

# Differences in Interictal Perfusion Patterns between Refractory and Non-refractory Temporal Lobe Epilepsies Evaluated with FAIR at 3.0T MR

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## Objective

To evaluate whether there is difference in interictal perfusion patterns between refractory and non-refractory temporal lobe epilepsies, which may be helpful in evaluating prognosis.

## Methods

MR imaging was performed on a GE signa 3.0-T VH3 scanner. Nine patients suffered from refractory temporal lobe epilepsy, 21 patients suffered from non-refractory temporal lobe epilepsy and 13 normal volunteers underwent FAIR MR scanning (TR 850ms, min TE, FA 90, TI 1200ms). The rCBF (regional cerebral blood flow) in bilateral hemispheres and mesial temporal lobes were measured. And the AI (asymmetry index) values of bilateral hemispheres and mesial temporal lobes were calculated with the equation  $AI=100(rCBF_{left}-rCBF_{right})/(rCBF_{left}+rCBF_{right})$ . Mann and Whitney test was conducted on the AI values of hemispheres and mesial temporal lobes between the two groups of patients and normal volunteers.

## Results

The AI values of each group were shown in table 1. The AI values of bilateral hemispheres of refractory and non-refractory epilepsy patients were both significantly different from those of volunteers (P=0.012 and 0.029 respectively). But there was no significant difference in temporal AI values between two groups of epilepsy patients (P=0.288). There was significant difference in AI values of bilateral mesial temporal lobes between non-refractory epilepsy patients and volunteers (P=0.049), and no significant difference between refractory epilepsy patients and volunteers (P=0.102).

## Discussion

SPECT and PET can demonstrate interictal temporal hypoperfusion in more than 50% of the temporal epilepsy patients, and in some cases the hypoperfusion may extends out of the temporal lobes. MR perfusion techniques have also been used in evaluating perfusion of epilepsy and have shown high sensitivity and consistency with PET. Our results show that the temporal AI values of non-refractory epilepsy patients are different from those of volunteers, which is compatible with former reports. But the interictal temporal perfusion in refractory epilepsy patients is comparatively symmetric, indicating the existence of bilateral hypoperfusion. Both non-refractory and refractory temporal epilepsy patients have interictal perfusion disturbances extending out of temporal lobes for that the hemispherical AI values of two groups of epilepsy patients were different from that of normal volunteers..

## Conclusion

The perfusion pattern that the hypoperfusion extends out of temporal lobes is not related to prognosis. In contrast to non-refractory temporal epilepsy, the refractory epilepsy patients have a preference of bilateral mesial temporal hypoperfusion. This perfusion pattern may be valuable for evaluating prognosis of temporal lobe epilepsy.

**Table 1 the AI values of bilateral hemispheres and bilateral mesial temporal lobes in each group**

Groups	No.	AI values of bilateral hemispheres			AI values of bilateral mesial temporal lobes		
		Median	Q <sup>1</sup>	R <sup>11</sup> [min~max]	Median	Q <sup>1</sup>	R <sup>11</sup> [min~max]
Refractory temporal epilepsy	9	3.23	3.50	7.49(0.04~7.53)	3.25	11.32	19.63(0.70~20.33)
Non-refractory temporal epilepsy	21	2.76	4.31	8.52(0.11~8.63)	4.60	7.48	12.03(0.38~12.41)
Controls	13	1.41	2.05	3.82(0.26~4.08)	1.94	2.18	4.30(0.14~4.44)

Q<sup>1</sup>=P75 □ P25 □ R<sup>11</sup>=maximum □ minimum.

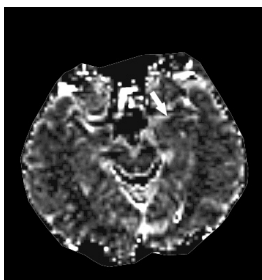


Fig 1. The CBF map obtained with FAIR shows hypoperfusion in the anterior left mesial temporal lobe (white arrow).