmonary and extra-pulmonary factors.