The Immunohistochemical Expression of L-NGFR and NRP2 Biomarkers in the Bone Marrow Biopsy of Primary Myelofibrosis Patients: Correlation With the Disease Characteristics

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INTRODUCTION

Primary myelofibrosis is characterized by progressive bone marrow fibrosis resulting from complex interactions between malignant hematopoietic cells and the bone marrow microenvironment.
Activated mesenchymal stromal cells are increasingly recognized as key mediators of fibrosis. L-NGFR is an established stromal marker, while NRP2 participates in angiogenic and profibrotic signaling pathways. However, their expression in PMF has not been well characterized.

AIM

Our objective was to evaluate the expression of L-NGFR and NRP2 in bone marrow biopsies from PMF patients and determine their relationship with fibrosis grade and clinical disease severity.

METHOD

This was a case-control study including 47 patients with primary myelofibrosis and 10 healthy controls.

- Bone marrow biopsies underwent routine histopathologic evaluation and reticulin grading.
- Immunohistochemical staining was performed for L-NGFR (graded from 0-3) and NRP2 (grades as 0-low-high).
- We correlated the biomarkers expression in cases vs controls. Also, we correlated the biomarkers expression correlation with fibrosis grade and DIPSS risk stratification.

CONCLUSIONS

In conclusion, L-NGFR and NRP2 are significantly overexpressed in primary myelofibrosis.
L-NGFR demonstrated the strongest association with fibrosis severity and disease risk, suggesting that it may serve as a promising biomarker of stromal activation in PMF.
Higher NRP2 expression tended to be associated with higher reticulin grades but not statistically significant.

RESULTS

Figure 1. Boxplot showing the distribution of L-NGFR levels in the cases and control groups.

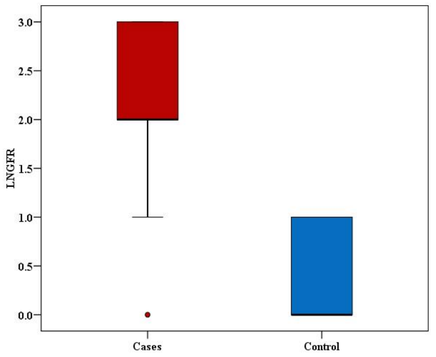

Figure 2. Boxplot showing the distribution of NRP2 levels in the cases and control groups.

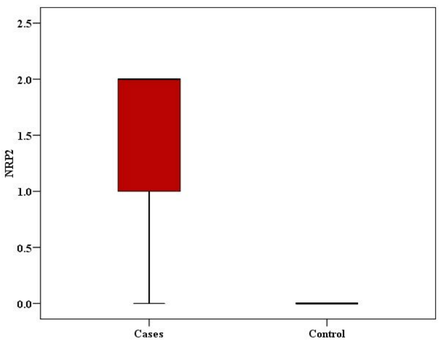

Figure 3. A: Reticulin (MF2). B: Expression of L-NGFR (membranous and cytoplasmic staining) (graded as G2) (x100)

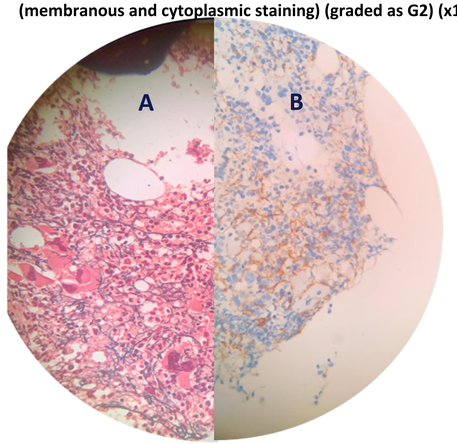

Figure 4. Expression of L-NGFR (membranous and cytoplasmic staining) in cases with reticulin MF III (graded as G3) (x100)

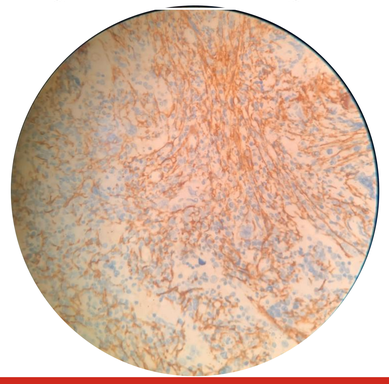

Figure 5. Expression of NRP2 (cytoplasmic staining) in cases with reticulin MF II (graded as low expression) (x100)

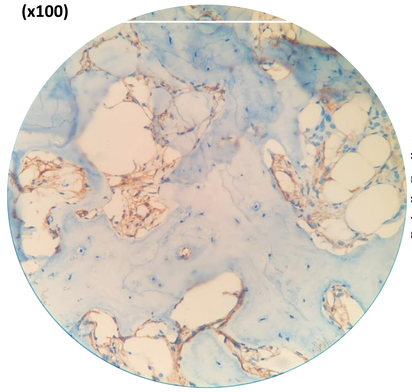

Figure 6. Expression of NRP2 (cytoplasmic and nuclear staining) in cases with reticulin MF III (graded as high expression) (x100)

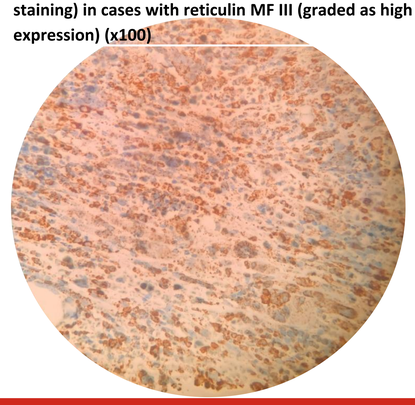

Figure 7. Scatter plot illustrating the positive linear relationship between LNGFR scoring and histopathological reticulin grading.

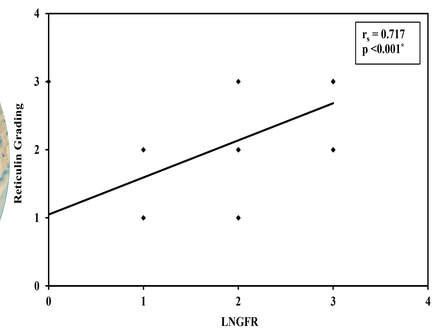

Table 1. Spearman correlation analysis for NRP2, L-NGFR, reticulin grading, and DIPSS scores.

		NRP2	L-NGFR	Reticulin Grading	DIPSS
NRP2	r_s	1.000	0.721	0.235	0.175
	p		<0.001	0.113	0.240
L-NGFR	r_s		1.000	0.717	0.332
	p			<0.001	0.023
Reticulin Grading	r_s			1.000	0.382
	p				0.008
DIPSS	r_s				1.000
	p				

Abbreviations used: **DIPSS**, Dynamic International Prognostic Scoring System; **L-NGFR**, Low-Affinity Nerve Growth Factor Receptor; **NRP2**, Neuropilin 2; **PMF**, Primary Myelofibrosis.

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CONTACT INFORMATION

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