

Economic burden of chemotherapy-related febrile neutropenia

Authors Derek Weycker, Jennifer Malin, Andrew Glass, and Gerry Oster

Origin of Study USA

Type of Study RETROSPECTIVE COHORT STUDY

Objectives Examine the true economic burden of febrile neutropenia in cancer patients receiving chemotherapy.

Study Design Data from an integrated database of medical and outpatient pharmacy claims from a large US health plan with 10-million covered individuals were examined for claims from January 2001 to December 2003. Each unique chemotherapy cycle per course, up to a maximum of 9, was identified. The first cycle began on the index date and ended with the next chemotherapy administration ≥ 20 days but < 90 days after the cycle start. If the next administration was 7–19 days following the index date, then the patient and all cycles for that patient were discarded. If a new cycle did not begin or radiotherapy was initiated during this period, the cycle and course were truncated accordingly.

Subsequent cycles were defined using similar rules; cycles during which patients were not continuously eligible for health benefits were excluded.

For each patient, each cycle in which febrile neutropenia occurred was identified, and patients with at least 1 such cycle were stratified according to the cycle in which febrile neutropenia first occurred. Febrile neutropenia was identified based upon hospitalization with a first- or second-degree diagnosis of neutropenia, fever, or infection.

Patients with febrile neutropenia in cycle 1 were matched to those with febrile neutropenia, regardless of subsequent occurrence; once matched, these cycles and controls were removed from their prospective pools. From remaining patients, cases and controls were matched similarly for tumor type, total number of cycles, chemotherapy characterization, and propensity score for cycle 2 and subsequent cycles.

The total healthcare charges were tallied for cases and controls from the date of febrile neutropenia onset through the end of the course. Charged amounts were used as a proxy for costs, since the latter were not available.

Patients Patients were ≥ 18 years of age and had at least one medical claim with a code for a chemotherapy drug or a code for chemotherapy administration between July 2001 and March 2003. The study population consisted of 746 patients; 38% had breast cancer, 21% had lung cancer, and 11% had non-Hodgkin's lymphoma. Among patients, the mean age was 54.5 years, and 63.3% were female. Among controls, the mean age was 53.7 years, and 64.3% were female. Other baseline characteristics for cases and controls were similar. Attention was limited to patients with at least two medical claims at least 7 days apart with a diagnosis code for primary cancer of the same body site during pretreatment.

Patients were excluded if they had primary cancers in at least two sites, did not meet minimum eligibility requirements, or underwent bone marrow or stem cell transplant.

Observations Charges related to febrile neutropenia totaled \$40,928 (95% confidence interval [CI], \$28,783–\$62,586) among cases versus \$3,933 (\$2,890–\$5,119) for controls, a difference of \$36,995 (\$25,283–\$58,776). Charges not related to febrile neutropenia were similar between the two groups (\$32,774 [\$28,587–\$36,061] versus \$32,253 [\$29,248–\$36,066]). Care needed after the initial hospitalization accounted for \$9,872 (or 27%) of the higher febrile-neutropenia-related charges among cases.

Charges related to all outpatient care for all office, clinic, and emergency-room visits totaled \$35,958 (95% CI, \$32,187–\$39,415) among cases versus \$29,920 (\$27,673–\$32,597) for controls, a differ-

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ence of \$6,038 (\$1,801–\$10,446). Care needed for febrile neutropenia-related outpatient visits totaled \$7,637 (95% CI \$6,514–\$8,920) among cases versus \$2,635 (\$2,193–\$3,212) for controls, a difference of \$5,002 (\$3,693–\$6,373).

Limitations of the study included coding errors and missing information on clinically important parameters. Further, there were some study-specific limitations with use of healthcare claims data. Most of the study population was < 65 years of age, so some results may not be able to be generalized to older patients. Further, charged amounts were used as a proxy for costs; hospital cost-to-charge ratios typically ranged from 0.50–0.60.

Conclusions

The burden of febrile neutropenia is substantial; in this study, the cost of the initial febrile neutropenia hospitalization was \$27,100, the cost for the subsequent febrile-neutropenia-related care was \$9,900, and the cost for all care related to febrile neutropenia was \$37,000.

Discussion

Febrile neutropenia is a potentially life-threatening complication of myelosuppressive chemotherapy. Management of this complication usually entails hospitalization, laboratory investigation, and antibiotic therapy—with their associated intensive use of resources. However, studies to date may underestimate the true cost of febrile neutropenia because they do not account for follow-up care. The objective of this study was to obtain a more complete picture of the financial burden of febrile neutropenia by also capturing the costs of care after hospital discharge.

In the retrospective study, investigators used data from a healthcare claims database to compare healthcare charges between cancer patients who developed febrile neutropenia during chemotherapy (cases) and matched cancer patients who did not (controls). The febrile neutropenia-related charges that were tallied included inpatient charges; outpatient charges; and charges for drug therapy for neutropenia, fever, and infection.

Febrile neutropenia-related charges were more than 10-fold higher among cases than among controls (\$40,928 vs \$3,933). Moreover, follow-up care after the initial hospitalization for febrile neutropenia accounted for 27% of the difference between groups. In contrast, non-febrile neutropenia-related charges did not differ between cases and controls.

“As noted in the most recent update of recommendations concerning the use of colony-stimulating factors (CSFs), currently available evidence suggests that use of these agents may be justified, on purely economic grounds—that is, they may be cost-saving—if the rate of febrile neutropenia approaches 40%,” said Dr. Weycker; however, he noted, that value considers only the initial hospitalization for febrile neutropenia. “Thus, to the extent that the costs of febrile neutropenia were underestimated in previous work, as suggested by the results of our study, the risk threshold at which the use of CSFs may be cost-saving may be considerably lower, and much closer to the new clinical threshold regarding use of these agents (20% risk of febrile neutropenia).”

“Moreover, it should be noted that disease burden estimated in our study does not include any so-called indirect costs, such as work and productivity loss, which if considered would lower the threshold for use of CSFs even more,” Dr. Weycker added. “Our study thus underscores the importance of accurately estimating the full burden of disease when evaluating the cost-effectiveness of medical interventions.”

Key Points

- The burden of care for reasons related to febrile neutropenia is higher than previously reported; previous studies may have underestimated the cost by as much as 25%–30%.

Reference

Weycker D, Malin J, Glass A, Oster G. Economic burden of chemotherapy-related febrile neutropenia. Presented at the 42nd Annual Meeting of the American Society of Clinical Oncology; June 2–6, 2006; Atlanta, Georgia. Abstract 6068.