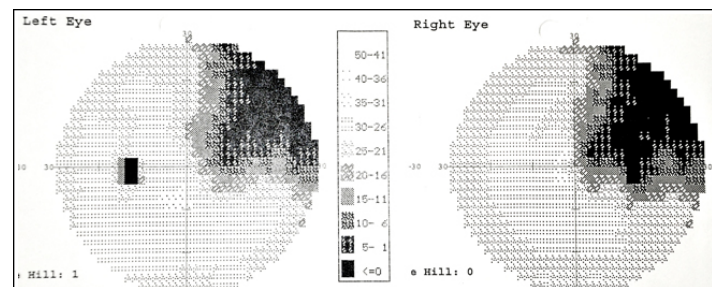


## Introduction

Anterior temporal lobe resection(ATLR) is a well-established and effective treatment in temporal lobe epilepsy (TLE)(1). However, this method sometimes can cause optic tract injury (4-50%) in the temporal lobe (the Meyer loop), which may lead to a "pie in the sky"-shaped visual defect after surgery.



Incongruous midperipheral and peripheral-contralesional, homonymous, superior (pie in the sky) quadrantanopsia

Is that there is great variability, which makes it difficult to give a generic recommendation to the neurosurgeons on the "safe" length of anterior temporal lobe that can be resected without causing a VFD. The grade of the visual field defect that has been reported, depends upon the anatomic range of the resection (2). The variations noted for the extent of the postsurgical visual field defect are due to interindividual variations in the spatial distribution of the position of the Meyer loop within the temporal lobe.

## Objectives

In this study, we focus on comparison of the size of ATLR, the postoperative VFD, and the seizure outcome, and evaluate the correlation between distance of Meyer's loop of the optic radiations with the margin of resection and postoperative VFD, using DTI tractography.

## Methods

We studied 22 patients with medically refractory temporal lobe epilepsy undergoing ATLR between June 2008 and December 2016. Of the 22 patients, 6 had left- and 16 right-sided resections. Preoperative and postoperative examination of visual fields was assessed in all patients (Table I). All patients were divided into two groups. Group I (n=12) were surgically treated without optic radiation mapping and Group II (n=10) with guidance of radiation mapping. Optic radiation mapping include DTI tractography and intraoperative visual evoked potentials (iVEPs).

## Results

The size of the ATLR was 4.59 +/- 1.44 cm (3.7-6 cm) and 3.74 +/-0.65 cm (3.2-4.8 cm) individually in Group I and II, respectively. The size of the ATLR was significantly smaller in Group II (p=0.0023).

**Table I**

| Demographic and Surgery-Related Data |            |                               |                            |           |                            |                   |                                     |
|--------------------------------------|------------|-------------------------------|----------------------------|-----------|----------------------------|-------------------|-------------------------------------|
| Patients No                          | Age/Gender | Handedness/language dominance | Duration of epilepsy (Yrs) | Operation | Visual Deficit             | Tractography/iVEP | Postoperative outcome (Engel Class) |
| 1                                    | 45/M       | R/L                           | 34                         | R/ATLR    | No                         | No                | I                                   |
| 2                                    | 26/W       | R/L                           | 25                         | R/ATLR    | No                         | No                | I                                   |
| 3                                    | 31/M       | R/L                           | 22                         | R/ATLR    | Incomplete quadrantanopsia | No                | I                                   |
| 4                                    | 41/W       | R/L                           | 23                         | R/ATLR    | No                         | No                | I                                   |
| 5                                    | 32/M       | R/L                           | 30                         | R/ATLR    | No                         | No                | I                                   |
| 6                                    | 45/M       | R/L                           | 39                         | R/ATLR    | No                         | No                | I                                   |
| 7                                    | 26/M       | R/L                           | 20                         | R/ATLR    | Incomplete quadrantanopsia | No                | I                                   |
| 8                                    | 17/M       | R/L                           | 8                          | L/ATLR    | No                         | No                | I                                   |
| 9                                    | 31/M       | R/L                           | 11                         | R/ATLR    | Incomplete quadrantanopsia | No                | I                                   |
| 10                                   | 32/W       | L/L                           |                            | R/ATLR    | No                         | No                | III                                 |
| 11                                   | 63/W       | R/L                           | 61                         | L/ATLR    | No                         | No                | III                                 |
| 12                                   | 23/W       | R/L                           | 11                         | R/ATLR    | No                         | No                | III                                 |
| 13                                   | 42/M       | R/L                           | 31                         | R/ATLR    | No                         | Yes               | I                                   |
| 14                                   | 46/W       | R/L                           |                            | L/ATLR    | No                         | Yes               | I                                   |
| 15                                   | 19/W       | R/L                           | 18                         | R/ATLR    | No                         | Yes               | I                                   |
| 16                                   | 35/W       | R/L                           | 33                         | R/ATLR    | No                         | Yes               | I                                   |
| 17                                   | 24/W       | R/L                           | 18                         | L/ATLR    | No                         | Yes               | I                                   |
| 18                                   | 44/W       | R/L                           | 40                         | L/ATLR    | No                         | Yes               | III                                 |
| 19                                   | 21/W       | R/L                           | 31                         | L/ATLR    | No                         | Yes               | I                                   |
| 20                                   | 33/W       | R/L                           | 29                         | R/ATLR    | No                         | Yes               | I                                   |
| 21                                   | 54/M       | R/L                           | 45                         | R/ATLR    | Incomplete quadrantanopsia | Yes               | I                                   |
| 22                                   | 36/M       | R/L                           | 32                         | R/ATLR    | No                         | Yes               | I                                   |

**Table II**

|                                     | Group I |    | Group II |    | p    |
|-------------------------------------|---------|----|----------|----|------|
| Age (y)                             | 34.3    |    | 37.4     |    | 0.8  |
| Sex                                 | Men     | 7  | Men      | 3  | 0.5  |
|                                     | Women   | 5  | Women    | 7  |      |
| Language Dominance                  | Right   | 11 | Right    | 10 | 0.9  |
|                                     | Left    | 1  | Left     | 0  |      |
| Postoperative Outcome (Engel Class) | I       | 9  | I        | 9  | 0.08 |
|                                     | III     | 3  | III      | 1  |      |

Five patients (25%) in Group I suffered VFDs at 3 months, whereas only one patient (10%) in Group II (p=0.0001). Distance from the margin to resection to the initial portion of the Meyer's loop was correlated with VFDs, with safe margin of 11.1 mm. The 6-month follow-up survey showed a good outcome in 93,7% of patients in Group I (Engel class I-II) and 90.0% in Group II. (Table 2)

## Conclusions

Optic radiation mapping can reduce the risk of visual deficits in anterior temporal lobe resection

## Learning Objectives

1. Know the relationships of optical radiation in ATLR
2. Determine the role of optical radiation mapping (DTI tractography and intraoperative visual evoked potentials (IVEPs)) in Epilepsy surgery

## References

1. Engel J Jr. Surgery for seizures. N Engl J Med 1996;334:647-52
2. Krolak-Salmon P, Guenot M, Tiliket C, et al. Anatomy of optic nerve radiations as assessed by static perimetry and MRI after tailored temporal lobectomy. Br J Ophthalmol 2000;84:884 - 89