# The relation between steroid responsiveness and immunofluorescence findings for idiopathic nephrotic syndrome in children

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## INTRODUCTION

- Some specialists insist that nephrotic syndrome with positive immunofluorescence (IF) findings should be categorized as different clinical entities such as IgM or C1q nephropathy, which is based on clinical findings that these patients have poorer response to steroid and poorer kidney prognoses.
- However, it is still unknown whether idiopathic nephrotic syndrome (INS) in children fit comfortably into the above concepts.
- Our objective was to clarify the association between IF findings and clinical entities from the aspect of steroid responsiveness in children with INS .

## METHODS

- This study included 77 patients with INS, who underwent initial renal biopsy at Kobe University Hospital between 1995 and 2010.
- 'IF-positive' was defined by renal biopsy findings that showed positive IF for 1 or more of the following immune system components: IgG, IgM, C1q, C3, and C4, with diffuse distribution of mesangial region.
- The above evaluation was done by the single pathologist (N.Y.). IF negative cases were those which did not show specific IF findings.
- The patients were separated into 2 groups: steroid resistant (SR) and steroid sensitive (SS) group, based on their steroid response at the most recent episode of renal biopsy.
- The age at onset, pathological findings, estimated glomerular filtration rate (eGFR), and treatment were retrospectively investigated using medical records.
- Comparisons between 2 groups were made using *t*-test and Fisher's exact test, and the differences were considered statistically significant at $p < 0.05$.

## RESULTS

Table1. Patient Characteristics

| | Total(n=77) | SR(n=20) | SS(n=57) | p value |
|---|---|---|---|---|
| Follow-up periods (years) | 8.4±0.6 | 9.4±1.1 | 8.0±0.7 | 0.35 |
| Duration between onset and biopsy (years) | 1.3±0.2 | 0.4±0.1 | 1.6±0.2 | <0.001 |
| **At renal biopsy** | | | | |
| Age (years) | 7.6±0.6 | 4.7±1.0 | 8.4±0.7 | <0.001 |
| Patient with Proteinuria | 35 | 20 | 15 | <0.001 |
| eGFR(ml/min/1.73m$^2$) | 116.7±2.5 | 109.2±7.2 | 119.2±2.4 | 0.18 |
| **At last visit** | | | | |
| Age(years) | 14.7±0.7 | 13.7±1.2 | 15.1±0.8 | 0.56 |
| eGFR(ml/min/1.73m$^2$) | 122.8±3.2 | 123.7±7.8 | 122.5±3.4 | 0.77 |
| Any medication | 48(62.3%) | 13(65.0%) | 32(56.1%) | 0.49 |
| CyA | 28 | 8 | 20 | |
| MZR | 14 | 1 | 13 | |
| ACE-I/ARB | 7 | 4 | 4 | |
| PSL | 9 | 2 | 7 | |
| RTx | 4 | 1 | 3 | |
| **Outcome** | | | | |
| ESKD | 4(5.2%) | ¶2(10.0%) | †2(3.5%) | <0.001 |

¶: Two patient were primary non responders.
†: One patient was secondary non responder, the other patient was non adherence

<Abbreviation in Table1,2>
CyA: Cyclosporine A MZR: Mizoribine ACE-I: Angiotensin coverting enzyme inhibition ARB: Angiotensin Ⅱ receptor blocker PSL: Predonisolone RTx: Rituximab ESKD: End Stage Kidney Disease MGA: Minor Glomerular Abnormality FSGS: Focal Segmental Glomerular Sclerosis DMP: Diffuse Mesangial Proliferation

Table2. Results of histopathological findings

| | Total(n=77) | SR(n=20) | SS (n=57) | p value |
|---|---|---|---|---|
| **Light Microscope findings** | | | | |
| MGA | 55(71.4%) | 10(50.0%) | 45(79.0%) | 0.006 |
| DMP | 11(14.3%) | 3(15.0%) | 8(14.0%) | |
| FSGS | 11(14.3%) | 7(35.0%) | 4(7.0%) | |
| NOS variant | 8 | 5 | 3 | 0.69 |
| Tip variant | 2 | 1 | 1 | |
| Perihilar variant | 1 | 1 | 0 | |
| Cellular variant | 0 | 0 | 0 | |
| Collapsing variant | 0 | 0 | 0 | |
| **IF findings** | | | | |
| **Negative** | **62(80.5%)** | **15(75.0%)** | **47(82.5%)** | **0.47** |
| **Positive** | **15(19.5%)** | **5(25.0%)** | **10(17.5%)** | |
| IgG | 11 | 5 | 6 | 0.72 |
| IgM | 7 | 2 | 5 | |
| C1q | 3 | 2 | 1 | |
| C3 | 2 | 1 | 1 | |
| C4 | 0 | 0 | 0 | |

Table3. Association between proteinuria and IF findings

| | IF+ | IF- | |
|---|---|---|---|
| Proteinuria(+) | 7 | 28 | 0.92 |
| Proteinuria(-) | 8 | 34 | |

## SUMMARY

- There were 20 and 57 patients in SR and SS groups, respectively.
- The mean observation period, the mean age at renal biopsy, and the mean eGFR were 8.4 ± 0.6 years, 7.6 ± 0.6 years, and 119.2 ± 2.4 mL/min/1.73 m$^2$, respectively.
- Five (25.0%) and 10 (17.5%) patients were IF-positive in SR and SS groups, respectively, but the difference in the percentage was not significant ($p = 0.47$).
- Proteinuria did not affect results of IF findings.
- The histological patterns of SR and SS groups showed minimal-change nephritic syndrome (MCNS) in 10 (50.0%) vs. 45 (78.9%) patients (SR group vs. SS group), focal segmental glomerulosclerosis (FSGS) in 7 (35.0%) vs. 4 (7.0%) patients, and diffuse mesangial proliferative glomerulonephritis (DMP) in 3 (15.0%) vs. 8 (14.0%) patients, with significant differences in the distributions ($p = 0.006$).

## CONCLUSION

- Steroid sensitivity in children with INS is correlated with light microscopic findings, which was consistent with those in previous reports.
- On the contrary, steroid sensitivity in children with INS bear no reference to immunostaining findings, which indicated that the prediction of steroid responsiveness by IF findings is difficult, at least in children with INS .
- IF findings in children with INS are not related to steroid responsiveness.

## DISCLOSURE

The author declare the absence of competing interest

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