

## TO ASSESS SUBCLINICAL RNFL THICKNESS LOSS IN THE FELLOW EYES OF PATIENTS OF DEMYELINATING DISEASES.

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### Abstract

An was Observational clinical study conducted on 30 patients who attended the OPD of upgraded department of Ophthalmology, Index Medical College Hospital & Research Centre, Indore. 60 eyes of 30 different patients of diagnosed cases of multiple sclerosis, neuromyelitis optica, and clinically isolated syndrome who had an H/O attack of Optic neuritis.

**Result:** The difference between overall RNFL thickness in affected eyes and Fellow eyes is statistically significant. Chi square value is - 14.16.P value- 0.006 (<0.05)

Severity of RNFL thickness loss in affected eyes of NMO (45.5µm; 83.34%) is more than MS (66.15µm; 65%). In CIS, RNFL thickness is highest (111.5µm)

**Conclusion:** Severity of RNFL thickness loss is associated with the severity of visual impairment. Hence, can predict the progression of visual impairment in demyelinating diseases. Hence, evaluating the axonal damage, severity of visual impairment by measuring RNFL thickness loss is extremely useful in assessing the progression of visual loss and progression of demyelinating diseases.

**Keywords:** RNFL, Eyes, Demyelinating & Subclinical.

### Introduction:

The retinal nerve fiber layer (RNFL) is made up of the axons of the retinal ganglion cells that convey the visual information from the retina to the lateral geniculate nucleus.

Axons emanating from retinal ganglion cells first display the morphologic characteristics of nonmyelinated (gray matter) fibers within the retinal nerve fiber layer (RNFL), and then become myelinated within the optic nerve, where they form a white matter tract<sup>1-2</sup>. Measurements of the RNFL give relatively direct measures of axons and thus of axonal damage.

This extraordinary circumstance allows us to study the influence on isolated axons of several diseases. Several studies have established the presence of RNFL atrophy in patients with demyelinating disease like MS<sup>3-4</sup>.

### Material & Method

This study was Observational clinical study conducted on 30 patients who attended the OPD of upgraded department of Ophthalmology, Index Medical College

Hospital & Research Centre, Indore from Jan 2018 to June 2019 18 months.

### Study Group-

60 eyes of 30 different patients of diagnosed cases of multiple sclerosis, neuromyelitis optica, and clinically isolated syndrome who had an H/O attack of Optic neuritis were selected from the neurology OPD of the Index Medical College Hospital & Research Centre, Indore.

### Inclusion criteria-

- Patients of all sex and above 10years old.
- Patients diagnosed of MS, NMO, CIS.

### Exclusion criteria-

- Patients with severe cognitive dysfunction.
- Patients unwilling to give consent.

### Methods

Each patient was examined in detail under the following details:

Registration: Name, age, sex, occupation and address of the patient.

Dates of examination-

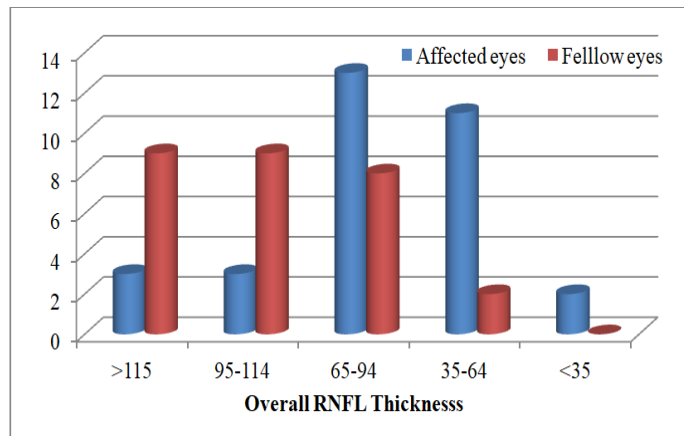
History of present illness-

History Taking-

**Results**

**Table 1: Overall rnfl thickness in affected and fellow eyes.**

| OVERALL RNFL THICKNESS (MICROMETERS) | No. of Affected eyes (n <sub>1</sub> ) | Percentage (n <sub>1</sub> /N) | No. of fellow eyes (n <sub>2</sub> ) | Percentage (n <sub>2</sub> /N) |
|--------------------------------------|----------------------------------------|--------------------------------|--------------------------------------|--------------------------------|
| >115µm                               | 3                                      | 9.38%                          | 9                                    | 32.14%                         |
| 95-114µm                             | 3                                      | 9.38%                          | 9                                    | 32.14%                         |
| 65-94µm                              | 13                                     | 40.62%                         | 8                                    | 28.58%                         |
| 35-64µm                              | 11                                     | 34.37%                         | 2                                    | 7.14%                          |
| <35µm                                | 2                                      | 6.25%                          | 0                                    | 0                              |
| TOTAL(N)                             | 32                                     | 100%                           | 28                                   | 100%                           |



**Graph 1: Overall RNFL thickness in affected eyes and Fellow eyes.**

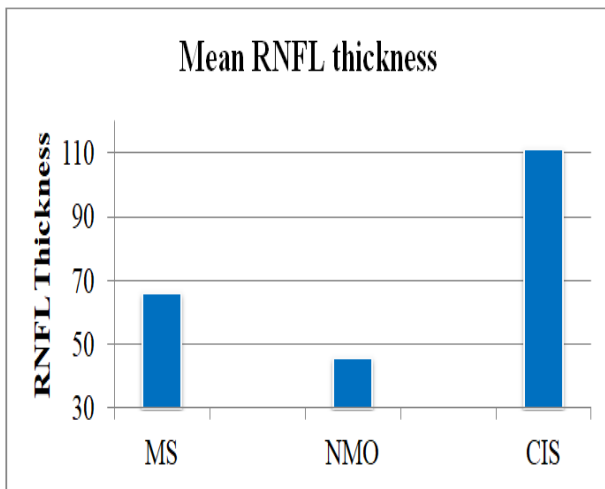
Above graph shows that difference between overall RNFL thickness in affected eyes and Fellow eyes is statistically significant.

Chi square value is - 14.16.P value- 0.006 (<0.05)

**Table 2: Rnfl thickness in affected eyes of diseases under study**

| Overall RNFL Thickness (in micrometers) | MS              | Percentage | NMO            | Percentage | CIS             | Percentage |
|-----------------------------------------|-----------------|------------|----------------|------------|-----------------|------------|
| >115µm                                  | 0               | 0%         | 0              | 0%         | 3               | 50%        |
| 95-114µm                                | 0               | 0%         | 0              | 0%         | 3               | 50%        |
| 65-94µm                                 | 13              | 65%        | 1              | 16.66%     | 0               | 0%         |
| 35-64µm                                 | 7               | 33%        | 3              | 50%        | 0               | 0%         |
| <35µm                                   | 0               | 0%         | 2              | 33.34%     | 0               | 0%         |
| <b>Mean RNFL thickness of</b>           | <b>66.15 µm</b> | -          | <b>45.5 µm</b> | -          | <b>111.5 µm</b> | -          |
| Total no. cases                         | 20              |            | 6              |            | 6               |            |

Table shows Severity of RNFL thickness loss in affected eyes of NMO (45.5µm; 83.34%) is more than MS (66.15µm; 65%). In CIS, RNFL thickness is highest (111.5µm)



**Graph 2: RNFL thickness in affected eyes of diseases under study**

### Discussion

Our Study shows that though the fellow eyes of MS & NMO patients showed some significant RNFL thinning, still there is a more loss of RNFL in affected eyes; than fellow eyes. There was overall RNFL thickness loss in 80.24% affected eyes and 35.72% in fellow eyes, which was statistically significant ( $p=0.006$ ). This is correlated with study by **Trip et al**<sup>2</sup> who found a 27 % reduction RNFL thickness in the affected eyes compared to the unaffected fellow eyes.

It is seen in our study that there is a value of overall RNFL thickness of  $< 65\mu\text{m}$  below which there is severe visual impairment ( $<6/60$  & worse) and a value of  $<35\mu\text{m}$  from where complete visual recovery is hardly possible which is in accordance with the study done by **Merle H, Olindo**<sup>5</sup>, **Naismith RT**<sup>6</sup>, who agreed on the fact that there is a critical value of RNFL thickness below which further decrease of the RNFL lead to incomplete visual recovery. This critical value has been set at  $71.41\mu\text{m}$ <sup>7</sup>. Below  $50\text{--}52\mu\text{m}$ , vision drops to  $\leq 20/100$ .<sup>5,6</sup>

Our study shows that severity of visual impairment is strongly correlated ( $R=0.942$ ) with the severity of the peripapillary overall RNFL thinning in affected eyes, which was statistically significant ( $p=0.0048$ ). Patients(68.74%) who had Mean RNFL thickness  $56.32\mu\text{m}\text{--}66.50\mu\text{m}$  had gross diminution of vision ( $6/36$  & less)which is well correlated with **Costello et al**<sup>8</sup>who reported that the pRNFL thinning to the level of  $75\text{--}80\mu\text{m}$  was a “threshold level” below which there were more severe decrements in visual function.<sup>9</sup>

### Conclusion

Severity of RNFL thickness loss is associated with the severity of visual impairment. Hence, can predict the progression of visual impairment in demyelinating diseases.

Hence, evaluating the axonal damage, severity of visual impairment by measuring RNFL thickness loss is extremely useful in assessing the progression of visual loss and progression of demyelinating diseases.

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