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EDITORIAL

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Vasovagal syncope or ventricular fibrillation. Your diagnosis better be accurate

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Studies in young populations show a strikingly high lifetime incidence of syncope. Two recent surveys of the frequency of syncope in medical students demonstrated that 20–25% of males and 40–50% of females reported to have experienced at least one such episode [6, 14]. The majority of the syncope triggers identified in these students involved stresses or conditions that affect orthostatic blood pressure control. Neurally mediated syncope was therefore likely a cause of the symptoms in these young subjects. The incidence peak of presumed neurally mediated syncope around the age of 15 years and the much higher incidence in young females is a consistent finding [4, 6, 7, 14]. A family history of presumed neurally mediated syncope in the first-degree relatives is often present in young fainting subjects [14]. Compared to the 30% incidence of presumed neurally mediated syncope in young medical students, the prevalence of epileptic seizures in a similar young age group is much lower (less than 1%) and syncope resulting from cardiac arrhythmias or structural heart disease, i.e., cardiac syncope, is even less common [4].

Emotional stress or pain and orthostatic stress in combination with symptoms and signs like sweating and nausea are classical symptoms of vasovagal fainting [18], but a classical presentation occurs in a minority of the cases. In the other patients less well-known stresses or conditions that affect orthostatic blood pressure control are involved and triggers and symptoms may vary between episodes in one patient [4, 6]. Nevertheless, without abnormalities at physical examination or on the electrocardiogram the diagnosis reflex syncope can safely be made [3].

Whenever malignant ventricular arrhythmias in the young age group are documented, a careful workup is mandatory and specific protocols should be followed. At young age these investigations should also be directed to relatively rare primary arrhythmia syndromes, including catecholaminergic polymorphic ventricular tachycardia (CPVT), the long QT syndromes and Brugada syndrome. Indeed, in victims of unexplained sudden cardiac death, screening of family members revealed evidence for the presence of a primary electrical disease in a substantial number of families [2, 17]. In the absence of any clear electrophysiological markers for these diseases, pharmacological tests can be used to unmask these syndromes [1, 9, 15]. In 'idiopathic' VF patients the incremental diagnostic value of the epinephrine and procainamide tests have been elegantly demonstrated by Krahn et al. [9]. In this study the additional diagnostic yield was 34%, five additional patients with CPVT and one Brugada syndrome patient were diagnosed [9]. Importantly, it should be noted that procainamide is not even the most potent drug in unmasking Brugada syndrome [1].

The patient described by Donnelly et al. in this issue of Clinical Autonomic Research [5] presenting with ventricular fibrillation (VF) should, despite the

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clear history of vasovagal syncope, have undergone this systematic workup. A normal transthoracic echo is insufficient to exclude discrete anatomical abnormalities (cardiomyopathies, among which arrhythmogenic right ventricular cardiomyopathy) and coronary anomalies (including coronary spasm) and primary electrical diseases are not or hardly addressed. Hence, the diagnosis 'idiopathic' VF cannot be made. Actually, CPVT is well possible given the (emotional) stress related events and the ventricular ectopy during atrial fibrillation with rapid ventricular rate (figure 2 in the manuscript). Furthermore, in all ECGs of this patient repolarization is abnormal. A minimum requirement therefore would have been an exercise test and, as stated above, additional pharmacological tests reveal a significant incremental number of diagnoses and would have been useful in this case [9]. In our view, none of the primary electrical diseases are presently excluded. This is even more important because two of the first degree relatives are symptomatic as well.

In the patient at hand, arrhythmias are only causally excluded in the last two described syncopal episodes (after ICD implant). In addition, it is also well conceivable that the majority of her earlier (prior to ICD implant) syncopal episodes were also related to an increase in vagal tone (vasovagal syncope). Yet, at least once a lethal arrhythmia was documented and it is tempting to speculate that vagal stimuli might be causally involved herein as well. Indeed, in Brugada syndrome patients, acethylcholine has been shown to increase the right precordial ST-segment amplitude [13] and thereby potentially the risk for life-threatening arrhythmias that are indeed, shown to be most prevalent in the early morning hours when vagal tone is highest [12]. Vagally-induced 'idiopathic' VF has been demonstrated in patients with characteristics of Brugada syndrome [8] and several case-reports have suggested an association between Brugada syndrome and vasovagal syncope [10]. Also in LQTS sudden changes in autonomic tone might be causal to arrhythmias because sudden changes in heart rate, also bradycardia, are pro-arrhythmic in various LQT syndromes [16]. CPVT is not related to increased vagal tone. These considerations also warrant a careful review of the patient with a diagnosis of vasovagal syncope after history taking, and an abnormal ECG. Because vasovagal syncope is as common a syndrome the chance of finding it as a comorbid condition is almost 40% of young patients with documented VF. Single episodes that are typical for VVS, next to episodes indicative of VF, can therefore never be used as an exclusion criterion for VF.

In conclusion, in this patient, vasovagal syncope and ventricular fibrillation coincide. The pressing question to address is whether these two conditions are related or not. A thorough cardiological work-up following predefined protocols is an absolute requirement to provide an adequate answer. In the interest of the patient and her family, the VF episode also necessitates active family screening including pharmacological testing in the family members, particularly in the two symptomatic sisters. Despite the fact that vasovagal syncope is very common and has also been reported to be familial [11, 14], this additional testing is mandatory before they can be reassured.

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