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## Medicine Correspondence Blog

The Medicine Correspondence Blog allows authors to post Letters to the Editors, Reviews, and other editorial writings that are not considered original research.

Wednesday, November 25, 2015

### Letter to the Editor: Atrial Fibrillation and Gastroesophageal Reflux Disease: what about vice-versa? The arrow of time in medicine and biology

I read with great interest the hospital-based, retrospective, case-control observational study pointing out a possible link between Atrial Fibrillation (AF) and Gastroesophageal reflux disease (GERD) recently published in *Medicine*<sup>1</sup>. As it is clearly stated by the authors, several studies have shown a correlation between GERD and AF but, interestingly, the present study suggests an inverse relationship between AF and GERD, since it is designed to look at AF as a risk factor for GERD. Indeed, by taking into consideration the possible pathophysiological mechanisms properly listed in the study, it would seem more logical to endorse the inverse association, which is supported by another recently published article<sup>2</sup>, but it is this apparent contradiction that raises an important question on the use of time variable in contemporary medicine that I want to point out.

The availability of comprehensive clinical data, compiled less or more diligently during the hospitalization, allows the clinical researcher to force backward the arrow of time in search of possible causal links. This cheaper approach has often been criticized<sup>3</sup> for the possible sources of errors due to bias and confounding the are more common if compared with prospective studies<sup>4</sup>; furthermore, it must be admitted that a positive association between two diseases is more likely among hospitalized patients than in the general population simply because the subjects that require hospitalization have often a combination of clinical issues.

Time is the most intriguing variable in the universe as it affects irreversibly biological life, but, when dealing with diseases that are recurrent during time, as AF and GERD are, with a certain seasonality, any observation, forward or backward, can connect the two diseases according to a timeline that can, inevitably, vary depending on our point of view. For this I have prepared a naive explanatory drawing (Figure 1). Possibly we are still looking at the *etiological model* expecting a cause-effect relationship forgetting that we are definitively moving in a *multifactorial context* where the relationship between events is much more fluid and follows *non-linear dynamics*<sup>5</sup> and, often, misunderstanding the fact that in statistics correlation does not imply causation.

Michele M Ciulla, MD, PhD

Laboratory of Clinical Informatics and Cardiovascular Imaging; Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy; Cardiovascular Diseases Unit, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan (Italy).  
E-mail: [michele.ciulla@unimi.it](mailto:michele.ciulla@unimi.it)

"...believe the separation between past, present, and future is only an illusion, although a convincing one." Albert Einstein

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Posted by Tom Pacific at 7:59 AM

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