

THE ASSOCIATION BETWEEN GEOMAGNETIC STORMS, SOLAR PARTICLE EVENTS AND HOSPITAL ADMISSIONS FOR FIRST MYOCARDIAL INFARCTION

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Background and Aims: Recent studies suggested that geomagnetic storms (GS) and Forbush decreases increase risk of myocardial infarction (MI), cardiovascular death, and stroke. One of products of eruption in the Sun is solar proton events (SPE). We analyze the association between GS, SPE and daily hospital admission for first MI.

Methods: We use daily number of all emergency admissions for first MI (I21), hospitalized in Kaunas University of Medicine clinic during 2004.01.01-2005.12.31. The daily geomagnetic activity we assessed by Ap indices; GS determine as minor or major storm: $Ap \geq 30$. The SPE define as proton $>10\text{MeV}$ energies fluency $> 864\ 000$ proton/($\text{cm}^2\text{-day-sr}$); daily proton fluencies are measured by satellite GOES and presented in NGDC database. Using Poisson regression we assessed risk of admission on MI with ST-elevation (STMI) and on MI non ST-elevation (NSTMI) in days of GS with SPE; GS and no SPE; no GS and SPE, compare with days (no GS and no SPE), controlling for seasonal variation, weekdays and meteorological factors.

Results: We analyzed data of 2 008 patients. STMI composes 1132 (56.4%) and NSTMI – 876 (43.6%) of total emergency admissions for first MI. Among patients with MI were 63% men and 52.7% older than 65 years age. During days of GS accompanied by SPE, the risk of admission on STMI increased in 37% (RR=1.37 95% CI 1.00-1.88). Two days after the GS with SPE, GS without SPE, SPE without GS, the relative risk of admission on NSTMI was respectively 1.41 95% CI 1.00-1.98, 0.92 95% CI 0.67-1.26 and 1.75 95% CI 1.26-2.43.

Conclusion: These data suggest that GS with SPE increase the risk of emergency admissions for MI; effect of these events show later for NSTMI. GS without SPE no affect on risk of emergency admission for MI. The SPE without GS increase the risk of NSTMI.