Impact of a granulocyte colony-stimulating factor (GCSF) guideline on appropriate use and expenditures – a comparative retrospective analysis

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Disclosure Statement

I, Taylor Goree, have no conflict of interest and have received no funding to support this research.

This research is subject to different interpretation and is being presented solely for educational purposes abiding by non-commercial guidelines.

Learning Objectives

1. Define febrile neutropenia (FN) and recognize parameters that qualify a patient for appropriate treatment with granulocyte colony-stimulating factor (GCSF).

2. Identify infection related risk factors and describe which parameters most contributed to inappropriate ordering of GCSF.

3. Given specific patient characteristics, identify the patient that would qualify for appropriate treatment with filgrastim.

Study Location

- Providence Alaska Medical Center
- Tertiary, non-profit, community medical center
- Largest hospital in the state
  - 401 beds
  - 62 emergency department beds
  - 12 bed oncology section of inpatient unit with dedicated nursing staff
- Lee Sheffield Infusion Center
  - 15 chair outpatient infusion center
- Oncologists and hematologists not directly employed by the hospital

Pre-Test Assessment Question #1

Which of the following objective criteria defines a patient with febrile neutropenia? (select all that apply)

- ❑ Temp ≥ 100.4 °F for over 1 hour
- ❑ ANC < 500 neutrophils/µL
- ❑ Afebrile
- ❑ ANC > 1000 neutrophils/µL
- ❑ Any temp over 101 °F

Pre-Test Assessment Question #2

Select the infection related risk factors below which would qualify a patient for appropriate treatment of FN with GCSF?

a) Prior episode of febrile neutropenia
b) Pneumonia or other clinically documented infection
c) Sepsis
d) Age > 65 years
e) Hospitalization at the time of fever
f) All the above

Pre-Test Assessment Question #3

Which of the following patients should be treated with filgrastim?

a) A 45 y/o female with hx of diabetes who received pegfilgrastim for prevention of FN 7 days prior and is now presenting to the ED w/ ANC of 300

b) A 67 y/o female with breast cancer who presents to the ED 3 days after her 2nd round of chemo with temp of 102 °F and ANC of 215

c) A 52 y/o male presenting 8 days after his first round of chemotherapy for tx of NSCLC with temp of 101 °F and ANC of 489

d) A 50 y/o afebrile female who presents 3 days after her 3rd round of chemotherapy with ANC of 198

Study Goal

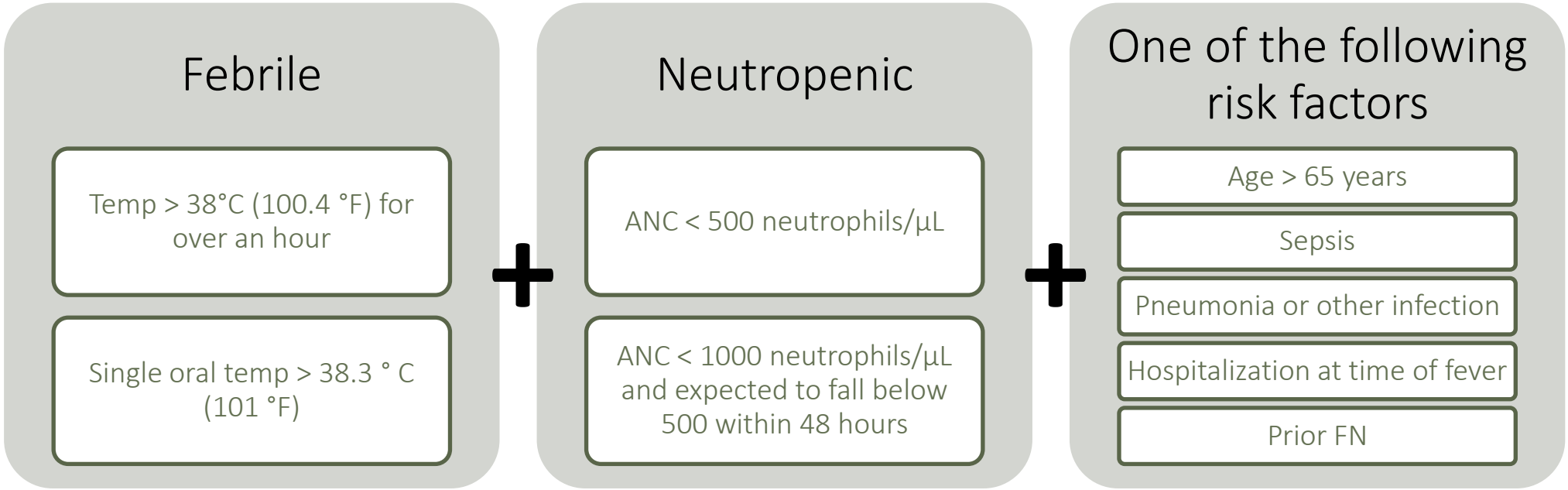
Evaluate the expenditures and prescribing of GCSF products for management of febrile neutropenia (FN) pre and post implementation of a local guideline.

Background

- Pharmacists have noticed an increase in inappropriate ordering of GCSF products for febrile neutropenia
- Providers have been ordering GCSF for non-febrile neutropenia or for patients with FN but no other infection related risk factors
- A local guideline was implemented at PAMC in September 2020 mirroring recommendations from the NCCN guidelines to help pharmacists assess the appropriateness of these orders

Background

Filgrastim would be considered <u>appropriate</u> for treatment of FN if patient presents:



~~Filgrastim administered < 14 days after pegfilgrastim~~

Outcomes

- Primary Outcome
  1. Percentage of patients treated with filgrastim who have definitive FN and risk factors

- Secondary Outcomes
  1. Number of patients treated for the appropriate duration
  2. Number of pharmacist interventions made to discontinue GCSF
  3. Estimated reduction of GCSF expenditures in dollars

Criteria

Inclusion Criteria

- ≥ 18 years old
- Documented administration of filgrastim for prevention or treatment of FN
- Cancer diagnosis

Exclusion Criteria

- Pregnant
- Incarcerated
- < 18 years of age
- No cancer diagnosis

Methods

- Data from EPIC in SlicerDicer
  - Administrations of GCSF and biosimilars
- Chi-squared and Fisher's exact tests for primary and secondary outcomes

STUDY	FROM	TO
Pre-guideline	March 1, 2020	August 31, 2020
Post-guideline	October 1, 2020	March 31, 2021

Population Characteristics

- 196 total administrations of filgrastim for either treatment or prophylaxis
- 67 patients received at least one dose and 53 met inclusion criteria

- 11 pediatric patients and 3 patients without any cancer diagnosis were excluded

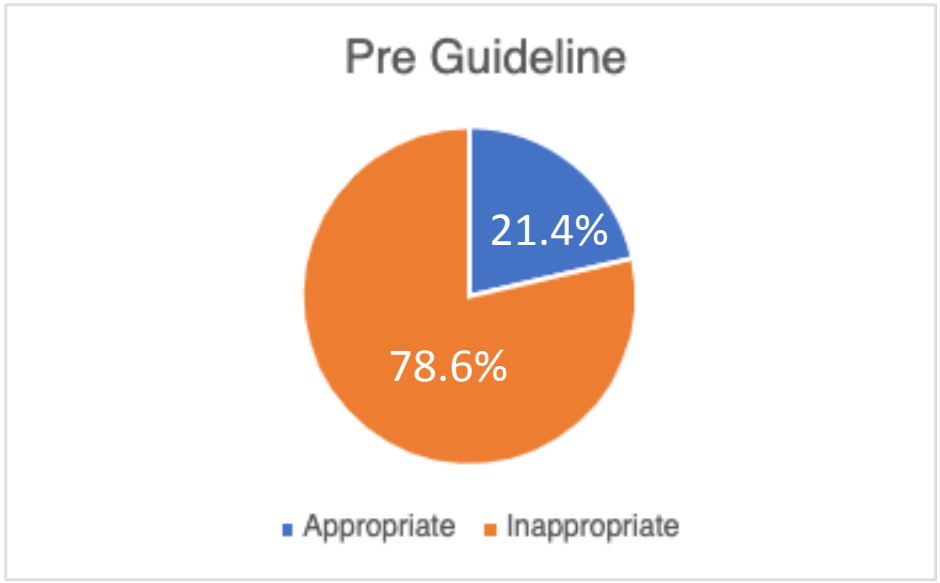
Pre-Guideline Group (25 patients)
14 received treatment
11 received prophylaxis

Post-Guideline Group (28 patients)
21 received treatment
7 received prophylaxis

Results

Pre-guideline

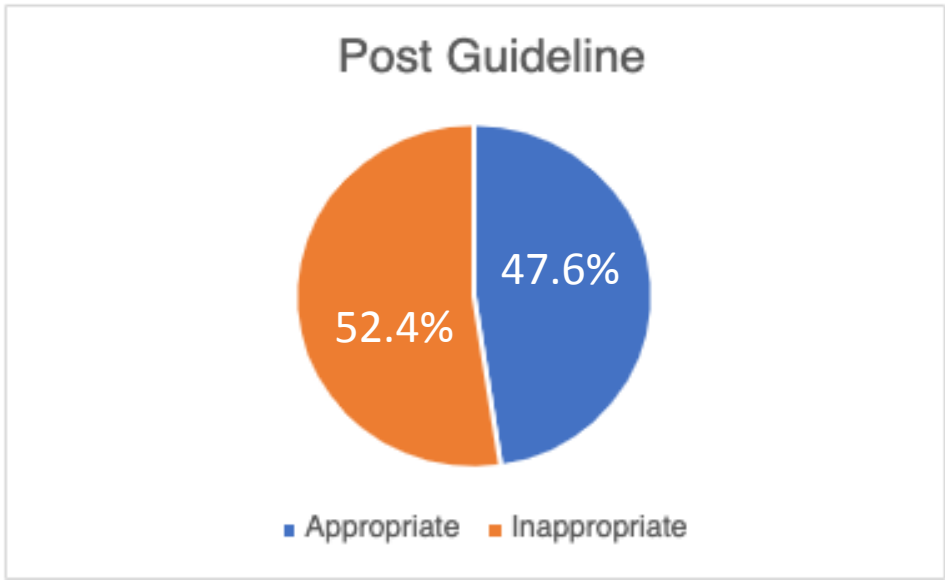
Appropriate tx	Inappropriate tx
3 (21.4%)	11 (78.6%)



p = 0.116

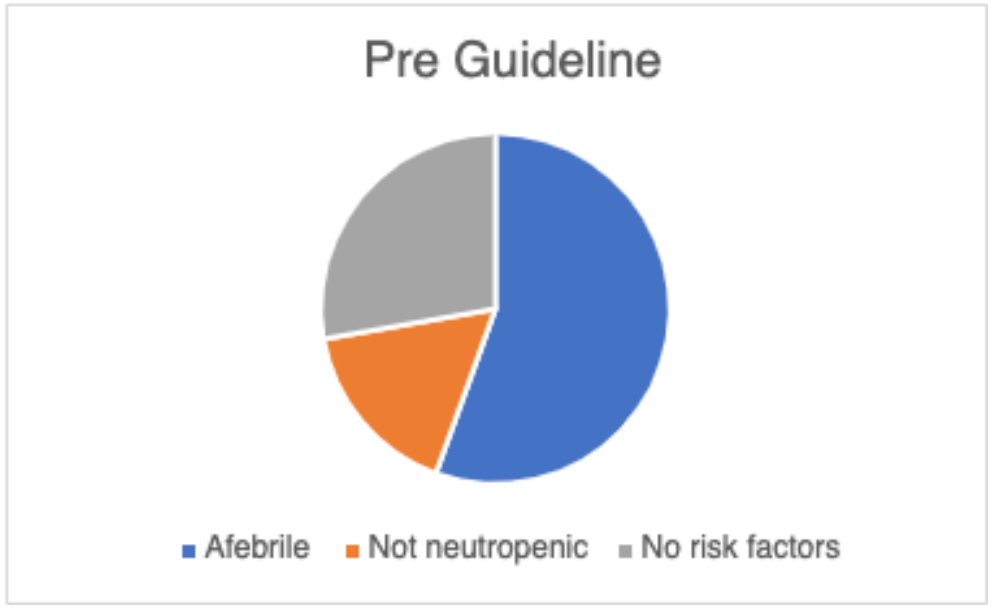
Post-guideline

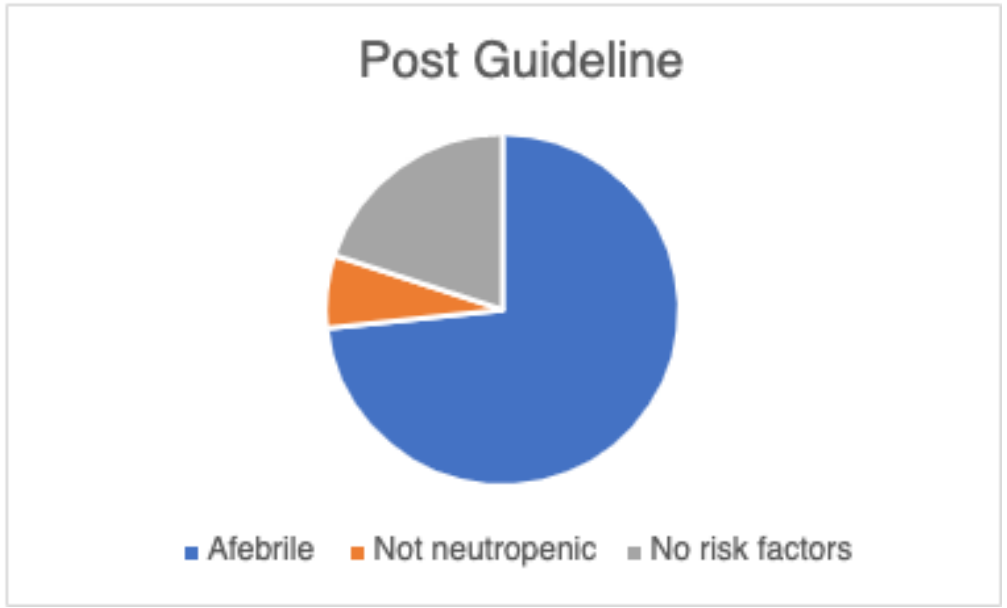
Appropriate tx	Inappropriate tx
10 (47.6%)	11 (52.4%)



Results

Factors Contributing to Inappropriate Ordering per Protocol





Results: Duration of tx/prophylaxis

Discontinuation when ANC ≥ 3,000 neutrophils/µL

Pre-guideline

- Appropriate - 16 (88.9 %)
- Inappropriate - 2 (11.1%)

Post-guideline

- Appropriate - 14 (93.3%)
- Inappropriate - 1 (6.7%)

$p = 0.57$

Results: Pharmacist Interventions

Appropriate orders: p = 0.58

Pre-Guideline	Post-Guideline
• 3 ivents	• 8 ivents • No ivents for 2 patients

Inappropriate orders: p = 0.19

Pre-Guideline	Post-Guideline
• 3 ivents • No ivents for 8 patients	• 6 ivents • No ivents for 5 patients

Results: GCSF expeditures

- Goal was to reduce expenditures
  - Number of administrations in the pre-guideline group was significantly affected by the decreased hospital census due to the COVID-19 pandemic
  - Expenditures could not be adequately compared between groups

Limitations

- Small sample size in pre-guideline group due to low hospital census during the COVID-19 pandemic
- Could not assess secondary outcome of pharmacist interventions

Discussion

- No statistical significance found in outcomes
  - There was improvement overall in appropriate use
  - More physician directed education

Conclusion/Future Direction

- More physician education on appropriate usage of GCSF according to NCCN guidelines
  - Physicians tend to order filgrastim when patients are neutropenic, have an additional risk factor, but are not febrile

- Implementation of a modified electronic order could contribute to less vials used for inappropriate indications – approved by the system 5/6/2021

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