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Review

Emotion recognition in temporal lobe epilepsy: A systematic review

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ABSTRACT

There is increasing interest in the understanding of emotion recognition deficits in temporal lobe epilepsy (TLE), the most common form of focal epilepsies. There are conflicting reports about impairments for different emotions in right and left temporal lobe epilepsy patients. A systematic review and a narrative synthesis was conducted for studies investigating emotion recognition (ER) in TLE. Embase, MEDLINE, PsychINFO and Pubmed were searched from 1990 to March 2015 and reference lists were reviewed. 996 citations were identified and 43 studies were finally included.

ER deficits are consistently observed across studies. A fear recognition deficit is always reported, followed by deficits in sadness and disgust recognition. Deficits are observed across visual and auditory domains. Conflicting evidence is present concerning the severity of ER deficits in right and left TLE. Studies on anterior temporal lobectomy report data similar to that observed in pre-surgical patients.

Current evidence supports the conclusion that recognition of negative emotions is commonly impaired in TLE, particularly for fear, and in the visual domain. Future work should focus on more ecologically valid test, on longitudinal studies to assess the role of anterior temporal lobectomy, and to correlate ER measures to social functioning in everyday life.

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1. Introduction

Temporal lobe epilepsy (TLE) is a group of disorders that predominately involves dysregulation of amygdalo-hippocampal function caused by neuronal hyper-excitability (Schwartzkroin, 1986; Graebenitz et al., 2011). Medial TLE in particular, is perhaps the best-characterized electroclinical syndrome of all the epilepsies. The inherent potential for the temporal lobe to be predisposed to focal seizures is based on the unique anatomic–functional networks that involve the amygdalo-hippocampal complex and entorhinal cortex. Beyond seizures, drug-resistant TLE is characterized by cognitive decline, especially involving memory functions, and by psychiatric co-morbidities (Hermann et al., 1997; Jokeit and Ebner, 1999; Helmstaedter and Kurthen, 2001; Helmstaedter et al., 2003). Behavioral deficits in TLE have a great impact on the burden of the disease, and often contribute much more than seizures per se to negatively impact on the patient's quality of life (Hermann et al., 2008; Helmstaedter and Witt, 2012).

The ability to recognize emotions in others is a key social skill, and much work has focused on studying the expression and recognition of basic emotions (happiness, fear, disgust, anger, sadness), which appear to be cross-cultural, and which are argued to have a biological basis (Ekman, 1992, 1993). The temporal lobe, and the amygdala in particular, have been demonstrated to play a crucial role in the processing of the appropriate cognitive, autonomic and behavioral responses to emotional relevant stimuli (Anderson and Phelps, 2001; Adolphs et al., 2002; Adolphs, 2010). The role and importance of the antero-medial temporal lobe region in decoding emotions has been demonstrated by a number of lesion and functional imaging studies (for reviews see Adolphs et al., 2003; Adolphs, 2008, 2013).

In the field of epilepsy this knowledge has several clinical as well as speculative implications. Indeed, TLE is frequently characterized by lesions or gliosis/atrophy (hippocampal sclerosis) involving the medial temporal lobe region. Moreover, antero-medial temporal lobectomy (ATL) is the "standard" treatment for drug-resistant medial TLE (Wiebe et al., 2001). Consequently, the investigation of emotional and social competence in TLE patients has been the focus of different studies (Meletti et al., 2003a,b, 2009; Broicher et al., 2012; Giovagnoli et al., 2011). After more than a decade of research in this field it has been reported that TLE patients show deficits in emotion recognition (ER) (either before and after ATL), especially for facial expressions, but also for different emotional stimuli such has prosody and music (Gosselin et al., 2005, 2011b; Bonora et al., 2011; Dellacherie et al., 2011). However, several questions are still open, concerning the "specificity" of fear recognition impairment and the role of the right and left temporal lobes. These two questions are relevant and contribute to our understanding of how the brain processes emotions. Other important questions to be elucidated concern the impact of several disease variables on emotion recognition, as well as the effect of anti-epileptic treatment, and temporal lobectomy procedures. These last issues are clearly relevant from a clinical perspective.

The aim of this review is therefore to disambiguate the pattern of emotion recognition deficits in TLE through a systematic appraisal of previous reports. We believe that a systematic review of the current literature could help to obtain some relevant theoretical message; in particular, in order to assess the nature of the reported deficits, we aim to analyze whether differences (if any) in emotion recognition performance can be explained by disease-related factors, such as age of epilepsy onset, duration of disease, types and number of antiepileptic drugs, side of seizure focus, pathology, pre/post-surgery status.

This review is warranted to better understand the conceptualization of the emotion recognition deficits in TLE patients, to improve our understanding of the social problems that occur in these patients, as well as to identify areas for future research.

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