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Vaccination strategies for oncology patients: the need for a pro-active approach

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Vulnerable patients bear an excessive burden of infectious diseases, as manifest during the COVID-19 pandemic, in which unvaccinated patients with active cancer, irrespective of the body site, had more severe outcomes due to COVID-19 (odds ratio [OR], 1.46).[1] This vulnerability may equally occur in cancer survivors: survivors of diffuse large B-cell lymphoma (DLBCL) are at increased risk of infectious diseases.[2] Compared with other cancer survivors, humoral immune deficiency is 17.6-fold higher in patients who have recovered from DLBCL.[2] Similarly, children treated for acute lymphoblastic leukaemia (ALL) show waning immunity to vaccine-preventable childhood diseases compared with heathy controls ($P < 0.001$), despite being fully immunized prior to diagnosis of ALL.[3]

The COVID-19 pandemic raised global awareness of vaccination as a core strategy in preventive health, while disrupting health services, including immunisation,[4] and decreasing parental confidence in childhood vaccines.[5] We report on a patient diagnosed with pertussis following DLBCL treatment and suggest vaccine strategies in this vulnerable group of patients should be reviewed.

A 52-year-old male patient presented to casualty, one year after completing treatment DLBCL treatment, complaining of fatigue, fever and a severe, paroxysmal cough, inducing a vasovagal response, the resultant decreased systemic blood pressure causing cerebral hypoperfusion with transient loss of consciousness. The patient was well-orientated to time and place with no localising neurological signs. Symptoms and signs consistent with an upper respiratory tract infection were present. Chest X-ray showed mildly increased bronchial markings bilaterally, but no other abnormalities. Full blood count, urea and electrolytes were within normal range. Due to the preceding history, the patient was started empirically on intravenous azithromycin. A neurological consult confirmed no predisposition to epilepsy: magnetic resonance imaging showed multiple calcified granulomas suggestive of neurocysticercosis which were non-contributory to the patient's vasovagal event. Polymerase chain reaction (Qiastat, Qiagen, Germantown, USA) confirmed *Bordetella pertussis* from a nasopharyngeal swab. Although pertussis is toxin-mediated, public health concerns mandate the need for antimicrobials. The patient responded clinically to early introduction of azithromycin, with fewer episodes and decreased severity of paroxysmal coughing. The patient's presentation alerted his clinicians to the necessity of vaccinating him against other vaccine-preventable diseases, including seasonal influenza and childhood infections.

A documented pertussis outbreak in South Africa in 2022/2023,[6] loss of herd immunity due to disrupted vaccination campaigns and vaccine hesitancy,[5,7] and loss of humoral immunity[2] undoubtedly contributed to this patient acquiring pertussis following DLBCL treatment. The European Blood and Marrow Transplantation Group recommends revaccination of all bone marrow transplant (BMT) patients.[8] Revaccinating allogenic stem cell transplantation patients, six months post-transplant, with combined diphtheria (D), tetanus (T), acellular pertussis (aP), inactivated poliovirus (IPV), and Haemophilus influenzae type b (Hib) conjugate vaccine (DTaP-IPV-Hib), with/without hepatitis B vaccine, with/without pneumococcal conjugate vaccine, confirmed the development of protective antibody titres with no severe side effects among vaccine recipients.[8,9] No specific studies however have examined the long-term success of revaccinating DLBCL survivors in the absence of BMT. Increasing recognition of vulnerability of all adults who did not receive DTaP in childhood, as well as pregnant mothers, has fostered recommendations for vaccination of these groups with TdaP, which includes a reduced diphtheria toxoid, with tetanus toxoid and acellular pertussis.[10] Irrespective of childhood vaccination history and BMT, we advocate inclusion of revaccination for childhood illnesses and prevalent vaccine-preventable diseases in management protocols following successful treatment of haematological and potentially other malignancies.

Declaration of competing interest

The authors declare that they have no conflict of interests.

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Ethics statement

The patient provided consent for the case study. Only de-identified data are used in this manuscript.

Author contributions

K.K. and B.M. conceptualised the case study. K.K. wrote the initial draft. All authors reviewed the content for accuracy, contributed to the writing and reviewing of the manuscript, viewed and approved the final submission.

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