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Utility of different seizure induction protocols in psychogenic nonepileptic seizures

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Summary Psychogenic non epileptic seizure (PNES) can be induced by several induction tests but their relative usefulness has not been evaluated. In this study, we report the sensitivity and specificity of various induction tests in the diagnosis of PNES and assess their discomfort level. The induction tests were: (a) compression of temple region (CTR), (b) verbal suggestion (VS), (c) tuning fork application (TFA), (d) moist swab application (MSA), (e) torch light stimulation (TLS) and (f) saline injection (SI). Up to 3 trials were done for each test except for normal saline injection which was given once. For comparison of these tests, patients with epileptic seizures were included as controls. The time to precipitate PNES was recorded and patients' discomfort levels were noted on a 0—10 scale. Video EEG was recorded in the PNES patients. 140 patients with PNES and 50 controls with epileptic seizures were included. The diagnostic yield of CTR was 65.7%, TFA 61.4%, MSA 60.7%, SI 55.6%, VS 54.3% and TLS 40.7%. These tests did not induce seizures in the controls. All these tests had 100% specificity and 100% positive predictive value in the diagnosis of PNES. The maximum discomfort was reported with SI and minimum with MSA. The similarity of efficacy and discomfort with CTR and TFA appear to be the most optimal induction techniques when compared with VS, AMS, TLS, and SI.

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Introduction

Psychogenic non epileptic seizure (PNES) is defined as psychologically determined clinical events that resemble epileptic attacks but are not associated with paroxysmal physiologic cerebral dysfunction (Bodde et al., 2009). PNES is often misdiagnosed as epilepsy and may have prevalence as high as 33/100,000 population (Benbadis and Hauser, 2000). PNES accounts for 18—23% of patients at epilepsy referral centers (Smith et al., 1999; Benbadis and Hauser, 2000; Leis et al., 1992). Missing the diagnosis of PNES has significant impact on the patients as well as on the health care providers. It may expose the patient to antiepileptic drugs and their side effects and increase the health care cost. Failure to recognize psychological nature of PNES delays the implementation of correct treatment. Misdiagnosis of these patients as epilepsy results in social stigma and frustration (Abubakr et al., 2003). The diagnosis of PNES is challenging and requires detailed evaluation to exclude epileptic seizures. Sometimes, PNES may coexist with epileptic seizures. The seizure semiology is although helpful in distinguishing PNES from epileptic seizure but may be difficult at times. The features favoring PNES are bizarre side to side head movement, closed or forcibly closed eyes, presence of light reflex, vocalization, tongue bite at the tip rather than on the side, synchronized incoordinated limb movements, absence of incontinence, longer duration of attack up to several hours, post ictal shallow irregular breathing, ability to recall the events, and absence of confusion or lethargy (Ali et al., 2011). The interpretation of EEG in the patients with PNES may be difficult due to associated movement artifacts. The patients with epilepsy and PNES are best distinguished by capturing the clinical and EEG events by video-EEG. Video EEG although has high interrater reliability for the diagnosis of epileptic seizure but has only moderate reliability in the diagnosis of PNES (Benbadis et al., 2009a). In one study, epileptologists had higher sensitivity (96%) to identify the epileptic seizure but had low specificity (50%) highlighting that epileptologists were more likely to diagnose PNES as an epileptic seizure (Deacon et al., 2003). Sometimes, clinical attacks are not captured during video EEG. Postictal or interictal EEG is normal in 15—30% of patients with epileptic seizures (Binnie and Prior, 1994). In view of these limitations of video EEG in the diagnosis of PNES, a simple and cost effective clinical test may be helpful. Normal video-EEG recording during the typical spontaneous or provoked seizure is almost diagnostic of PNES (Krumholz, 1999). Sometimes, PNES does not occur spontaneously despite long video-EEG recording and leads to inconclusive result. In resource poor countries, video-EEG is not widely available. Combining induction tests with video-EEG improves the diagnostic yield and shortens the duration of recording, its cost as well as waiting period. In the literature, various induction tests such as compression of the temple, verbal suggestion, tuning fork application, moist swab application, torch light stimulation and saline injection have been used to diagnose PNES but there is paucity of studies evaluating the comparative usefulness of these tests (Walczak et al., 1994; Zaidi et al., 1999; Devinsky and Fisher, 1996; Benbadis et al., 2000). Only few studies have evaluated the sensitivity and specificity of normal saline injection to induce the clinical attack (Lancman et al., 1994; Walczak et al., 1994; Bazil et al., 1994; Slater et al., 1995). The various induction tests used in the diagnosis of PNES may have different sensitivity and specificity as well as discomfort level. In this communication, we report the sensitivity, specificity and discomfort level of a number of induction tests in the patients with PNES.

Methods

This is a prospective, single center study comparing the sensitivity, specificity and discomfort level of different induction tests in the patients with PNES. The research protocol was approved by the Institutional Ethics Committee. Informed consent was obtained from all the patients. For children (8—18 years of age), informed consent was obtained from their parents or guardians.

Inclusion criteria

Consecutive patients with a possible diagnosis of PNES were included from the neurology out-patient and emergency service during 1st July 2009 to 31st December 2011. PNES was defined an observable abrupt paroxysmal change in the behavior or consciousness, that resembles an epileptic seizure, but not accompanied by the EEG changes of epileptic seizure or clinical evidence of epilepsy and there is positive evidence or a strong suspicion for psychogenic factors that may have caused the seizure (Bodde et al., 2009).

Exclusion criteria

Children below 8 years and patients with mental retardation or dementia were excluded because of communication and assessment problem. The patients with underlying serious medical conditions such as cardiac, renal and liver failure and malignancy were also excluded. The patients with both PNES and epilepsy were excluded to avoid any conflicting results. The patients with underlying serious psychiatric disorders such as schizophrenia or mania and autistic spectrum disorders were also excluded.

Controls

Age and gender matched patients with established diagnosis of epilepsy based on clinical and EEG findings with normal cognitive function were included as controls.

Evaluation

Demographic information including age, gender, education, occupation and residence of the PNES patients and the controls (epileptic patients) were noted. Detailed medical history including duration of illness, number of attacks, precipitating factors and ictal semiology were recorded. Video EEG was performed in the patients with PNES.