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Intracranial aneurysms: How can Ergodic hypothesis help to infer causality from cross-sectional studies?

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While the unruptured intracranial aneurysms (UIA) continue to be increasingly detected, both their chronological development and inherent mechanisms remain known poorly. More, both the low prevalence of aneurysms (~3%) in the general population and incidence of SAH (6 per 100000 patient-years), prevent standardization of any management strategy despite achievement of long follow-up terms (few decades) during which observational and interventional analytic study designs were carried away. Since it will hardly be possible to carry on such ambitious prospective studies in the future (low time at risk available is unworthy), there is a critical need to exploring new ways of extracting causality (time course of events) from inexpensive and immediately accessible descriptive study designs, hence offering much longer "time-at-risk periods" to registering larger number of event scenarios that might have possibly occurred.

In this paper, we discuss, in particular, how ergodic hypothesis might be used to infer causality from recent cross-sectional study based on 241 patients and 352 aneurysms (92 ruptured) recruited at hospital of Geneva. Verification of ergodic hypothesis, risk incidence, time course of predictors, strengths and weaknesses of the method will be presented.