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Differentiation of NAION and Idiopathic Optic Neuritis by the Expression of CD95 and CD54 on CD3⁺ T Cells

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Objective: To quantify the proportion of CD3⁺ T lymphocytes expressing CD95 (CD95%) and the CD54/CD95 index (ratio of absolute CD3⁺CD54⁺ to CD3⁺CD95⁺ counts) to improve differential diagnosis between anterior NAION and ON (papillitis).

Methods: Two clinical groups were enrolled: ON (papillitis), 18 patients (18 eyes; median time from symptom onset to assessment, 12 days [Q1–Q3, 7–30]; mean age 37.8 ± 11.3 years) and anterior NAION, 31 patients (52 eyes; mean age 50.6 ± 11.8 years). All participants underwent a standardized ophthalmic examination including best-corrected visual acuity, autorefractometry, intraocular pressure measurement, slit-lamp biomicroscopy, indirect ophthalmoscopy, automated static perimetry (Humphrey Field Analyzer, 30-2 SITA-Fast), and SD-OCT of the macula and optic nerve head (Cirrus HD-OCT 5000; Carl Zeiss Meditec). As indicated, patients received neurology or internal medicine consultation and neuroimaging (brain MRI and/or CT).

Laboratory assessments were performed by immunocytochemistry on peripheral blood smears: we quantified the percentages of CD3⁺CD54⁺ and CD3⁺CD95⁺ T cells and calculated the CD54/CD95 index as (CD3⁺CD54⁺ count)/(CD3⁺CD95⁺ count).

Statistics: analyses were performed in IBM SPSS Statistics; group comparisons used a two-sample Student's t test; discriminative performance was evaluated by ROC analysis with AUC and 95% CIs; optimal cut-offs were determined by the Youden index, with sensitivity and specificity reported.

Results: In ON, the percentage of CD3⁺ T cells expressing CD54 was 28.8 ± 2.6% versus 29.0 ± 2.3% in NAION, with no significant difference. CD95% was 23.15 ± 3.3% in ON and 26.10 ± 1.9% in NAION, which was 12.74% higher in NAION ($p = 0.004$). ROC analysis for CD95% yielded an AUC of 0.81 (95% CI, 0.663–0.948); a cut-off > 24.5% provided sensitivity ≈ 0.70 and specificity ≈ 0.75, indicating values above 24.5% are more consistent with NAION than ON. The CD54/CD95 index averaged 1.29 ± 0.29 in ON and 1.13 ± 0.13 in NAION ($p < 0.001$), with an AUC of 0.76 (95% CI, 0.580–0.856) and an optimal cut-off < 1.25 (sensitivity ≈ 0.62; specificity ≈ 0.75). At a CD54/CD95 cut-off < 1.25 (sensitivity ≈ 0.62; specificity ≈ 0.75), cases were more consistent with anterior NAION.

Conclusion: When clinical findings are inconclusive, peripheral blood immunocytochemistry can aid differentiation: CD95% > 24.5% together with a CD54/CD95 index < 1.25 supports the diagnosis of anterior NAION rather than ON (papillitis).

Disclosure of Interest: None Declared