

# Impairment in the immediate recall of the RCFT and relaxation time in T2 in right hippocampus

Orozco-Giménez, Carmen(a), Puente, Antonio E.(b), Morento-Soto, Gustavo(a), Pastor-Pons, Elena(c), Sánchez-Álvarez, Juan Carlos(d) & Pérez-García, Miguel(a)

(a) University of Granada (Spain). (b) University of North Carolina at Wilmington. (c) Diagnostic Center of Granada (Spain). (d) “Virgen de las Nieves” Hospital of Granada (Spain).

## Introduction

The epilepsy is one of the most frequent neurological diseases with a high prevalence (Annegers, 1996). The temporal lobe epilepsy (TLE) is an epileptic syndrome which origin is in one or both temporal lobes (ILAE, 1989). The most common pathologic substrate of the TLE is de hippocampal sclerosis (HS) (Babb et al., 1984). The clinical manifestations of this syndrome are partial seizures with beginning in the temporal lobes and with or without consciousness loss. 75% of these patients suffer a poor control of the seizures using antiepileptic drugs (Kim et al., 1999). The histopathologic damage in the HS consists on asymmetric neuronal loss and asymmetric increase in glial cells, affecting structures of the temporal lobe (hippocampus, amygdala, parahippocampal girus and enthorinal cortex) (Babb & Brown, 1987). The HS is characterized by neuropsychological deficits in verbal and visual memory (Sass et al., 1994).

The anterior temporal lobectomy is a neurosurgical treatment for the TLE when the patient is drug-resistant. The Clinical Neuropsychology has important roles in the epilepsy surgery units. These roles include the control of the surgery consequences, epileptic lateralization and localization of the epileptic focus, and prediction of the result and neuropsychological consequences of the surgery. The neuropsychological test of can lateralize the memory deficits related to the hippocampal damage. Several neuropsychological studies that look for the lateralization, have related the memory impairment for verbal material to left hippocampal damage. In this way, there are less studies that had related the visual memory impairment to right hippocampal damage (Lencz et al., 1992, Martin et al., 1999, Sass et al., 1990, Sass et al., 1992, Baxendale et al., 1998, Martin et al., 1999).

## Objective

To determine whether the patients with neuropsychological deficits in visual memory, have prolonged T2 relaxation time in the right hippocampus.

## Method

**Subjects.** 31 right-handed patients with TLE, having magnetic resonance imaging (MRI) volumetry indicative of HS.

**Material.** Neuropsychological measures: Immediate recall of Rey Complex Figure Test, Spanish version (de la Cruz et al., 1997).

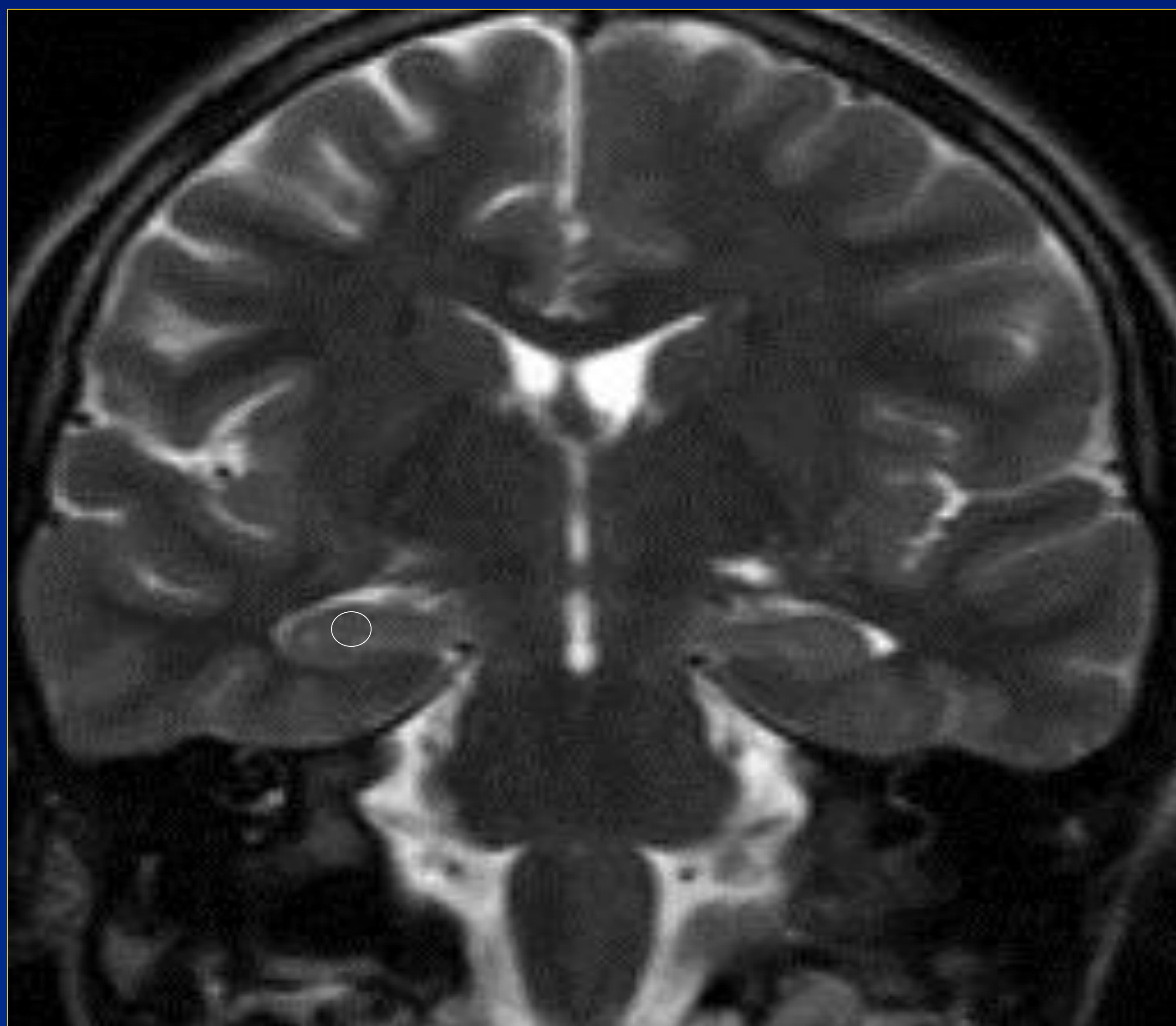
**MRI relaxometry:** 1,5 Tesla Philips Gyroscan ACS-NT (Philips Medical System, Eindhoven, The Netherlands), Philips Easy Vision Work Station (CT/RM).

**Procedure.** All the patients were evaluated as surgery candidates for anterior temporal lobectomy between January of 1999 and February of 2001.

We did first several MRI studies. The relaxometry is one of those studies. The radiologist marks on a coronal slice a region of interest (ROI) on de right hippocampus body (figure 1), obtaining the relaxation time in milliseconds. This measure shows the hippocampal atrophy due to the glial cells increase.

A few days after the MRI studies we practiced the neuropsychological assessment. The patients were classified in two groups depending on their performance in the memory test: Impaired group (2SD below the mean), and No Impaired group (equal or higher of 2SD).

Figura 1. T2 coronal slice with marked region of interes for relaxometry



## Results

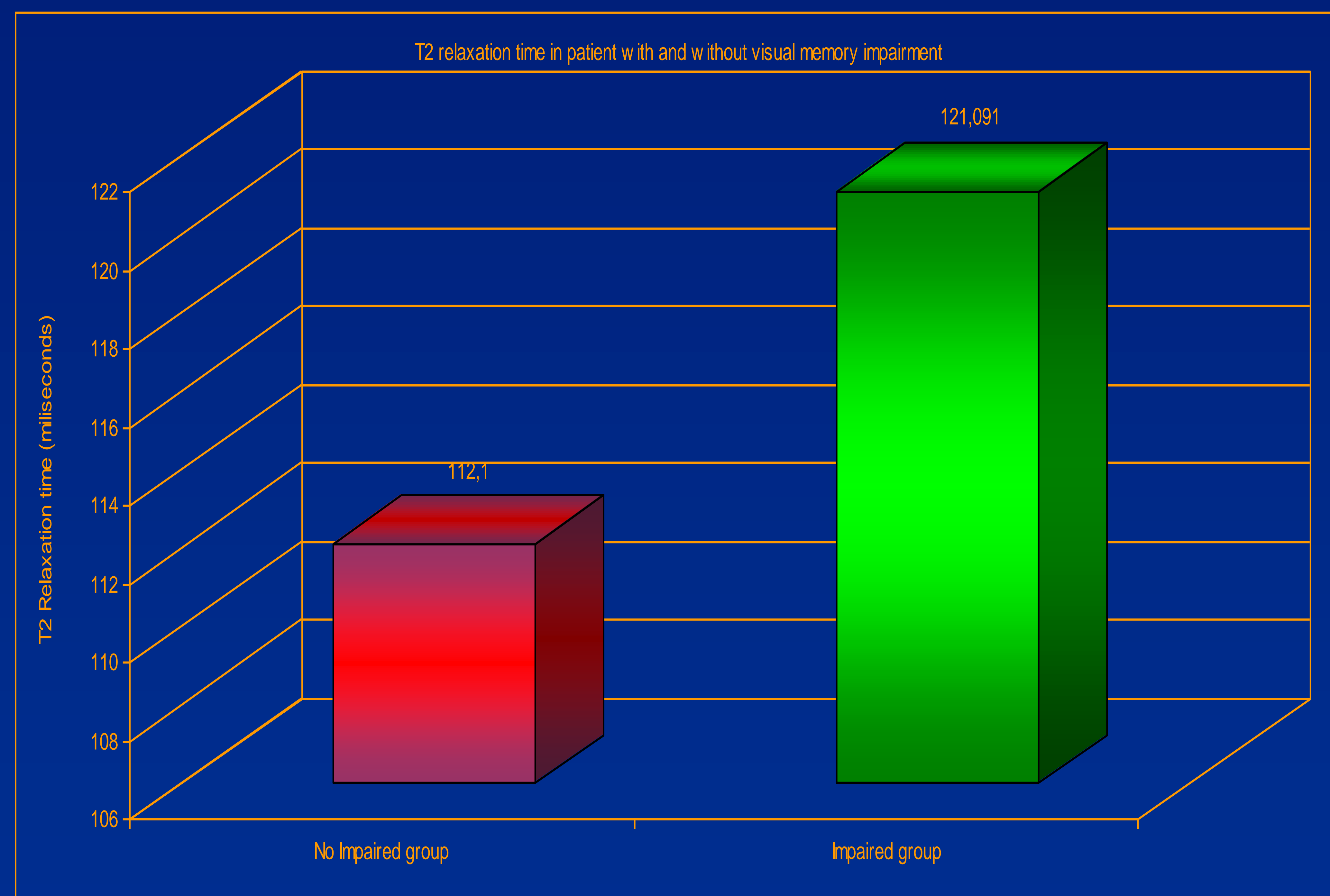
Eleven patients were in the Impaired group, and 20 in the No Impaired group.

We conducted an ANOVA to determine whether the relaxation time of the right hippocampus were more prolonged in the impaired group than in the No Impaired group. There were statistical significant differences in the relaxation time between both groups [ $F(1, 29)=5.224$ ;  $p>0.030$ ]. Impaired patients showed more prolonged relaxation time than no impaired ones.

## Conclusion

We have found that in our sample the increase in glial cells in the right hippocampus measured with MRI is bigger in the patients with visual memory impairment. According with the cutoff of 113 of impaired T2 relaxation time (Sánchez-Alvarez et al., 2000), the patients with impaired visual memory show an impaired relaxometry in the right hippocampus.

In conclusion, this study let us to know the performance level, relating it to the anathomic status of the hippocampus. Further investigations will relate these results with postsurgical performance, looking for the prediction of postsurgical memory changes.



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