

Evaluation of granulocyte colony-stimulating factor use following inpatient administration of chemotherapy at a large academic medical center

Purpose:

While many chemotherapy regimens are safely administered in an outpatient setting, certain therapies for treatment of hematologic malignancies may necessitate inpatient administration during the initial cancer diagnosis or due to the frequent monitoring requirements. Granulocyte colony-stimulating factor (G-CSF) is typically administered 24 to 72 hours after such therapies as primary prophylaxis to reduce the incidence of febrile neutropenia. There are two formulations of G-CSF available: filgrastim and pegfilgrastim. Filgrastim is given once daily until absolute neutrophil count (ANC) recovery, while pegfilgrastim is given as a one-time dose after chemotherapy that is equivalent to two weeks of filgrastim; a convenience owed to its pegylated formulation and reliable kinetics. At the University of Kansas Health System (TUKHS), filgrastim is used for hospitalized patients who require G-CSF but are unable to discharge within the specified time frame while pegfilgrastim is restricted to outpatient administration due to its higher price and differences in acquisition cost or reimbursement seen across the different healthcare settings. Biosimilars in both G-CSF formulations have allowed for increased access to and reduced costs of each drug which makes use of pegfilgrastim biosimilars in hospitalized patients appealing. The purpose of this study was to evaluate the inpatient use of filgrastim, or its FDA-approved biosimilars, and determine the potential cost-saving opportunity to substituting pegfilgrastim biosimilars.

Methods:

A retrospective analysis of 144 patients with leukemia, lymphoma, or multiple myeloma who received a total of 190 cycles of chemotherapy while hospitalized at TUKHS over a 7-year period (from February 2013 to October 2020) was completed. Adult patients who received at least one cycle of myelosuppressive chemotherapy followed by five or more doses of filgrastim, or approved biosimilar, during their hospital admission were included. Patients who received G-CSF post hematopoietic stem-cell transplant for less than five days, or for reasons unrelated to a cycle of chemotherapy were excluded. Descriptive statistics were used to evaluate the data. Discussion related to costs was based on wholesale acquisition cost (WAC) pricing specific to TUKHS at the time of analysis for their current formulary biosimilar products: filgrastim-aafi (Nivestym®) and pegfilgrastim-cbqv (Udenyca®).

Results:

Filgrastim, or approved biosimilar, was given subcutaneously at a dose of 5 mcg/kg once daily; doses were rounded to the nearest 300 mcg or 480 mcg vial size. Of the patients included, 62% were male with a median age of 59 years (range 24-84). Among the chemotherapy regimens received, HyperCVAD Arms A and B were the most common, followed by DVR-PACE and FLAG-Ida. Median length of hospital admission was 24 days (range 6-78). Thirty-nine percent of patients received the 300mcg dose and 61% received the 480mcg dose. Filgrastim, or approved biosimilar, was continued until $ANC \geq 500-1500$ cells/mm³; however, 18% of patients were discharged with an $ANC < 500$ cells/mm³. Patients required an average of 9.9 to 14.7 doses of filgrastim, or approved biosimilar, per chemotherapy cycle resulting in an average cost of

\$2,510.27 to \$3,600.81 depending on regimen received. In comparison, the cost of one dose of pegfilgrastim-cbqv is \$2,925.

Based on the patients evaluated, the chemotherapy cycles received, and the costs of the current TUKHS formulary biosimilar products, use of filgrastim-aafi exceeded the cost of a single pegfilgrastim-cbqv dose for several regimens commonly given inpatient, including both arms of HyperCVAD, VDR-PACE, and FLAG-Ida. The degree of potential cost-savings was most pronounced for regimens that required an average of 12 or more filgrastim-aafi doses or when patients required the 480-mcg dose.

Conclusion:

There may be financial benefit to utilizing pegfilgrastim biosimilars inpatient on a restricted basis in certain high-risk chemotherapy regimens.