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Letter to the Editor

Neurological Disease Triggering Takotsubo Syndrome

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In a recent article, Morris *et al.,* presented a retrospective study of patients with acute neurological disease, who also experienced Takotsubo syndrome (TTS) (Morris, N.A. *et al.,* 2018). We have the following comments and concerns.

TTS has not only been reported in association with epilepsy, subarachnoid bleeding, ischemic, stroke, intracerebral bleeding, migraine, Guillain-Barre syndrome, and traumatic brain injury as mentioned in the article by Morris *et al.*,., but also in association with amyotrophic lateral sclerosis (Choi, S.J. *et al.,* 2017), mitochondrial disorder (Finsterer, J. *et al.,* 2007), thrombolysis of ischemic stroke (Kitagawa, T. *et al.,* 2018), non-convulsive status epilepticus (Uemura, J. *et al.,* 2016), zoster virus encephalitis (Bennett, L., & Iqbal, J. A. 2017), HLTV1-associated myelopathy (Yamanaka, S. *et al.,* 2017), myasthenia gravis (Battineni, A. *et al.,* 2017), Miller-Fisher syndrome (Gill, D. *et al.,* 2017), posterior reversible encephalopathy syndrome (PRES) (Grimaldi, S. *et al.,* 2017), syndrome of inadequate SDH secretion (Jha, K.K. *et al.,* 2016), transient global amnesia (TGA) (Sajeev, J. *et al.,* 2017), multiple sclerosis (Peller, M. *et al.,* 2016), baclofen withdrawal (Levy, J. *et al.,* 2016), post-anoxic encephalopathy (Batouche, D.D. *et al.,* 2016), Alzheimer's disease (Zuin, M. *et al.,* 2016), myotonic dystrophy type 1 (Fernández, A. M. *et al.,* 2016), acute disseminated encephalo-myelitis (Venkatraman, A. *et al.,* 2016), eclampsia (Gleich, S. J. *et al.,* 2016), delirium (Joy, P.S., & Kumar, G. 2015), panhypopituitarism (Plácido, R. *et al.,* 2016), entacarpone add-on (Baldacci, F. *et al.,* 2014), and botulism (Tonomura, S. *et al.,* 2017).

A main disadvantage of the study is that only ICD9 was applied. According to ICD10 the identifier for TTS is I51.81. Was this code also considered during the recruitment of patients with acute neurological disease and TTS? Due to ignoring the ICD10 system, a number of patients might have been missed during the search for appropriate patients.

Interestingly, the authors included hypertensive encephalopathy to the list of acute neurological disorders [1]. However, we do not regard hypertensive encephalopathy as "acute". It is a chronic disease developing due to chronic arterial hypertension. The authors may mean an acute hypertensive crisis, for example due to pheochromocytoma previously reported in association with TTS, but this is not an acute neurological disease.

A further shortcoming of the study is that only diagnoses at dismissal from the hospital were considered. Mentioning TTS with an acute neurological disease on the report does not mean that these diagnoses are causally linked, and does not clarify if there was a timely relation. A patient may have been admitted for ischemic stroke but may have developed TTS four weeks later due to a completely different trigger. Furthermore, TTS may have been the initial event leading to admission and the neurological disease may have developed long after TTS, thus excluding a causal relation. However, both may occur on the report of same hospitalisation.

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In summary, this interesting study could be more meaningful, if additional neurological disorders would have been considered as triggers of TTS, if the ICD10 codes for TTS would have been additionally used, and if the time relation between the neurological event and TTS would have been clarified.

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