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ΣStent Thrombosis Related Acute Myocardial Infarction (SThAMI) In Changing Geomagnetic (GMA) And Cosmic Ray (CRA) Neutron Activity. PCI Data.

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Background. Acute myocardial infarction (AMI) may be caused by blood coagulation, inflammation, and atheroma rupture-fissuring, all of which are affected by environmental physical activity.
The aim of this study was to investigate if the occurrence of AMI due to stent thrombosis (SThAMI) is related to geomagnetic (GMA) and cosmic ray activity (CRA) on the day of the event.

Methods. The study group consisted of 1616 patients who underwent invasive coronary interventions for AMI in 2000-2008. Bare-metal stents were used in 1352 patients and drug-eluting stents in 191; 73 patients were treated without stenting. SThAMI developed in 60 of these patients (3.64%) who were treated by repeated PCI on the day of the event. The timing of the SThAMI events was investigated by levels of GMA (graded Io to IVo) and CRA (measured indirectly by neutron activity) on the same day. The physical data were derived from space science institutions in the USA, Russia, and Finland.

Results. There was a significant inverse correlation between SThAMI and daily GMA ($r=-0.98$, $p=0.018$). SThAMI was associated with relatively higher CRA . The ratio of lesions in the left anterior descending to right coronary arteries was inversely related to GMA. Drug-eluting stents were associated with more frequent SThAMI events than bare-metal stents ($p<0.0001$), though with a significantly longer time between first stenting and SThAMI ($p=0.017$).

Conclusion. The timing of SthAMI appears to be related to cosmophysical activity. Specifically, SThAMI events tend to occur on days of lower GMA and higher CRA, similar to primary AMI.