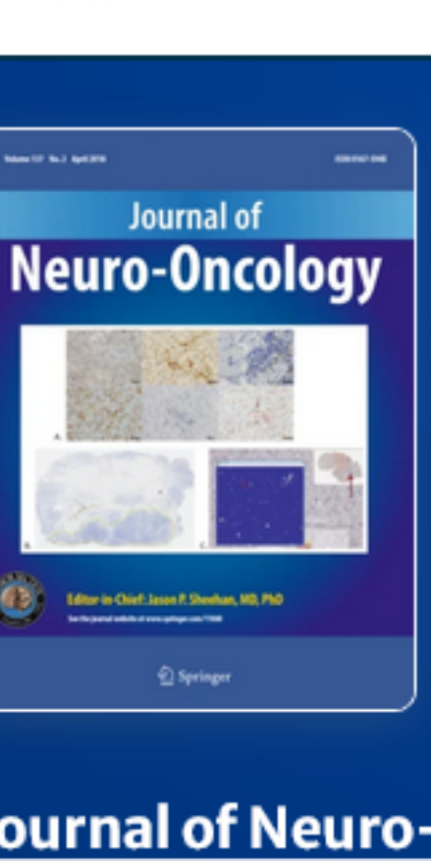
Pneumocystis jirovecii pneumonia in patients with CNS tumors receiving dexamethasone: clinical outcomes and prophylaxis gaps



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Research | Published: 13 March 2026
Volume 177, article number 51 (2026) Cite this article

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Abstract

Purpose

Pneumocystis jirovecii pneumonia (PCP) now predominantly affects non-HIV immunocompromised patients, with corticosteroid exposure a major risk factor. Patients receiving high-dose dexamethasone for central nervous system (CNS) tumor–related indications represent a vulnerable but understudied subgroup. We sought to characterize outcomes in this population and compare disease severity and mortality with other immunocompromised patients with PCP.

Methods

We performed a retrospective multicenter cohort study of adults with proven or probable *Pneumocystis jirovecii* pneumonia (PCP) according to EORTC diagnostic criteria between January 1, 2017, and December 31, 2025. Patients receiving chronic dexamethasone for CNS tumor–related indications (vasogenic edema, mass effect, or spinal cord compression) were identified and compared with the remainder of the PCP cohort. Logistic regression was used to evaluate differences in 30-day and 90-day mortality between the CNS tumor subgroup and other patients with PCP. Severe disease was assessed as a secondary outcome and defined as the requirement for high-flow nasal cannula, noninvasive ventilation, invasive mechanical ventilation, or extracorporeal membrane oxygenation. Within the CNS tumor subgroup, logistic regression was used to evaluate associations between 30-day mortality and age, dexamethasone dose, and tumor etiology (primary vs. metastatic).

Results

Among 865 patients with PCP, 46 (5.3%) were receiving dexamethasone for CNS tumor–related indications. Median steroid exposure prior to diagnosis was 33 days (IQR 25–49), and only 4.4% were receiving PCP prophylaxis. All-cause 30-day mortality was 41.3% and 90-day mortality was 52.2%. Compared with other immunocompromised patients with PCP, CNS tumor patients had higher odds of severe disease (OR 2.24, 95% CI 1.20–4.18; $p = 0.011$), 30-day mortality (OR 2.45, 95% CI 1.33–4.50; $p = 0.004$), and 90-day mortality (OR 2.69, 95% CI 1.48–4.90; $p = 0.001$). Within the CNS tumor subgroup, age, dexamethasone dose, and tumor etiology were not significantly associated with 30-day mortality or severe disease.

Conclusions

PCP developing during dexamethasone therapy for CNS tumors is associated with greater severity and mortality. Prophylaxis should be strongly considered when initiating prolonged corticosteroids in this high-risk population.

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Data availability

The data underlying this study contain protected health information and are not publicly available. Data access is restricted in accordance with institutional review board policies and applicable regulations.

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Funding

REDCap support from The Mayo Clinic | Center for Clinical and Translational Science, Mayo Clinic (CCaTS). UL1TR002377

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Ethics declarations

Competing interests

The authors declare no competing interests.

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Pulsipher, A.M., Khattar, G., Gotway, M.B. *et al.* *Pneumocystis jirovecii* pneumonia in patients with CNS tumors receiving dexamethasone: clinical outcomes and prophylaxis gaps. *J Neurooncol* **177**, 51 (2026). https://doi.org/10.1007/s11060-026-05516-4

Download citation

Received
12 February 2026

Accepted
08 March 2026

Published
13 March 2026

Version of record
13 March 2026

DOI
https://doi.org/10.1007/s11060-026-05516-4

Keywords

Immunocompromised host
Pneumocystis jirovecii pneumonia
Central nervous system tumors
Dexamethasone
Antimicrobial prophylaxis