

Review Article

Pharmacotherapy in Changing Environmental Physical Activity (EPA). Preventive Measures

Eliyahu Stoupel

Division of Cardiology, Rabin Medical Center, Petah Tiqwa, Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

***Corresponding author:** Eliyahu Stoupel, Division of Cardiology, Rabin Medical Center, Petah Tiqwa, Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel, Tel: 972-97426439; Fax: 972-577-971684; Email: Stoupel@inter.net.il; EGStoupel@gmail.com

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Abstract

In recent year's many studies were published related to a number of cardiovascular pathologies and, also, to Space Weather effects on human health-a part of Clinical Cosmobiology. These studies are related to close associated Solar (SA) and Geomagnetic Activity (GMA) and their Antagonist Cosmic Ray (CRA) (Neutron) Activity. At days of extreme high (Stormy-IV0) GMA such risk factors like arterial blood pressure, blood coagulation parameters, markers of inflammation (CRP), some immune system signs are rising. SA is inverse correlated to CRA $r=-0.85$, $p=0.0001$; GMA/CRA= -0.66 , $p=0.0001$; and SA/GMA are related by $r=0.55$, $p<0.0001$. Such important pathologies like Acute Myocardial Infarction (AMI) and some its serious complications, Sudden Cardiac Death (SCD), life threatening cardiac Arrhythmias (VF, VT, VES, AF) are related to low GMA (or Zero GMA) and High CRA (Neutron Activity).

Aim: The aim of this study is to discuss, if the prescribed to patients pharmacotherapy must consider the mentioned links and adjust the drug doses to the EPA and adapt them to changing, especially extreme Space Weather events.

Methods: The basis for this study were many decades of clinical comparisons of medical events and their outcomes with daily, monthly, yearly Space Weather activity, concomitant laboratory test results; comparison of data related to different levels of Space Weather Activity and discussion of adopted pharmacotherapy, if its possible.

Conclusion

- Presented data show that at days of extreme Space Weather activity many risk factors of Cardiovascular Disease are changing their levels.
- The question is, if fluctuating, in accord to Space Weather prediction, drug dose can be effective
- At days of high CRA (Neutron) activity the use of artificial magnetic fields by high risk patients is a possibility worth to check.
- At the days higher CRA (Neutron) activity more active measures against air pollution are recommended.

Keywords: Arrhythmia; Acute;Cosmic Ray; Coagulation; Cardiac; Events;Geomagnetic; Inflammation; Neutron Activity; Pharmacotherapy.

Introduction or Background:

Human life is accompanied by a number of Space Weather energetic fields. The Sun and related Geomagnetic field activities

serve as shields against possible harmful effects of Cosmic Ray activity that in extreme cases overlap all known limits of our Planet accepted highest limits of energy (1019Electron-Volt.). Only the accepted now presumption that CRA has it's source close to our, but separate galactic black hole and prevent us from revision of many parts of physics [1-11]. Many studies published in the XX and XXI centuries deal with biologic effects of SA, GMA [12-

43]. Since 1989 a term of Clinical Cosmobiology was introduced presenting events of Clinical Medicine in the time of changing EPA- Space Weather [22,23]. Studies related to General Health tendencies, Cardiovascular, Congenital, Psychiatric, Neurologic, Pregnancy and Genetic related events, Newborn morbidity, Ophthalmology related pathologies, Traumatology (including traffic accidents) Emergency Medicine, different forms of Sudden Cardiac Death, Endocrinology and many other were published [12-58]. If in the first years the dominant place in these studies were SA and GMA effects, in the last decades their antagonist CRA (and their close “partners” high energy (more 90MEV) Proton flux are more and more studied. [2-6,36-41]. It’s presumed that CRA related colossal energies affect atoms at the borders of our galactic, pressing their electrons back into the nucleus and transforming them to Neutrons. This give a marker of CRA - Neutron activity on our Planet’s surface in impulse per minute (imp/min). As it was mentioned in the abstract studies of the last decades show the correlation levels of SA and GMA $r=0.55$; and inverse relationship to CRA (Neutron) activity: $SA/CRA = -0.85$; $GMA/CRA = -0.66$ [39-41,23]. In the last years medical events at days of Zero GMA (accompanied by higher CRA (Neutron) activity) were studied and at following days were studied, trying to see situation when the predominant Space Weather force close to us are the Neutrons [39,46] Table 1.

Differences in some risk factor markers and clinical course at days of extreme Space Weather (GMA,CRA) Activity. The following table presents significant cardiovascular risk factors and morbidity-mortality rise at highest (Stormy, IV0) days of GMA and at lowest (Quiet, I0) days of GMA accompanied by high Neutron activity,

GMA Stormy Days	Low GMA –High CRA-Neutron Activity
Blood Coagulation	Electrical Heart Instability
1.Prothrombin time $p=0.007$ (INR) $\uparrow 11.18\%$	I0/IV0 GMA APB's $\uparrow 31.57\%$; VPB's $\uparrow 25\%$
2. Platelets Count $p=0.002$ $\uparrow 24.33\%$	VT, VF I0/ IV0 GMA: $r=0.97$; $p=0.02$
3. Fibrinogen $p=0.002$ $\uparrow 11.18\%$	\uparrow (more) PAF, AMI, SCD.
4. Platelets Activity $p=0.001$ $\uparrow 8.633\%$	Cardiac Arrhythmia in 14.1% AMI pts . I0/IV0 GMA $r=0.96$; $p=0.01$
5. Basophyl's $p=0.003$ $\downarrow 63.33\%$	Implantable Cardioverter Defibrillator (ICD) Discharges for VT, VF at 9246 ± 299 imp./min. Daily average at 1995-2005 8865 ± 411 imp/min; I9/IV0 GMA $r=0.96$. $p=0.01$
Inflammation	Stroke (CVA) mortality- Neutron Activity $r=0.41$, $p<0.0001$; (n-132020)

1. \uparrow C-reactive Protein IV0/ I0 $r=0.96$; $p=0.039$;	
2. \uparrow Immunoglobulins M,G;	
3. \uparrow Anti cardio lipin Syndrome	
Arterial Blood Pressure:	
1. Systolic press. $\uparrow 4.06$; Diastolic press. $\uparrow 2.246$ mm Hg;	
2. Maximal Daytime \uparrow Systolic press. 5.56 mm Hg.	
3. \uparrow Diastolic press. 6.04 mm Hg.	

Table 1: some cardiovascular disease risk factors in extreme (high/low) daily space weather conditions. [23]

Discussion

So, we have two groups of medical events related to high GMA, related to higher blood coagulation, inflammation, higher arterial blood pressure and the second group related to Low (Quiet) GMA and higher CRA (Neutron) activity and connected with electrical heart instability, cardiac arrhythmia’s, sudden cardiac deaths, complications of intravascular atheroma (atherosclerotic plaque rupture, or fissuring (AMI), cerebral thrombosis and embolism or bleeding (CVA) [61-63]. How can Neutrons affect our body? It’s presumed that Neutrons, included our tissues (inhaling, or other ways) are joining the H+ Anions, transforming to Protons and attacking our inside located heart conduction system, intravascular Atheroma’s (rich by H+ Anions) [64,65]. Antagonists to the coagulation rising consequence are Anticoagulants (Warfarin-Coumadin, Heparin etc.), Antiplatelet drugs (Aspirin, Clopidogre-Plavix, Prasugrel, Tipigralor etc.), New Anticoagulants (NOAC) like Dabigatran etc. Many groups of antihypertensive drugs are used for prevention of high blood pressure related artery damage and bleedings (CVA), myocardial strain, hypertrophy and Heart Failure (Beta-blockers, Angiotensin Converting Enzymes Antagonists and their Receptor Blockers, Diuretics, Calcium Antagonists etc.). It’s of special importance in Diabetic patients, Dislipidemia suffering persons and other high risk groups. The question is, if some drug dose changes can be done having prediction of a strong GMA storm in the coming days. For example in anticoagulants, or antiplatelet drugs, antihypertensive treatment with blood pressure control that is today in available in many patients home.

As it was shown in a number of studies [27-31,33,35,37,39,40] higher GMA prevents a number of life threatening cardiac arrhythmias and connected SCD, One of the most popular cardiac events in all parts of the World. A relative short time ago it was shown that

under the influence of MRI (Magnetic Resonance Imaging) study (using magnetic field for diagnostics) the most untreatable Depression patients show improvement [59,60] in a number of studies; many MRI devices were transformed from diagnostic to therapeutic facilities. Cardiac arrhythmia in a big Mayo clinic arranged study (2016; ref.38) and in many our studies [36,39,46,56-58] it was confirmed that higher GMA prevents severe, life threatening cardiac arrhythmias. In our previous studies it was mentioned that artificial magnetic fields can be used in an attempt to prevent life threatening cardiac arrhythmias. It's the time to make such attempts. The dosage of antiarrhythmic drugs can also be revised.

The possibility that extreme changes of Space Weather activity are provoking some changes in Gene activity, regulating many sites of human homeostasis were also discussed [66].

The problem is that still people studying Space Climate are usually working isolated from clinicians, often are physicists, or physicians, isolated from clinical practice. On the other hand most physicians are not familiar with the Space Weather elements, and don't have data about the changing daily energetic spectrum. We send a note, that, maybe, such changes are worth to check. An additional question was raised referring to such risk factors of cardiovascular disease like CRA (Neutron) activity and air pollution: we don't know precisely how the CRA related Neutrons surrounding our planet, as a marker of this Space Weather component, are joining our body cells and tissues. One of the ways that can be supposed is the connection of the Neutrons to the fine particles (nanoparticles) of air pollution and together invading our respiratory and other systems. The possibility at days of higher Neutron (CRA) level to put more efforts for prevention of contacts with polluted air (respirators, air filtration and other possibilities, in addition to global efforts to drop air pollution) [67-70]. Discussing such possibilities we must also remember that high GMA (Stormy) and Quiet days (accompanied by higher Neutron activity) are in the last decades distributed unequal: Quiet days (with higher Neutron activity) in years 1983-2007 were 41.62%, Stormy – 4.38%, in 1995-2010, Quiet days 57.75%, Stormy -1.68% [21].

Conclusion

1. Presented data show that at days of extreme Space Weather activity many risk factors of Cardiovascular Disease are changing their levels.
2. The question is, if fluctuating, in accord to Space Weather prediction, drug dose can be effective
3. At days of high CRA (Neutron) activity the use of artificial magnetic fields by high risk patients is a possibility worth to check.
4. At the days higher CRA (Neutron) activity more active measures against air pollution are recommended.

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