HUMAN VACCINES & IMMUNOTHERAPEUTICS
2018, VOL. 14, NO. 11, 2802
https://doi.org/10.1080/21645515.2018.1486157

Taylor & Francis
Taylor & Francis Group

LETTER TO THE EDITOR

Fatal meningococcemia due to *Neisseria meningitidis* serogroup Y in a vaccinated child receiving eculizumab

Meltem Polat[a], Selçuk Yüksel[b], and Nuriye Ünal Şahin[c]

[a]Pamukkale University School of Medicine, Department of Pediatric Infectious Diseases, Denizli, Turkey; [b]Pamukkale University School of Medicine, Department of Pediatric Rheumatology, Denizli, Turkey; [c]National Reference Laboratory for Respiratory Pathogens, Microbiology Reference Laboratories Department, Public Health Institution of Turkey, Ankara, Turkey

To the Editors,

We read the article by Dretler et al.[1] regarding meningococcal disease and vaccination with great interest. As stated in this review, individuals receiving the complement inhibitor eculizumab are at increased risk for invasive meningococcal disease. Eculizumab (Soliris, Alexion Pharmaceuticals), is a humanized monoclonal antibody that is a terminal complement inhibitor used to treat atypical hemolytic uremic syndrome (aHUS).[2] Administration of eculizumab has been associated with a 1000-fold to 2000-fold increased incidence of meningococcal disease.[3] Current Advisory Committee on Immunization Practices guidelines recommend that eculizumab recipients should be vaccinated with both quadrivalent meningococcal conjugate (MenACWY) and serogroup B (MenB) meningococcal vaccines.[1] Clinicians could also consider antimicrobial prophylaxis for the duration of eculizumab treatment to reduce the risk for meningococcal disease. However, neither vaccination nor antibiotic prophylaxis provides complete protection in patients receiving eculizumab treatment.[3] Thus, as stated by Dretler et al.,[1] the ideal management for these patients remains challenging. Here, we present an 11-year-old boy with aHUS treated with eculizumab who developed fatal meningococcemia due to *Neisseria meningitidis* serogroup Y 16 months after receiving two doses of MenACWY-D (first dose: prior to start of eculizumab treatment; second dose: 2 months later) while on oral penicillin prophylaxis. The patient presented to the pediatric emergency department with fever, chills, headache, and myalgia, but no rash, or neck stiffness. Treatment with empirical intravenous ceftriaxone was started after blood and cerebrospinal fluid (CSF) cultures were obtained. Laboratory evaluation revealed leukopenia (2600/μL [N:4–10.8 $\times$ $10^3/\mu$L]), thrombocytopenia (128000/μL [N:130-400 $\times$ $10^3/\mu$L]), elevated C reactive protein (19 mg/dL [N: 0-0,5]), and disseminated intravascular coagulation (DIC). Lumbar puncture revealed no evidence of meningitis. Due to rapid deterioration with progressive shock and multiorgan failure the patient was transferred to pediatric intensive care unit (PICU). He developed a petechial and purpuric rash over his entire body in the first hour after PICU admission. Despite aggressive fluid resuscitation, inotropic and ventilatory support, hypotension and respiratory failure persisted, and the patient died within hours of PICU admission. Twenty-four hours later, *N. meningitidis* growth was noted in blood culture, but not in CSF culture. The bacterial isolate was sent to the national reference laboratory for serogrouping and confirmed as serogroup Y. The *N. meningitidis* strain showed intermediate penicilin susceptibility, with a minimal inhibitory concentration of 0.19 mg/L (sensitive 0.06 mg/L, resistant 0.25 mg/L).

Our case highlights the difficulties in protecting patients on eculizumab treatment against meningococcal disease, even with vaccination and antibiotic prophylaxis. Futher studies are needed to investigate the potential efficacy and duration of protection of meningococcal conjugate vaccines in pediatric eculizumab recipients.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

References

1. Dretler AW, Rouphael NG, Stephens DS. Progress toward the global control of Neisseria meningitidis: 21st century vaccines, current guidelines, and challenges for future vaccine development. Hum Vaccin Immunother. 2018;15:1–35. doi:10.1080/21645515.2018.1451810.
2. Yüksel S, Evrengül H, Özçakar ZB, Becerir T, Yalçın N, Korkmaz E, Ozaltin F. First-line, early and long-term eculizumab therapy in atypical hemolytic uremic syndrome: a case series in pediatric patients. Paediatr Drugs. 2016;18(6):413–20. doi:10.1007/s40272-016-0194-0.
3. McNamara LA, Topaz N, Wang X, Hariri S, Fox L, MacNeil JR. High risk for invasive meningococcal disease among patients receiving eculizumab (Soliris) despite receipt of meningococcal vaccine. MMWR Morbidity and mortality weekly report 2017;66:734–7.

CONTACT Meltem Polat meltemtemizhan@gmail.com Corresponding author: Meltem Polat, MD, Pamukkale University Faculty of Medicine, Department of Paediatric Infectious Diseases, 20070, Kınıklı, Denizli, Turkey.