

## FUNCTIONAL NEUROLOGICAL DISORDERS: THOSE BIZARRE AND PAINFUL DISCONNECTIONS BETWEEN BRAIN AND BODY

RAMPELLO LUIGI\*, VECCHIO IGNAZIO\*\*, MALAGUARNERA MICHELE\*\*\*, CHISARI CLARA GRAZIA\*, RAMPELLO LIBORIO\*

\*G.F. Ingrassia, Neurosciences Department, A.O.U. Policlinico-V. E., University of Catania, \*\*Department of Medical and Pediatric Sciences - \*\*\*Senescence Research Center, University of Catania

### ABSTRACT

*Functional neurological disorders have been a subject of scientific and neurological interest and debate for over a century. The variability of clinical manifestations make difficult the clinical and laboratory evaluation, and hence have a negative impact on the pathophysiological interpretation of the condition. Considering the significant frequency of the condition and the great effort necessary for diagnosis, there has been increased attention by researchers in recent years to better understand the causes and determine treatment. This paper describes the many labels used in the literature over time to define the condition, along with the clinical and laboratory characteristics of functional neurological disorders, including our personal experience, to recognize and as far as possible treat the condition.*

**Key words:** psychogenic, functional, conversion, somatoform disorders, hysteria

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### Introduction

The distinction between organic and functional clinical presentations is neither simple nor obvious, involving a significant effort to study the case along with the relative costs to the health care system<sup>(1,2)</sup>. Psychogenic disorders are considered those whose clinical presentations have no demonstrable organic alterations: hematological, neurophysiologic, neuro-radiological, or neuropathological. Psychogenic disorders include “conversion” (DSM-IV)<sup>(3)</sup>, hysteria, psychosomatic, “without cause”, psychogenic, pseudo-seizures (not epileptic or febrile)<sup>(4)</sup>, functional syndromes<sup>(5)</sup>, depending on their symptoms.

A preliminary distinction must be made for the so-called somatization symptoms, which in contrast to conversion/functional disorders include only clinical conditions with one or more somatic manifestations involving the vegetative nervous system provoked by environmental or internal factors either real or imagined, as a way to adapt to various stressors.

From that point it's no longer possible to make a sharp distinction between disorders primarily involving the sympathetic nervous system or the parasympathetic system, defining those conditions as autonomic dysfunction, amphotony<sup>(6)</sup>.

Among the sympathicotonic forms we must include tachycardia, arrhythmia, weight loss, hyperactivity, insomnia; among the parasympathicotonic forms we include hyper-hydrosis, the tendency toward bradycardia, aerophagia, gastrointestinal disorders (gastritis, gastroenteritis, diarrhea), or respiratory disorders (shortness of breath, bronco-spasm). All these conditions are associated with a state of persistent anxiety and possible acute crises or critical seizures<sup>(7)</sup>.

### Functional neurological disorders

In true functional neurological disorders the involvement of autonomic dysfunction is not demonstrable and the symptoms seem somatic ( sensory

and/or motor) or cognitive: local or general asthenia or hypoasthenia, hypo- or anesthesia, paresthesia, pain, more or less selective amnesia disorders, difficulty recognizing, perception disorders (visual, auditory, olfactory), phonatory. It is clear that a diagnosis of functional neurological disorder must be the last considered, after excluding any organic etiopathogenesis; without the current costs incurred by the health care system it isn't possible to exclude all other clinical conditions. Despite the caution in daily clinical study, there remains a certain percentage of error in diagnosis, mistaking organic conditions as functional or vice versa, with the treatment, prognostic, and legal consequences.

Whoever is familiar with psychogenic pathology has no difficulty understanding the frustration that the physician feels during diagnosis and treatment, in the absence of reliable criteria to recognize therapeutic opportunities. The physician's emotional frustration may itself appear to steer into a diagnosis of psychogenic disorder. Here are some other aspects of the diagnostic guidelines to consider:

- Gender of the patient, since females are more affected by functional pathology<sup>(8,9)</sup>.
- No age group is excluded, although young people seem to be more often affected, but rarely before age 6<sup>(8)</sup>.
- No socioeconomic category is excluded, but the most disadvantaged seem more often affected<sup>(10)</sup>.
- There seems to be pathoplastic influence considering socioeconomic or cultural differences, and a century ago fainting was one of the most common manifestations but has become less common today.
- Concerning the patient's personality characteristics, those who tend to be theatrical, eccentric, always attention-seeking, all of which don't occur in isolation or at night, indicate a psychogenic origin.
- A general observation in such patients is that symptoms are intermittent, with severity and duration varying over time according to certain difficult periods in the patient's life, even in the past, that can cause depression or anxiety.
- The patient is unaware of the functional nature of her symptoms, and when informed seems reluctant to accept such an interpretation of her condition, claiming to be mentally normal and healthy<sup>(11,12)</sup>.
- The symptoms are not voluntarily and intentionally expressed by the patient as in the case of shamers<sup>(13)</sup>.
- A characteristic that such patients seem to share is the tendency to present a clinical picture aimed at attracting the attention of doctors, with

increased attention from the family (secondary gain).

- The symptoms are polymorphic, with significant variability between individuals and in the same individual in the periods of illness.
- The psychodynamic interpretation inspired by Freud, which attempts to understand the symptoms as a "conversion" of an unconscious psychic conflict to avoid the suffering of consciously accepting the conflict, is still difficult to evaluate. But it contributes to understanding the apparent foreignness of the somatic symptoms to the patient (apparent disconnection between brain and body).
- The statistical frequency of functional disorders in current clinical practice is rather high, approximately 20% of all neurological pathology, according to the data in English-speaking countries<sup>(6,14)</sup>.
- It's useful to keep in mind that manifestations of somatic conversion can sometimes coexist or alternate with organic conditions, such as epileptic and pseudo-epileptic seizures<sup>(15,16)</sup>.
- It is difficult to explain the kinds of symptoms that appear (motor or sensory dysfunction, cognitive or balance problems, gait). Only in a few cases do such symptoms originate in prior personal or family experiences in the patient's past. The patient's own opinions and fears are often useful for clinical interpretation of the disorder and choice of eventual therapy.
- The organic pathologies most likely to be mistaken for functional disorders are the result of neuromuscular junction disease, multiple sclerosis, epilepsy, syncope pathology, extrapyramidal disease, brain tumors, cerebral vascular diseases, psychiatric, neurodegenerative and neuromuscular disease<sup>(17,31)</sup>(Table 1).
- Differential diagnosis of functional disorders is necessary when there are manifestations of epileptic seizures and syncope episodes. Keep in mind that functional symptoms never occur when the patient is alone or during the night, the face is not altered, the seizures last longer and never include biting the tongue or sphincter incontinence, there is no loss of consciousness, nor tissue trauma or wounds. Functional symptoms are often associated with bilateral benign blepharoclonus and plantar areflexia<sup>(32,33)</sup>, resistance to passive opening of the eyelid, possible crying, shouts, self-injury or incoherent gesticulations, unpredictable and often indescribable, no ECG alterations are observed between seizures nor post-seizure confusion<sup>(34)</sup>.

- The American Epilepsy Society (2010) stated that bizarre complex automatisms can occur with frontal lobe seizures, frontal lobe seizures may have bilateral convulsive movements without impairment of consciousness, post-ictal confusion is often absent after frontal lobe seizures, aggressive and emotional behavior can occur after epileptic seizures. In some cases psychogenic seizures alternate with true epileptic seizures in the same patient.

- It should be possible to interrupt any manifestations of a functional disorder by distracting the patient through maneuvers that are incompatible with the symptoms: Finger Tap Test, complex mental calculation, or contralateral motor task.

- Despite the considerable effort of researchers to understand the physiological mechanisms underlying the process of somatic conversion, currently there are insufficient data to interpret the various functional syndromes, although recent evidence tends to support the hypothesis of possible cerebral alterations<sup>(33,35-38)</sup>.

•	Neuromuscular junction diseases
•	Epilepsy
•	Syncope
•	Multiple sclerosis
•	Brain tumors
•	Psychiatric diseases
•	Malingering
•	Extrapyramidalopathy
•	Cerebral vascular disease
•	Neurodegenerative disease
•	Gait disorder
•	Myelopathy
•	Neuromuscular disease
•	Visual disorders
•	Iatrogenic disorder

**Table 1:** Organic pathology mistaken for functional disorders.

- The effective role of the psychotherapeutic approach is still unclear, despite being widely used<sup>(39-43)</sup>.

- Pharmacological treatment has achieved effective outcomes in some clinical trials<sup>(44)</sup>, and promising results of magnetic stimulation are reported in the literature<sup>(45,46)</sup>.

- In our experience improvement compared to placebo has been achieved with drugs clearly hyperprolactinemic, such as benzamide substitutes, in association with anxiolytics or antidepressants drugs, with significant results, sometimes sufficiently effective to induce a true dependence on hyperprolactinemia syndrome<sup>(47-49)</sup>.

### Conclusions

Despite the widespread existence of “functional” disorders throughout the world, and the notable scientific literature produced for over a century, currently there is no conclusive data to interpret the pathophysiology and appropriate treatment.

As in many other diseases that affect human beings, functional neurological manifestations may support the idea of a constitutional predisposition that coincides with certain periods or stressful life experiences (abuse, disappointment, grief, offense, loss, whether real or imagined). Thus symptoms may appear to be unpredictable, polymorphous, fluid and mutable, with partial or full remission possible. The constitutional element that we consider most likely in generating such symptoms is the histrionic or theatrical personality with a tendency to eccentricity, suggestibility, emotional immaturity, and attention-seeking (in the family, school and at work). The tendency to seek the secondary benefits of disease, encourages the persistence of symptoms despite the efforts of the physician (general practitioner, psychotherapist, psychiatrist, neurologist, rehabilitation specialist). It becomes a way of being and responding to stimuli.

The growing interest in “functional” disorders is justified by the frequency of the pathology and the need to differentiate it from organic disease. Healthcare systems endure significant costs in excluding other diagnoses, as well as providing scarce hospital beds needed for patients with more serious diseases. More effective treatment is needed to heal patients and improve their quality of life as well as that of their families. Neurologists have a great interest in better treatment since they are often the first called for diagnosis and treatment.

## References

- 1) Espay AJ, Goldenhar LM, Voon V, Schrag A, Burton N, Lang AE. *Opinions and clinical practices related to diagnosing and managing patients with psychogenic movement disorders: an international survey of movement disorder society members*. *Mov Disord* 2009; 24: 1366-74.
- 2) Mark J Edwards, Kailash P Bhatia *Functional (psychogenic) movement disorders: merging mind and brain*. *Lancet Neurol* 2012; 11: 250-60.
- 3) APA. *Diagnostic and statistical manual of mental disorders: DSM-IV*. Washington, DC: American Psychiatric Association; 2014.
- 4) Scull DA. *Pseudoseizures or non-epileptic seizures (NES); 15 synonyms*. *J Neurol Neurosurg Psychiatry* 1997; 62(2): 200.
- 5) Carson AJ, Brown R, David AS, Duncan R, Edwards MJ, Goldstein LH, Grunewald R, Howlett S, Kanaan R, Mellers J, Nicholson TR, Reuber M, Schrag AE, Stone J, Voon V; UK-FNS. *Functional (conversion) neurological symptoms: research since the millennium*, *J Neurol Neurosurg Psychiatry*. 2012 Aug; 83(8): 842-50.
- 6) RON MA, *Somatisation in neurological practice*, *Journal of Neurology, Neurosurgery, and Psychiatry* 1994; 57: 1161-1164.
- 7) Bodde, N. M. G., Brooks, J. L., Baker, G. A., Boon, P. A. J. M., Hendriksen, J. G. M., Mulder, O. G., & Aldenkamp, A. P. *Psychogenic non-epileptic seizures-definition, etiology, treatment and prognostic issues: a critical review* 2009. *Seizure*, 18(8), 543-553.
- 8) Maloney MD. *Diagnosing hysterical conversion reactions in children*. *J Paediatr* 1980; 97: 1016-20.
- 9) Rosenbaum M. *Psychogenic seizures-why women?* *Psychosomatics* 2000; 41: 147-9.
- 10) Escobar JI, Canino G. *Unexplained physical complaints. Psychopathology and epidemiological correlates*. *Br J Psychiatry* 1989; 154 (suppl 4): 24-7.
- 11) Shen W, Bowman E, Markand O. *Presenting the diagnosis of pseudoseizures*. *Neurology* 1990; 40: 756-9.
- 12) Farias ST, Thieman C, Alsaadi TM. *Psychogenic nonepileptic seizures: acute change in event frequency after presentation of the diagnosis*. *Epilepsy Behav* 2003; 4: 424-9.
- 13) Voon V, Gallea C, Hattori N, et al. *The involuntary nature of conversion disorder*. *Neurology* 2010; 74: 223-8.
- 14) Schiffer RB. *Psychiatric aspects of clinical neurology*. *Am J Psychiatry* 1983; 140: 205-7.
- 15) Galimberti CA, Ratti MT, Murelli R, Marchioni E, Manni R, Tartara A. *Patients with psychogenic nonepileptic seizures, alone or epilepsy-associated, share a psychological profile distinct from that of epilepsy patients*. *J Neurol* 2003; 250: 338-46.
- 16) Benbadis SR, Agrawal V, Tatum WO. *How many patients with psychogenic nonepileptic seizures also have epilepsy?* *Neurology* 2001; 57: 915-7.
- 17) Rampello, L., Buttà, V., Raffaele, R., Vecchio, I., Battaglia, G., Cormaci, G., & Alvano, A. (2005). *Progressive supranuclear palsy: a systematic review*. *Neurobiology of disease*, 20(2), 179-186.
- 18) Rampello, L., Alvano, A., Battaglia, G., Bruno, V., Raffaele, R., & Nicoletti, F. (2006). *Tic disorders: from pathophysiology to treatment*. *Journal of neurology*, 253(1), 1-15.
- 19) Rampello, L., Alvano, A., Battaglia, G., Raffaele, R., Vecchio, I., & Malaguarnera, M. (2005). *Different clinical and evolutionary patterns in late idiopathic and vascular parkinsonism*. *Journal of neurology*, 252(9), 1045-1049.
- 20) Rampello, L., Nicoletti, F., & Nicoletti, F. (2000). *Dopamine and depression*. *CNS drugs*, 13(1), 35-45.
- 21) Rampello, L., Malaguarnera, M., Rampello, L., Nicoletti, G., & Battaglia, G. (2012). *Stabbing headache in patients with autoimmune disorders*. *Clinical Neurology and neurosurgery*, 114(6), 751-753.
- 22) Rampello, L., Casolla, B., Rampello, L., Pignatelli, M., Battaglia, G., Gradini, R., & Nicoletti, F. (2011). *The conditioned eyeblink reflex: a potential tool for the detection of cerebellar dysfunction in multiple sclerosis*. *Multiple Sclerosis Journal*, 17(10), 1155-1161.
- 23) Migliore, M., Vecchio, I., Rampello, L., Borrata, F., Astuto, M., Rampello, L. (2012). *Multidisciplinary approach of non-thymomatous myasthenia gravis*. *Acta Med Medit*, 28(3), 211-213.
- 24) Migliore M, Alongi G, Rampello L, Astuto M. *Video assisted trans-cervical thymectomy: a minimally invasive approach to treat non-thymomatous myasthenia gravis*. *Ann Ital Chir*. 2013 Nov-Dec; 84(6): 667-70.
- 25) Rampello L., Ruggieri M., Vecchio I., Battaglia G., Chisari C.G., Malaguarnera M., Zelante G., Catalano A., Rampello L. "Astenia: una maschera per tante identità. Ruolo della patologia della placca neuromuscolare" *Acta Medica Mediterranea*, 2011, 27: 163-8.
- 26) Rampello, L., Ruggieri, M., Vecchio, I., Battaglia, G., Chisari, C. G., Malaguarnera, M., Rampello, L. (2011). *Amyotrophic lateral sclerosis: differential diagnosis with cervical myeloradiculopathy*. *Acta Medica Mediterranea*, 27(3), 149-152.
- 27) Zelante, G., Catalano, A., Ricceri, R., Rampello, L., Rampello, L. (2012). *La demenza vascolare sottocorticale: luci ed ombre*. *Acta Medica Mediterranea*, 28, 45-52.
- 28) Rampello, L., Vecchio, I., Battaglia, G., Malaguarnera, G., & Rampello, L. (2012). *Diabetic neuropathy. Elements of epidemiology and pathophysiology*. *Acta Medica Mediterranea*, 28, 219.
- 29) Rampello, L., Vecchio, I., Malaguarnera, M., Rampello, L. (2012). *Parkinsonism with cognitive impairment*. *Acta Medica Mediterranea*, 28, 123-125.
- 30) Rampello L, Vecchio I, Malaguarnera M, RAMPELLO L (2012). *Diabetic neuropathy. Diagnosis*. *Acta Medica Mediterranea*, vol. 28, 133-138.
- 31) Rampello L, Vecchio I, Malaguarnera M, Malaguarnera G, Rampello L (2012). *Parkinson's disease: knowing it to recognize it*. *Acta Medica Mediterranea*, vol. 28, p. 113-116
- 32) Rampello L, Vecchio I, Migliore M, Malaguarnera M, Rampello L. *Multidisciplinary Approach For The Diagnosis of Neurogenic Vasovagal Syncope*. 2012 *Acta Medica Mediterranea*, vol. 28, 207-210.
- 33) Rampello L, Battaglia G, Rampello L, Malaguarnera M., *Bilateral benign blepharoclonus*, *Clin Neurol Neurosurg*. 2009 Jun, 111(5): 480-1.
- 34) Leis AA, Ross MA, Summers AK. *Psychogenic seizures: ictal characteristics and diagnostic pitfalls*. *Neurology* 1992; 42: 95-9.

- 35) Mailis-Gagnon A, Giannoylis I, Downar J, et al. *Altered central somatosensory processing in chronic pain patients with “hysterical” anesthesia*. *Neurology* 2003; 60: 1501-7.
- 36) Ghaffar O, Staines WR, Feinstein A. *Unexplained neurologic symptoms: an fMRI study of sensory conversion disorder*. *Neurology* 2006; 67: 2036-8.
- 37) Voon V, Brezing C, Gallea C, et al. *Emotional stimuli and motor conversion disorder*. *Brain* 2010; 133: 1526-36.
- 38) van der Kruijs SJ, Bodde NM, Vaessen MJ, et al. *Functional connectivity of dissociation in patients with psychogenic non-epileptic seizures*. *J Neurol Neurosurg Psychiatry* 2012; 83: 239-47.
- 39) Carton S, Thompson PJ, Duncan JS. *Non-epileptic seizures: patients’ understanding and reaction to the diagnosis and impact on outcome*. *Seizure* 2003; 12: 287-94.
- 40) Goldstein LH, Deale AC, Mitchell-O’Malley AJ, Toone BK, Mellers JD. *An evaluation of cognitive behavioral therapy as a treatment for dissociative seizures: a pilot study*. *Cogn Behav Neurol* 2004, 17(1): 41-9.
- 41) Rusch MD, Morris GL, Allen L, Lathrop LA. *Psychological treatment of nonepileptic events*. *Epilepsy Behav* 2001; 2: 277-83.
- 42) Goldstein LH, Chalder T, Chigwedere C, et al. *Cognitive-behavioral therapy for psychogenic nonepileptic seizures: a pilot RCT*. *Neurology* 2010;74:1986-94
- 43) Sharpe M, Walker J, Williams C, et al. *Guided self-help for functional (psychogenic) symptoms: a randomized controlled efficacy trial*. *Neurology* 2011; 77: 564-72.
- 44) LaFrance WC Jr, Keitner GI, Papandonatos GD, et al. *Pilot pharmacologic randomized controlled trial for psychogenic nonepileptic seizures*. *Neurology* 2010; 75: 1166-73.
- 45) Chastan N, Parain D. *Psychogenic paralysis and recovery after motor cortex transcranial magnetic stimulation*. *Mov Disord* 2010; 25: 1501-4.
- 46) Chastan N, Parain D, Verin E, et al. *Psychogenic aphonia: spectacular recovery after motor cortex transcranial magnetic stimulation*. *J Neurol Neurosurg Psychiatry* 2009; 80: 94.
- 47) Rampello, L., Nicoletti, G. *The withdrawal syndrome from H2-receptor blocking agents: Possible role of hyperprolactinaemia* *Medicina, Rivista dell’Enciclopedia Medica Italiana*, 10 (3) 294-96.
- 48) Rampello L., Nicoletti G., Drago F. *The dopaminergic hypothesis for hysterical neurosis-conversion type: a study with Sulpiride, Haloperidol and Amineptine*; *Acta Therapeutica*, Vol. 17, 2, 195-202 , 1991.
- 49) Rampello L., Raffaele R., Nicoletti G., Le Pira F., Malaguarnera M., Drago F. *“Hysterical neurosis of the conversion type: therapeutic activity of neuroleptics with different hyperprolactinemic potency”*. *Neuropsychobiology*, 33 (4), 186-188, 1996.

Corresponding author  
RAMPELLO LIBORIO  
(Italy)