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"Seesaw effect" between the host immune response and tic expression in a *Staphylococcus aureus* intermittent carrier with Tourette syndrome

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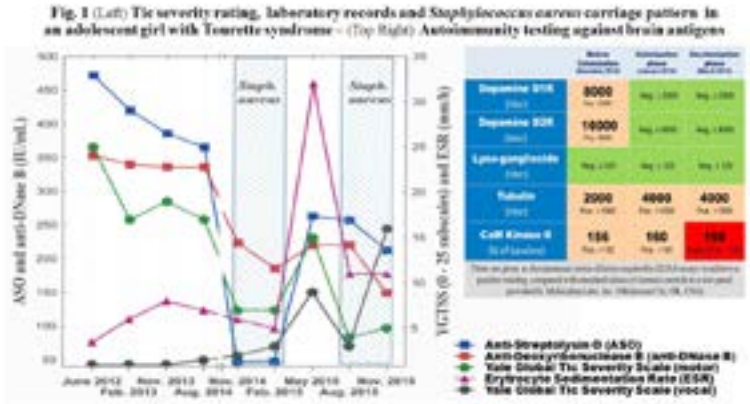
A girl with Tourette syndrome (TS) and increased an-tibody levels against *Streptococcus pyogenes* was monitored longitudinally for the presence of nasopha-ryngeal bacteria, specific antibody titres, and autoim-munity directed against brain antigens (Fig.1). This case presented overlapping similarities with PAN-DAS patients (Paediatric Autoimmune Neuropsychi-atric Disorders Associated with Group A Streptococcal Infections) where tics and obsessive compulsive disorders follow acute *Streptococcus pyogenes* infections. Microbiological monitoring indicated that the child was an intermittent *Staphylococcus aureus* nasopharyngeal carrier. Clinical improvements in motor tic frequency and severity were observed during the *S. aureus* colonization phase and were temporally correlated with the downregulation of anti-streptococcal and anti-D1/D2 dopamine receptor antibody production. *S. aureus* is known to be very effective in the downregulation of the host immune response to pro-mote immune evasion. Dopamine is a crucial neurotransmitter in motor control, and autoimmunity against its neuronal receptors may alter central dopamine pathways leading to movement and neuropsychiatric disorders, especially in childhood. After decolonization, clinical conditions reverted to the poor scores previously observed, suggesting a possible role of the immune response in bacterial clearance as a trigger of symptom recrudescence. This hypothesis is consistent with the data from animal models showing that a pro-inflammatory, Th17 cell-associated immune response, is required for *S. aureus* nasal decolonization. These findings imply that a cause–effect relationship exists between *S. aureus* colonization and tic improvement, as well as between bacterial decolonization and tic exacerbation. This case is the first demonstration of the modulation of tic manifestation in a *S. aureus* intermittent carrier with TS. A shift occurred from an anti-inflammatory modulatory response during the colonization phase to a pro-inflammatory state during the clearing process. Thus, *S. aureus* nasal carriage possibly provides a new human model for the *in vivo* study of the interplay between infections, immunity, auto-immunity, and tic disorders.



Biography

Gemma Eftimiadi is currently a fourth year Medical student of the International "Medicine and Surgery" English-taught program started at Università Cattolica del Sacro Cuore, Rome, Italy. She is interested in Child Neuropsychiatric Disorders. She had the opportunity to join GNOSIS, a nonprofit research organization devoted to the study of movement disorders and behavioural child and is grateful for the privilege of being involved in a research project on the psychiatric aspects of infectious diseases.

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