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Molecular correlates of neuroimaging findings in acute ischemic stroke: Early oxidative stress biomarkers of ischemic penumbra and infarct growth

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Oxidative stress is likely to play an important role in ischemic brain injury pathogenesis. Advanced neuroimaging may provide fundamental data on brain tissue viability in acute ischemic stroke (AIS). We sought to assess whether plasma biomarkers of oxidative stress predict diffusion-perfusion (DWI-PWI) mismatch and infarct growth (IG). We prospectively measured plasma F2-isoprostane (F2-isoP), total and perchloric acid Oxygen Absorbance Capacity (ORAC-TOT and ORAC-PCA), in consecutive AIS patients presenting within 9h of symptom onset. Mismatch was defined as baseline mean transit time (MTT) volume minus DWI volume (DWIV), and IG volume (IGV) as the difference between FIV and baseline DWIV. A percent mismatch cut-off of 20% was considered clinically significant. Mismatch >20% was present in 153/216 patients that, compared to those with 20% or no mismatch, have higher F2- isoP (p=0.15) and ORAC-PCA (p=0.02). Compared to those without IG, 170 patients with IG have higher levels of F2-isoP (p=0.009). Baseline F2-isoP significantly correlated with IGV (Spearman's rho=0.20, p=0.005) and FIV (Spearman's rho=0.19, p=0.009). In a multivariate binary logistic regression model, baseline F2-isoP emerged as an independent predictor of mismatch >20% (OR 2.44 95% CI 1.19-4.98; p=0.01) and IG (OR 2.57, 95%CI 1.37-4.83; p=0.007). In a multivariate linear regression model, F2-isoP was independently associated with IGV (B 0.38, 95%CI 0.04-0.72; p=0.03). ORAC-TOT significantly correlated with mismatch salvage volume (Spearman's =0.18, p=0.049) and mismatch salvage percentage (Spearman's =0.21, p=0.025). Elevated hyper acute plasma F2-isoP concentrations independently predict mismatch, IG and IGV in AIS patients. If validated in future studies, measuring plasma F2-isoP might be helpful in the acute setting to stratify patients for progression and relative severity of ischemic injury.

Biography

Svetlana Lorenzano has obtained her Medical School degree, Board in Neurology, and Ph.D. at the Sapienza University of Rome, Italy, and her European M.Sc. degree at the Danube University, Krems, Austria. She did Observership at the Heidelberg University, Germany and Oxford University, United Kingdom. She completed her Post-doctoral Research Fellowships at Massachusetts General Hospital and Harvard Medical School, Boston, USA. She has been doing research at the Sapienza University of Rome, Department of Neurology and Psychiatry. She has teaching and mentorship experience. She has extensive experience in international clinical trials. She has received awards and honors. She serves as official reviewer of international peer-reviewed journals, and is a member of the Editorial Board of an international journal. She is a member of scientific professional societies and of a Committee of one of these societies. She has authored articles for international peer-reviewed scientific journals, book chapters, proceedings of meetings and educational materials. She has presented several oral presentations and poster presentations at local meetings and national and international conferences.

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