

artery in length, the pulse strength, the rhythm, the regularity and also the weight of the pulse. The "Demand State" is assessed by the degree of arterial wall expansion in height and length, the velocity, the frequency and the weight of the pulse and also the temperature of the artery. Finally the "Vascular Wall Elasticity or Consistency" is also assessed by the degree of arterial wall expansion in width and the degree of its softness or firmness under the examining fingers [11]. These relations and indications may show a small portion of the complexity of Avicenna's pulsology.

In further articles we would like to discuss more interesting aspects of Persian Medicine's pulsology in relation to physiology and also pathology of diseases and to emphasize how Avicenna's pulsology may help to reveal the unknown etiologies of diseases such as the essential hypertension.

The authors of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology [12].

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Trends in publications on stress-induced cardiomyopathy

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Stress-induced cardiomyopathy (SIC) is an important differential diagnosis to acute myocardial infarction (AMI), as the patients present with chest pain, ST-T segment alterations and extensive myocardial wall motion abnormalities. The prevalence is unknown but SIC has been reported to be present in approximately 2% of patients presenting for emergency PCI [1,2]. So far, no large cohort studies have attempted to address the prognosis, etiology or epidemiology of SIC.

We performed a PubMed literature search of the terms "takotsubo", "tako-tsubo", "stress-induced cardiomyopathy", "stress cardiomyopathy" and "apical ballooning" between August 4 and 16, 2011. All case reports and prospective and retrospective case series that were published in English were included.

We included 1042 peer-reviewed articles (748 case reports) and found reports of 7621 SIC patients. An increasing amount of SIC-patients are reported each year ($p < 0.05$) (Suppl. Fig. 1). The reviewed material includes data published from 42 different countries (Suppl. Figs. 2 and 3). Although SIC was first described in Japan and originally thought to affect mainly elderly Asian women [3], our data show that SIC is prevalent worldwide. The top ten countries to report cases with SIC are USA, Germany, Italy, Japan, Sweden, France, Korea, Spain, Australia and Poland. Together these ten countries have reported more than 93% of all cases of SIC described in the literature to date. When plotted per capita, Sweden reports the most cases, followed by Italy, Germany and Iceland (Suppl. Figs. 4 and 5). These data indicate that SIC may be at least as common in the European and US populations as among Asian subjects but is of course related to local reporting practice. Our future research efforts should address, among others, the following questions. Are certain populations more prone to develop SIC? Are there specific genetic polymorphisms or mutations that predispose an individual to develop SIC, or that predispose to a more severe course of the disease? Could lifestyle differences explain potential differences in SIC incidence? Could social factors also be extended to partially explain the gender disparity?

89% of SIC patients in the reviewed material were women and patient age ranged from 0 to 97 years.

A preceding strong emotional stressor was more commonly reported in old (>55 years) compared to young (<35 years) patients. Other reported preceding events or conditions include vigorous exercise, pheochromocytoma, subarachnoid hemorrhage, seizure, other intracranial processes, post-operative pain, hyperthyroidism, alcohol

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withdrawal, invasive medical procedures, exacerbation of underlying non-cardiac disease, and sexual intercourse. Administration of sympathomimetics such as dobutamine, epinephrine, cocaine or metaamphetamine, were frequently described to have induced SIC, even including nasal decongestants.

Seven different patterns of myocardial dysfunction were described: apical akinesia with compensatory basal hyperkinesia presenting as the typical Tako-tsubo like apical ballooning, midventricular akinesia with preserved contraction in basal and apical regions (MLV variant), basal akinesia with hyperkinesia of the apex (inverted Takotsubo), global hypokinesia, biventricular involvement, isolated right ventricular dysfunction, and isolated lateral wall akinesia. The typical "Takotsubo-like" variant is reported in 87.32% of the cases reviewed. There is, however, a trend towards an increasing ratio of atypical to typical cases of SIC reported each year ($p < 0.05$) (Suppl. Fig. 6). Is the typical variant really the predominant type of stress-induced cardiac dysfunction or is it simply more easily detected? Could other types of SIC as well as milder forms of "apical ballooning" occur without being recognized in the population? With so many preceding events described to trigger SIC, it is possible that different degrees of transient SIC-like cardiac dysfunction may be rather common in the general population.

Patients with concomitant obstructive coronary artery disease (CAD), defined as angiographically estimated luminal stenosis of $>50\%$, were included in only 0.17% ($n = 13$) of the publications, likely reflecting a rather strict adherence to the Mayo criteria [4]. Today, there is considerable evidence for concomitant CAD and SIC [5,6]. Furthermore, any patient that dies acutely in SIC by definition cannot have "transient ventricular dysfunction" and may therefore not be diagnosed with SIC. Indeed, many of the reviewed publications used "reversible cardiac dysfunction" as inclusion criteria. The Mayo criteria may thus cause us to underestimate the severity of this disease. We propose the Gothenburg criteria:

1. Transient hypokinesia/dyskinesia in left or right ventricular segments and frequently, but not always, a stressful trigger (psychical or physical)
2. Absence of other pathological conditions (e.g. ischemia, myocarditis, toxic damage, tachycardia etc.) that more credibly explain the regional dysfunction.
3. No or modest elevation of cardiac troponin (i.e. disparity between the troponin level and the amount of dysfunctional myocardium).

The above criteria pertain to patients that survive the acute phase of SIC. In addition to these clinical criteria, it is of importance to establish (histological) criteria for diagnosing SIC in patients who do not survive the acute phase. Relevant clinical and histological criteria would allow for better design of clinical studies regarding SIC.

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