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YouTube as a potential learning tool to help distinguish tonic–clonic seizures from nonepileptic attacks

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ABSTRACT

Medical students are increasingly turning to the website YouTube as a learning resource. This study set out to determine whether the videos on YouTube accurately depict the type of seizures that a medical student may search for. Two consultant epileptologists independently assessed the top YouTube videos returned following searches for eight terms relating to different categories of seizures. The videos were rated for their technical quality, concordance of diagnosis with an epileptologist-assigned diagnosis, and efficacy as a learning tool for medical education. Of the 200 videos assessed, 106 (63%) met the inclusion criteria for further analysis. Technical quality was generally good and only interfered with the diagnostic process in 8.5% of the videos. Of the included videos, 40.6–46.2% were judged to depict the purported diagnosis with moderate agreement between raters (75% agreement, $\kappa = 0.50$). Of the videos returned after searching "tonic–clonic seizure", 28.6–35.7% were judged to show nonepileptic seizures with almost perfect interrater agreement (92.9% agreement, $\kappa = 0.84$). Of the videos returned following the search "pseudoseizure", 77.8–88.9% of videos were judged to show nonepileptic seizures with substantial agreement (88.9% agreement, $\kappa = 0.61$). Across all search terms, 19.8–33% of videos were judged as potentially useful as a learning resource, with fair agreement between raters (75.5% agreement, $\kappa = 0.38$). These findings suggest that the majority of videos on YouTube claiming to show specific seizure subtypes are inaccurate, and YouTube should not be recommended as a learning tool for students. However, a small group of videos provides excellent demonstrations of tonic–clonic and nonepileptic seizures, which could be used by an expert teacher to demonstrate the difference between epileptic and nonepileptic seizures.

1. Introduction

Epilepsy is the most common serious neurological condition, affecting approximately 50.4 people/100,000/year [1]. Most junior doctors will, at some point, encounter a patient having a seizure either in the wards, in the emergency department, or in general practice. Status epilepticus is a life-threatening emergency with an estimated mortality approaching 15% [2]. Prompt recognition and treatment of a seizure is vital to optimize outcome. However, up to a fifth of patients referred to epilepsy centers suffer from psychogenic nonepileptic seizures [3]. Nonepileptic seizures are often mistaken for generalized tonic–clonic seizures, with about a quarter of referrals to neurological intensive care units for refractory status epilepticus found to be "pseudostatus" [4]. Clinicians, therefore, may subject patients suffering from nonepileptic seizures to unnecessary, expensive, and potentially harmful medical interventions [5].

Today, many medical students and qualified doctors use the Internet as a learning resource to help recognize different clinical signs and syndromes [6]. Likewise, the general public will often access the Internet to learn more about medical conditions. As different seizure types can be distinguished based on the characteristic behavior of a patient during an event, video examples have the potential to be extremely useful educational aids in understanding epilepsy and differentiating seizure types.

YouTube (www.youtube.com) is currently ranked as the second most visited website in the world and holds a vast collection of videos claiming to demonstrate different types of medical events, including various forms of epileptic seizures [7]. Previous studies have investigated the quality of other YouTube videos of relevance to neurology, including the following: movement disorders [8], West syndrome [9], and the correct technique for performing lumbar puncture [10]. Each of these studies found the videos on YouTube to be inaccurate and has advised against their use as a learning resource without stringent supervision from a specialist. As the potential adverse effect from junior doctors incorrectly classifying paroxysmal events as either epileptic or nonepileptic in origin is great, we investigated the accuracy of YouTube videos claiming to show different seizure types. In particular, we wished to study whether nonepileptic events could be clearly differentiated from epileptic seizures and if the type of seizure returned following a

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search term concurred with the classification that an epileptologist would apply. We also wished to determine if it was possible to identify certain YouTube videos that could be recommended for medical students to help them differentiate epileptic from nonepileptic events.

2. Methods

We reviewed YouTube videos claiming to show different types of epileptic seizures. Two consultant neurologists with a special interest in epilepsy independently assessed the top YouTube videos returned following searches based loosely around the International League Against Epilepsy (ILAE) classification of seizure events (Fig. 1) [11]. The videos were rated for their technical quality, accuracy, and efficacy as a learning tool for medical education. We aimed to determine the accuracy of seizure videos on YouTube, the usefulness of YouTube videos in distinguishing tonic–clonic seizures from nonepileptic seizures, and the potential use of YouTube as a learning resource in differentiating different forms of epileptic seizures.

2.1. Search strategy

YouTube searches were performed using the default settings and sorted by relevance. The following terms were searched in June 2012: "tonic clonic seizure", "absence seizure", "pseudoseizure", "tonic seizure", "atonic seizure", "myoclonic seizure", "simple partial seizure", and "complex partial seizure". These search terms were based on a modification of the 1981 ILAE classification system and were chosen to reflect the terminology commonly in use by medical students in the UK [11]. Despite the pejorative connotations associated with the term "pseudoseizure", this term was searched instead of "non-epileptic

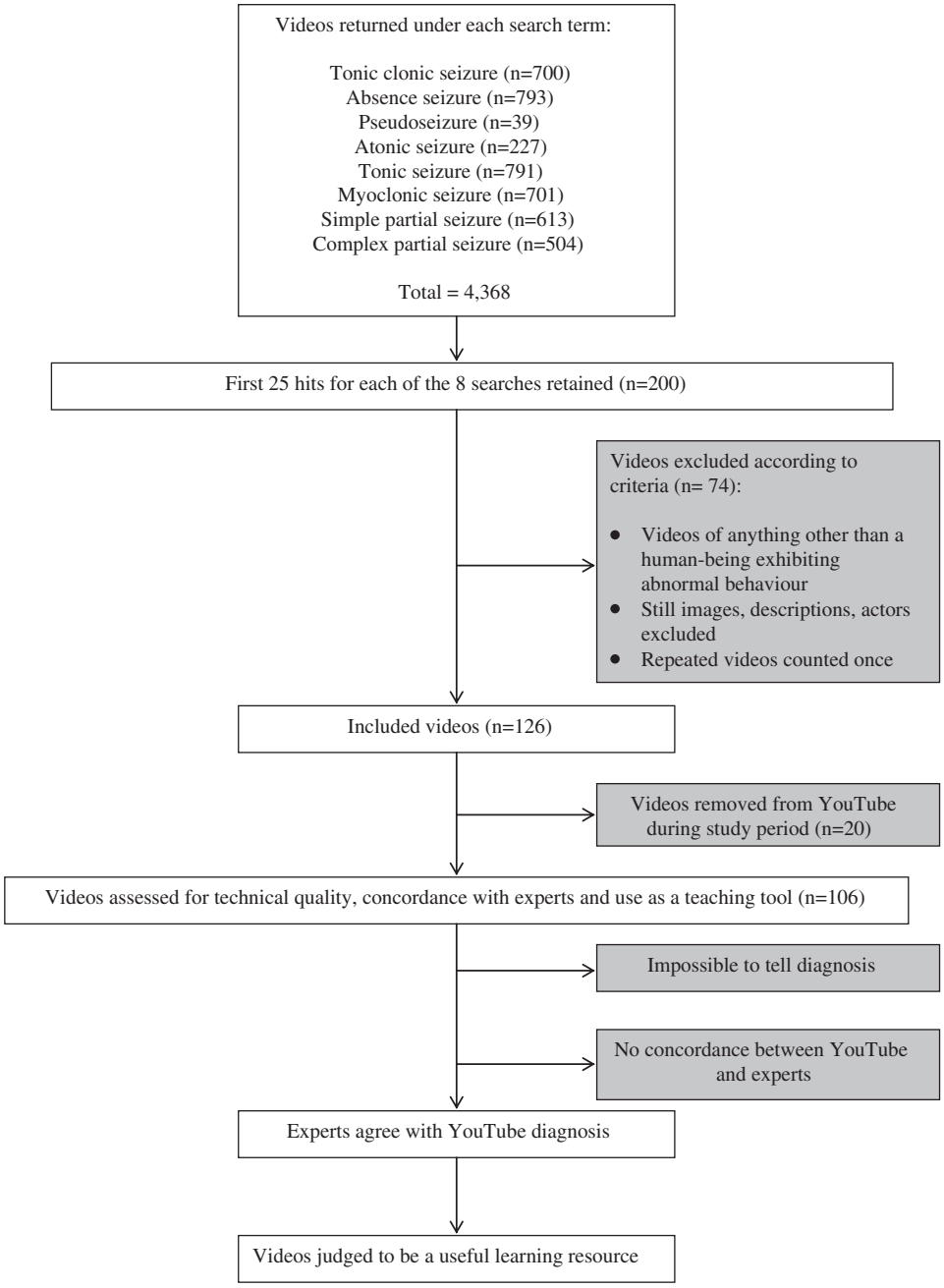

Fig. 1. Stages of video analysis. The flowchart demonstrates the process by which appropriate videos were selected to determine the accuracy of the type of attack demonstrated and whether the video could potentially be used as a teaching resource to help in the training of medical students to recognize a specific type of event.