

Immunomodulation with Rituximab in Severe Pediatric Acute-Onset Neuropsychiatric Syndrome and Autoimmunity: A Case Series

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BACKGROUND

- Children with PANS/PANDAS → **Abrupt-onset OCD + >2 neuropsychiatric symptoms** (anxiety, mood instability, psychosis, tics) often have associated frank autoimmune disease¹
- **PANDAS can present as a “first episode” of autoimmunity and translational research has clarified it is an immune-mediated, post-infectious condition** → autoimmune inflammation in the **basal ganglia**²
- Standard Treatments: Antibiotics, psychotropic medications and psychotherapy, immunomodulation (steroids, IVIG)^{3,4}
- **Rituximab (anti-CD20 monoclonal antibody) = therapy prescribed targeting associated autoimmune conditions with potential benefit for neuropsychiatric symptoms**^{5,6,7,8,9}
- Evaluation and treatment by multidisciplinary team (Rheumatology, Neurology, Psychiatry, Pediatrics)

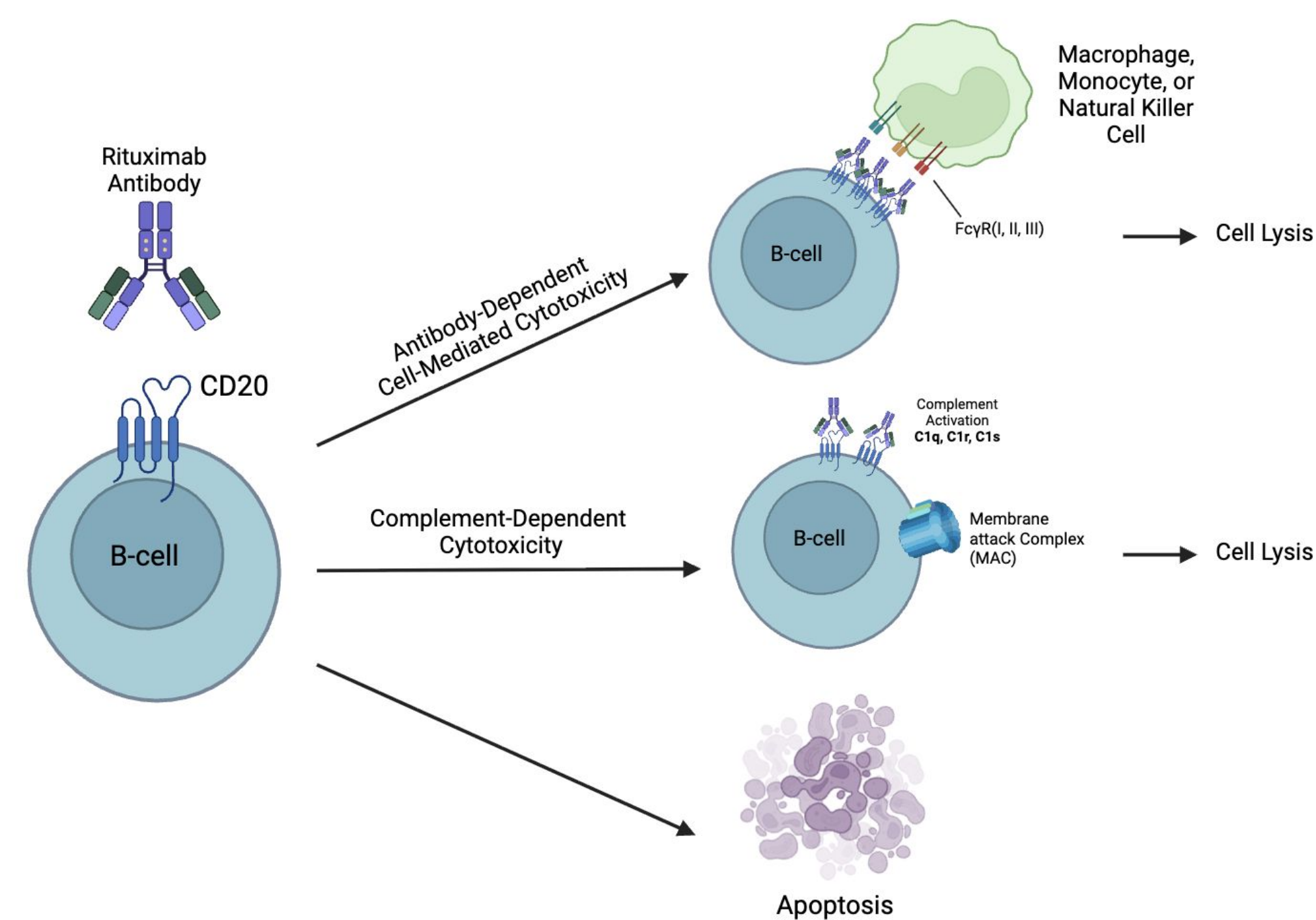


Figure 1 Mechanisms of Rituximab-Mediated B Cell Depletion in Supporting Autoimmune Disease Control

AIM

Describe the clinical course, response, and adverse events in children with severe PANDAS and comorbid autoimmune conditions treated with Rituximab.

METHODS

- Design: Retrospective case series of four adolescents (3F/1M, Ages 12-16) with severe, treatment-refractory PANS/PANDAS and associated autoimmune conditions
- Treatment Protocol: Rituximab as IV infusions (700 mg in 350 mL at ~4-6 month intervals)

RESULTS

| Case | Presentation | Prior Treatments | Rituximab Response | Adverse Effects |
|--------|---|---|---|---|
| F, 16Y | <ul style="list-style-type: none"> • JIA (Juvenile idiopathic arthritis) POTS, Wolff-Parkinson-White (WPW) syndrome • PANS onset: OCD, panic attacks, tics • Antecedent infection: Group A Strep | <ul style="list-style-type: none"> • Antibiotics • SSRIs • IVIG • Steroids • MTX, Humira • Intensive psychotherapy programs | <ul style="list-style-type: none"> • Partial Improvement (OCD, Chronic Pain ↓) • Relapse ~5.5mo post-infusion | <ul style="list-style-type: none"> • No major adverse effects |
| M, 13Y | <ul style="list-style-type: none"> • Undifferentiated connective tissue disorder (lupus-like condition, ANA+) • Prior dx: ADHD, MDD, ODD • PANS onset: OCD, anxiety, severe aggression, suicidal ideation • Antecedent infection: Group A Strep | <ul style="list-style-type: none"> • Antibiotics • Steroids • IVIG | <ul style="list-style-type: none"> • Partial response (emotional stability, school attendance ↑) • OCD symptoms ↓ • Intermittent relapses | <ul style="list-style-type: none"> • No major adverse effects |
| M, 12Y | <ul style="list-style-type: none"> • Celiac disease, chronic rhinitis, migraine • PANS onset: Auditory hallucinations, OCD, panic attacks • Antecedent infection: Group A Strep | <ul style="list-style-type: none"> • Antibiotics • CBT • NSAIDs • SSRI • Steroids • IVIG | <ul style="list-style-type: none"> • 100% back to baseline • Minimal OCD, depression resolved | <ul style="list-style-type: none"> • Infusion headaches |
| F, 12Y | <ul style="list-style-type: none"> • Sjogren's syndrome, SLE, chronic sinusitis, gastric reflux • PANS onset: Auditory hallucinations, anxiety, anorexia, suicidal ideation • Antecedent infection: Group A Strep | <ul style="list-style-type: none"> • T & A • SSRI • Antipsychotics • Steroids • IVIG | <ul style="list-style-type: none"> • 80-90% back to baseline • (anxiety and hallucinations ↓, school engagement ↑) • Mild flares with Covid and Flu | <ul style="list-style-type: none"> • Mild infection-triggered flares |

DISCUSSION

- Rituximab was associated with a **robust clinical improvement** in 3 out of 4 patients, including **near-complete remission** in 2
- Predictable relapse window (~5-6 months) suggests waning effect of Rituximab → **individualized maintenance dosing** may be necessary
- Risks: Hypogammaglobulinemia due to immunosuppression – careful risk/benefit discussions were held with families, led by rheumatology and neurology
- Adjunctive measures (e.g. antibiotic prophylaxis, infection prevention) psychotherapies, psychiatric medications if indicated, remain essential

CONCLUSIONS

- Rituximab shows significant benefit in treatment refractory neuropsychiatric symptoms in PANS/PANDAS patients with comorbid autoimmune conditions
- Long term follow up is needed
- Future research → RCTs are planned; biomarker investigations are ongoing

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