

E. Virgilio<sup>1,2</sup>, M. Morra<sup>1</sup>, A. Maglione<sup>2</sup>, R. Rosso<sup>2</sup>, F. Masuzzo<sup>1</sup>, M. Matta<sup>1</sup>, S. Rolla<sup>2</sup>, A. Sala<sup>3</sup>, M. Clerico<sup>1,2</sup>

<sup>1</sup> Neurology Unit, San Luigi Gonzaga University Hospital, 10043 Orbassano, Italy.  
<sup>2</sup> Department of Clinical and Biological Sciences, University of Turin, 10124 Orbassano, Italy.  
<sup>3</sup> Clinical Neurobiology Unit, University Hospital San Luigi Gonzaga, Orbassano, Turin, Italy

## INTRODUCTION

- CSF kappa FLC and **Kappa-Index**, has been proven useful in the diagnostic workup of Multiple Sclerosis (MS) patient (1).
- Data on Lambda FLC and Lambda-Index are still **limited** (2).

## AIMS

- To compare the diagnostic performance of **Lambda-Index** with other intrathecal synthesis markers in patients with MS and other neurological diseases
- To explore the **prognostic** value at one-year follow-up of both Kappa and Lambda-Index.

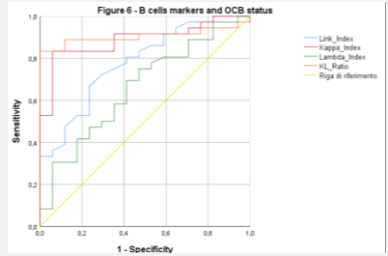
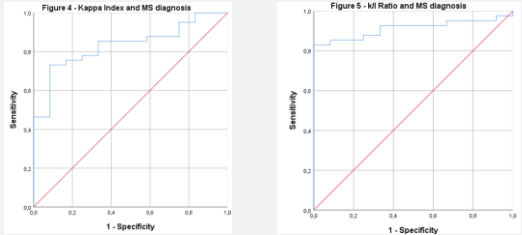
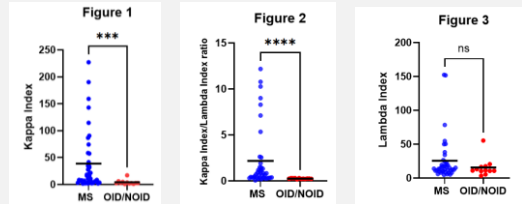
## MATERIAL AND METHODS

- Retrospective single-center analysis.
- **60 patients** who underwent lumbar puncture (LP) for suspected inflammatory disease of the central nervous system (CNS) over the past 2y with at least 1y follow-up.
- Oligoclonal bands (OCBs) detected via isoelectrofocusing,
- serum and CSF albumin, LFLCs, and KFLCs measured via nephelometry.
- Kappa-Index and Lambda-Index are ratios between CSF/serum KFLC or LFLC and CSF/serum albumin.

## RESULTS

- **MS patients** showed **higher** Kappa-Index (p:0.0003), Kappa/Lambda Index ratio (p<0.0001) and CSF LFLC (p:0.03) compared to patients with inflammatory disorders (OID), and non-inflammatory disorders (NOID). [Figure 1 and 2](#)
- Serum LFLC and Lambda-Index were similar (p:0.1 and p:0.2) [Figure 3](#).
- **Kappa/Lambda Index ratio** showed better diagnostic performances (AUC 0.913 p:0.0001) with a cut-off of 0.32 compared to Kappa Index alone (AUC 0.833, p:0.0001) [Figure 4 and 5](#).
- Kappa/Lambda Index ratio **more accurate** (AUC of 0.905 p:0.0001) in identifying patients with **OCB** than Kappa-Index alone (AUC 0.889 p:0.0001) or Link-Index (AUC 0.775 p:0.001). [Figure 6](#)
- Moderate positive correlation between serum LFLC and 1year follow-up EDSS (r:0.29 p:0.049)
- Moderate inverse correlation with Lambda-Index (r=-0.34 p:0.002).
- No correlation with MSSS and ARMSS.

Table 1	MS patients (n <sup>o</sup> 41)	OID/NOID (n <sup>o</sup> 12)	p-value
Age at LP (mean ± SD)	43 ± 16	53 ± 14	0.048
Female n <sup>o</sup> %	25 (61%)	6 (50%)	0.5
EDSS (median - range)	2 (0-6)	---	---
OCB Pattern 2, n %	34 (83%)	1 (8%)	<0.0001
CSF KFLC mg/dl (mean ± SD)	3.7 ± 5.5	1.2 ± 2.9	0.001
CSF LFLC mg/dl (mean ± SD)	1.88 ± 2.2	0.97 ± 0.2	0.03
Kappa Index (mean ± SD)	38.8 ± 55.2	4.2 ± 4.3	0.0003
Lambda Index (mean ± SD)	25.6 ± 32.8	15.5 ± 13.44	0.2
K/L ratio mean ± SD	2.2 ± 3.3	0.2 ± 0.04	<0.0001
CSF Albumin mg/dl (mean ± SD)	274.5 ± 107.3	295.8 ± 370	0.1
Link Index mg/dl (mean ± SD)	0.75 ± 0.37	0.54 ± 0.12	0.02



## CONCLUSIONS

- We suggest a potential application of the Lambda-Index in conjunction with the Kappa-Index, particularly for **diagnostic purposes**.
- We further expand the potential diagnostic landscape of diagnostic fluid biomarkers in MS.
- We plan to expand our cohort and include longer follow-ups.

## REFERENCES

- 1) Vecchio D, et al. Kappa index for multiple sclerosis diagnosis: an accurate biomarker of intrathecal synthesis. J Neurol. 2024 Dec 12;272(1):30.
- 2) Hegen H, et al. Cerebrospinal fluid kappa free light chains for the diagnosis of multiple sclerosis: A systematic review and meta-analysis. Mult Scler. 2023 Feb;29(2):169-181.