Available online at www.sciencedirect.com

ScienceDirect

Journal of Electrocardiology 47 (2014) 113 – 117

JOURNAL OF Electrocardiology

www.jecgonline.com

Learning electrocardiogram on YouTube: How useful is it?

Taylan Akgun, MD,* Can Yucel Karabay, MD, Gonenc Kocabay, MD, Arzu Kalayci, MD, Vecih Oduncu, MD, Ahmet Guler, MD, Selcuk Pala, MD, Cevat Kirma, MD

Kartal Kosuyolu Heart and Research Hospital

Abstract

Background: YouTube has become a useful resource for knowledge and is widely used by medical students as an e-learning source. The purpose of this study was to assess the videos relating electrocardiogram (ECG) on YouTube.

Methods: YouTube was searched on May 28, 2013 for the search terms "AF ecg" for atrial fibrillation, "AVNRT" for atrioventricular nodal reentrant tachycardia, "AVRT" for atrioventricular reentrant tachycardia, "AV block or heart block" for atrioventricular block, "LBBB, RBBB" for bundle branch block, "left anterior fascicular block or left posterior fascicular block" for fascicular blocks, "VT ecg" for ventricular tachycardia, "long QT" and "Brugada ecg". Non-English language, unrelated and non-educational videos were excluded. Remaining videos were assessed for usefulness, source and characteristics. Usefulness was assessed with using a checklist developed by the authors.

Results: One hundred nineteen videos were included in the analysis. Sources of the videos were as follows: individuals n = 70, 58.8%, universities/hospitals n = 10, 8.4% and medical organizations n = 3, 2.5%, health ads n = 10 8.4%, health websites n = 26, 21.8%. Fifty-six (47.1%) videos were classified as very useful and 16 (13.4%) videos were misleading. 90% of the videos uploaded by universities/hospitals were grouped as very useful videos, the same ratio was 45% for the individual uploads. There were statistically significant differences in ECG diagnosis among the groups (for very useful, useful and misleading, $p < 0.001$, 0.02 and 0.008, respectively). The ratio of the misleading information in ventricular tachycardia videos was found to be 42.9%.

Conclusions: YouTube has a substantial amount of videos on ECG with a wide diversity from useful to misleading content. The lack of quality content relating to ECG on YouTube necessitates that videos should be selected with utmost care.

Keywords: Electrocardiography; Medical information; Internet; YouTube

Introduction

The electrocardiogram (ECG) remains a daily diagnostic tool for the detection of numerous cardiovascular diseases. However, it is important to have a sufficient knowledge and ability to interpret ECG accurately and quickly for diagnosis. One study, including Family Practice residents found that only 66% of 18 common findings on ECG were recognized by the residents, with no difference or improvement noted across the 3 years of training [1]. Other studies assessing the severity of ECG interpretation errors reported that 4% to 33% of interpretations contained errors of major importance [2]. Thus, it necessitates that not only specialists, but also other healthcare professionals like General practitioners, Interns, Post-Graduate students, Nurses and Paramedical staff should have basic understanding of ECG for timely and accurate diagnosis.

The internet has become an easily available source of healthcare information [3,4]. Freely available video broadcast sites, such as YouTube are internet applications that may be widely used by medical students and trainee doctors. Thus, YouTube presents an opportunity for educational use [5]. However, the quality and accuracy of the medical information on the Internet are very heteregeneous. Most videos on YouTube are based on personal experience although some videos are from professional sources such as universities. Although some studies have been conducted to assess the quality of videos posted on YouTube relating to medical information [6–8], there is only one study that exists in the field of cardiology [5]. Additionally, it has been shown

* Corresponding author. Denizer st, Kartal Kosuyolu Heart and Research Hospital, Cevizli, Kartal, Istanbul 34648, Turkey.

E-mail address: taylan_akgun@yahoo.com

0022-0736/$ – see front matter © 2014 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jelectrocard.2013.09.004

Table 1
Usefulness checklist.

Usefulness Checklist	Points
Animation	1
Hand-drawn ECG	1
Verbal expression	1
Diagnostic criterias	1
Pathophysiology	1
Etiology	1
Prognosis	1
Usefulness total points available:7	Very useful: ≥4 points Useful: <4 points

ECG: electrocardiography.

that YouTube currently hosts videos of inadequate educational value [5]. However, so far, no study has examined the quality of ECG videos on YouTube. The purpose of the present study was to evaluate the quality and accuracy of ECG information on the video-based source, YouTube.

Methods

The YouTube Website (http://www.youtube.com) was researched on May 28, 2013 for the following 10 diagnosis "atrial fibrillation", "AV nodal reentrant tachycardia (AVNRT)", "atrioventricular reciprocating tachycardia (AVRT)", "atrioventricular block (AV block) first, second, third degree", "bundle branch blocks-left and right (LBBB and RBBB, respectively)", "left anterior and posterior fascicular block (LAFB and LPFB, respectively)", "Ventricular tachycardia (VT)", "long QT syndrome" and "Brugada syndrome". These 10 diagnoses were chosen that are essential information for electrocardiography interpretation.

To find the most appropriate terms, Google Trends (http://www.google.com/trends/) was used. This search engine sorts the terms according to the most searched term. After identifying the search terms by using Google Trends, YouTube was researched for the following search terms: for atrial fibrillation, "AF ecg"; for atrioventricular nodal reentrant tachycardia, "AVNRT"; for atrioventricular reentrant tachycardia, "AVRT"; for atrioventricular block, "AV block or heart block"; for bundle branch block, "LBBB, RBBB"; for fascicular blocks, "left anterior fascicular block or left posterior fascicular block"; for ventricular tachycardia, "VT ecg"; "long QT" and "Brugada ecg".

On the assumption that no user would search beyond the first ten pages for a search term, only the videos on these pages were evaluated. Since the AVNRT and AVRT topics share the same video and both long QT and Brugada syndrome have less number of video, these criteria were compiled.

Two physicians independently assessed each video and scored the videos. The following videos were excluded: non-English language and non-educational in nature or the topic of the video was not related to ECG. Videos that were duplicated partly or totally were treated as a single file for analysis. All videos were fully viewed to confirm that they contained ECG representations. For each video the following information were collected: duration of the video, number of views (hits), name of uploader or creator (university/hospital; medical organization; individual: one person or group of person; health advertisements: if video contained advertisement; health websites: if video contained Web link) determined from the user profile, scoring system that viewers can assign to videos (likes or dislikes) and content (usefulness: very useful or useful, misleading).

Since no validated scoring system for this purpose exists in the literature, the authors created a checklist for evaluating usefulness (Table 1). Video accuracy was checked from Marriott's practical electrocardiography as reference textbook [9]. According to the checklist, each criterion was scored as one point. The total usefulness number of points available is seven. The content of the videos was classified as very useful, useful or misleading. While very useful videos should fulfill ≥4 points, those with less than 4 points were identified as useful videos. Misleading referred to at least one criterion containing inaccurate information. The mean of total points was defined as video score.

Statistical analysis

Continuous and categorical variables were expressed as mean ± standard deviation (SD) and percentages, respectively. Continuous variables were compared using one-way Analysis of Variance (ANOVA) models with Tukey test for post hoc analyses. Categorical variables were compared using chi-square test (χ^2) or Fisher's exact test, as appropriate. A p value of less than 0.05 was regarded significant for all analyses. All the statistical tests were done using SPSS 11.5 (SPSS Inc, Chicago, IL, USA).

Reproducibility

Intra- and interobserver reproducibilities were assessed for usefulness checklist values. For intraobserver assessment, the videos were added to the playlist and reanalyzed after 1 week. The Bland–Altman analysis for interobserver reproducibility (mean difference — 95% confidence interval [CI]) and intraobserver reproducibility (intraclass correlation coefficient [ICC], 95% CI) were calculated, and the ICC showed good inter- and intraobserver agreement — interobserver and intraobserver agreements were assessed for usefulness checklist, 0.03 [−0.92 to 0.97] and ([0.95], 0.93–0.96).

Results

The search identified a total of 16,169 videos on May 28, 2013. After limiting the review to the first 10 pages of search result and excluding irrelevant videos with non-English videos, 119 videos were found (Table 2). A graphical representation of the number of ECG videos included in the study and the year they were uploaded to YouTube is presented in Fig. 1.

The use of the criteria for grouping the videos to very useful, useful and misleading video revealed that while there were 56 (47.1%) very useful and 47 (39.5%) useful videos, 16 (13.4 %) videos were classified as misleading. The