



Clinical Study

Functional neurological disorders in outpatient practice: An Australian cohort

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ABSTRACT

Functional disorders are defined as neurological symptoms without causative organic pathology identified. They are a diverse and often neglected group of disorders. The aim of this was to determine the incidence and outcome of functional neurological disorders in an Australian neurology practice. Over a 17 month period, all patients presenting to a single outpatient neurology service were evaluated to determine the incidence and outcome of these disorders. A total of 884 patients were assessed and of these, 137 had a final diagnosis of functional neurological illness, equating to an incidence of 15% of all patients seen. Functional disorders were the third most common presentation overall. Patients with functional disorders were younger, more likely to be female and had a higher rate of current psychiatric comorbidity compared to other neurology patients. Sensory symptoms were the most common manifestation (48%) followed by limb weakness (37%) and psychogenic non-epileptic seizures (14%). Outcome information was available for 49% of patients at an average of 3 months follow-up. 45% had some improvement in their symptoms, 43% had static symptoms and 12% had worsening of symptoms. This study confirms the high incidence of functional disorders in outpatient neurology practice. Early improvement was seen in a substantial proportion of patients and is influenced by duration of symptoms.

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1. Background

Functional neurological disorders are generally defined as neurological symptoms or signs without a clear structural or organic basis, and are commonly encountered in both inpatient and outpatient practice. Functional disorders have alternatively been known as psychogenic or medically unexplained symptoms and the correct terminology is still a matter of debate. The *Diagnostic and Statistical Manual Fifth Revision* (DSM-V) definition of conversion disorder is applicable to some of these presentations. Functional disorders encompass a broad range of symptoms from mild anxiety over transient physiological phenomena to non-epileptic status epilepticus. The frequency of functional disorders has been reported to be between 15–30% of all neurology outpatient presentations [1,2]. Despite the lack of clear organic pathology, affected patients incur high health costs and not uncommonly develop long term disability [3]. Symptoms persist or worsen in 40–66% of patients at long term follow-up [4–6]. Diagnosis of these conditions is often hampered by a fear of missing organic pathology, and by a tendency to strive to make a

diagnosis rather than to label a patient as “functional”. Some patients will see many clinicians before a diagnosis is made, during which time they may be subject to extensive investigations and a delay in treatment. Management is often challenging, particularly in patients with longstanding symptoms. We undertook a study of all outpatient functional presentations to a single centre to determine their frequency, associations and outcome.

2. Methods

A prospective collection of all patient records was undertaken at a single neurology outpatient clinic over a 17 month period (22 August 2011 to 12 January 2013). This was a consultant led clinic with the vast majority of referrals from general practitioners. Demographic and clinical data was collected for and patients were categorised according to their neurological presentation. Presentations were subdivided into broad neurological categories (such as headache, vertigo, epilepsy, cerebrovascular disease). Those with functional neurological disorders were selected for further analysis to determine duration of symptoms, clinical presentation and outcome. The definition of a functional presentation was broad and included those patients whose symptoms were not in keeping with a known neurological cause and had inconsistent or incongruent

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examinations coupled with normal investigations. Where possible all relevant investigations were ordered or already available for analysis prior to confirming the diagnosis. Should important abnormalities have been found on investigations or examination at follow-up, the diagnosis was revised to a more appropriate category. Patients with headache disorders and vertigo or dizziness were intentionally excluded from this definition as the diagnosis of these presentations is much more open to interpretation. Pre-existing psychiatric disorders (as determined by a psychiatrist) were taken into account when assessing patients. These included the DSM-V depressive disorders, anxiety disorders, bipolar disorders, schizophrenia and personality disorders. The rates of these were compared to the control population. Those with pre-existing somatic symptom disorders or conversion disorders were excluded from analysis. Outcome was measured at last follow-up over the study period. Those patients with any degree of improvement were classified as improved and those without improvement were labeled either static or worse. Outcomes were based on patient reporting and neurologist examination findings. Statistical analysis was performed using Minitab version 17 (Minitab, State College, PA, USA). Tests of significance were performed using Welch's t-test.

This study has been approved by the appropriate human research ethics committee.

3. Results

Over a 17 month period, a total of 884 patients presented for neurology assessment. Of these, 137 (15%) were classified as having a functional neurological disorder. This was the third most common presentation overall after headache and movement disorders (Fig. 1). Seventy-one percent of functional patients had neuro-imaging and 49% had neurophysiological investigations.

Compared to other neurology presentations, functional disorders had a significantly younger average age (45 versus 56 years, $p < 0.0001$, Table 1) and significantly higher proportion of females (75% versus 56%, $p < 0.0001$). Patients with functional disorders also had a significantly higher rate of current psychiatric disorders (11% versus 4%, $p < 0.01$). The age of presentation ranged from 16 to 80 years.

In terms of presentation, the most common symptom was sensory abnormalities, which were present in 48% ($n = 66$) of functional cases (Table 2). Functional limb weakness (37%, $n = 51$) was the second most common presentation, and psychogenic non-epileptic seizures (PNES) was third (14%, $n = 19$). Patients with PNES had a significantly younger average age than other functional presentations (38 versus 46). Most PNES presentations were investigated with electroencephalography (EEG) (12/19) and two had inpatient video telemetry recordings. Three patients with PNES had witnessed attacks in clinic. Reassuringly, patients with cognitive presentations were not significantly older compared to other presentations and the oldest presentation in the cohort was for sensory complaints. Multiple symptoms were present in 24% ($n = 33$) of patients. Significant pain (with no clear cause) associated with functional symptoms was present in 27% ($n = 37$) of patients.

Forty-seven percent ($n = 59$) of functional patients had their symptoms for less than 6 months and 26% ($n = 33$) of patients had symptoms for 2 years or more. There were no significant differences between the type of presentation and duration of symptoms.

Outcome data was available for 49% ($n = 67$) of patients with an average follow-up of 3 months. At the end of follow-up, 43% ($n = 29$) of patients had improvement in their symptoms or signs. Forty-five percent ($n = 30$) of patients had no improvement and

12% ($n = 8$) had worsening of symptoms or signs (Table 3). Symptom duration varied substantially between the outcome groups. Those with improvement had a significantly shorter median duration of symptoms versus those with static or worse symptoms (3 versus 15 months; $p = 0.021$).

No statistically significant difference was observed with outcome and the type of functional presentation. More specifically, 14/37 (38%) of sensory, 13/33 (39%) of motor and 9/12 (75%) of PNES presentations experienced improvement at follow-up. In addition, no significant difference was seen with outcome and the number of functional symptoms or psychiatric history.

4. Discussion

This study confirms that functional disorders constitute a large proportion of presentations to Australian general neurology clinics. Functional disorders accounted for 15% of presentations in this study and were the third most common presentation overall. The most common functional presentations were sensory symptoms, weakness and PNES.

We found a strong association with a younger age, female sex and current psychiatric comorbidity. These associations have been reported consistently in prior studies performed in other countries [3]. Other studies have reported higher rates of psychiatric illness, perhaps due to the fact that our patients did not have a full psychiatric assessment, and diagnosis of psychiatric issues was based on history and patient volunteered information.

The most important finding in this study was that of improvement in 45% of patients in the short term. This was irrespective of the type of presentation, number of functional symptoms or psychiatric history. Improvement was however significantly associated with a shorter duration of symptoms. Those who improved had only experienced symptoms for a median of 3 months. This has been seen in several other studies and is likely to be one of the strongest predictors of outcome [6]. Whilst functional disorders are often seen as a diagnosis of exclusion, it may be that there needs to be more urgency in making a diagnosis, or at least initiating early treatment whilst waiting for investigation results. Many of the presentations are relatively clear-cut and can be deduced from inconsistencies on clinical examination and the presence of "positive" signs. Many of the signs associated with functional presentations (for example, Hoover's signs, collapsing/give way weakness) have now been validated in the literature and can be applied with confidence [7]. It is likely that the combination of findings is more predicative than any individual sign. It is not feasible to perform extensive investigations for every functional presentation as this approach often leads to a prolonged search for alternate disorders and delays early intervention. Attempting to find positive evidence on testing (for example, video EEG telemetry, tremor studies) is often useful but can also be negative in many situations or cannot be applied to all cases. This study shows that these presentations are already investigated to a high degree and that further in-depth testing should be selective.

The major shortcoming in the present study was that outcome assessment was available for only 49% of patients and that the follow-up period was relatively short. This is likely a true reflection of outpatient practice where many patients end up lost to follow-up or represent only when symptoms progress. Short follow-up is likely of more concern for degenerative processes where progression may take many years. We did not have data available for the misdiagnosis rate in our cohort but other studies have shown that this is relatively low at about 4% [8].

Functional symptoms are likely to have complex aetiologies, some of which are modifiable in the short term. The impact of duration of symptoms on improvement highlights the need for

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