Sargramostim (GM-CSF) as Immunotherapy: Findings from a National Descriptive Study

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Abstract

Sargramostim (granulocyte macrophage colony stimulating factor [GM-CSF]) is being investigated for use as adjuvant immunotherapy in treating several types of cancer. To assess such therapy in actual clinical practice, random samples of treating physicians provided detailed medical history and treatment information for 232 patients receiving GM-CSF for cancer immunotherapy. These patients were a subset of the 1,011 patients in the 2007 National Retrospective CSF Patient Study. Treating physicians (hematologists/oncologists and oncologists) transmitted study data to researchers by fax or mail. Subjective treatment efficacy, as defined by meeting expectations of the treating physician, was recorded for 93.3% of the 642 GM-CSF administrations. Physician respondents reported that their expectations for 6.7% of administrations were not met. "Good efficacy for the type of cancer treated" was the most frequently cited reason for prescribing GM-CSF for immunotherapy.

Background and Objectives of Study

After an extensive literature review, Edmund K. Waller, M.D., Ph.D., concluded that GM-CSF has been used to:

- augment the activity of rituximab in patients with follicular lymphoma;
- induce autologous anti-tumor immunity in patients with hormone-refractory prostate cancer;
- induce anti-tumor immune responses in patients whose acute leukemia has relapsed following allogeneic hematopoietic progenitor cell transplant, when used in combination with interferon-α;
- increase effectiveness of anti-tumor vaccines, possibly by recruiting myeloid dendritic cells (DCs) to the site of vaccination.

Waller also observed that a significant limitation in the use of GM-CSF as an immunostimulatory agent is that objective anti-tumor responses are infrequent and are often not durable ("The Role of Sargramostim [rhGM-CSF] as Immunotherapy." *The Oncologist*, Vol. 12, No. suppl 2, [October] 2007: 22-26).

The current study was designed to determine the extent to which expectations of treating physicians were met when GM-CSF was used for immunotherapy, a subjective measure of efficacy. Another objective was to determine the major reasons physicians prescribed GM-CSF as immunotherapy for specific cancer types. The study was also designed to obtain descriptive information on patients receiving GM-CSF as immunotherapy.

Methodology

Random samples of treating physicians provided detailed medical history and treatment information for 232 patients receiving GM-CSF for cancer immunotherapy. Patient records information was extracted by 23 physicians for 82 prostate cancer patients, by 28 physicians for 74 melanoma patients, by 19 physicians for 72 NHL patients, and by 4 physicians for 4 AML patients. These GM-CSF immunotherapy patients were a subset of the 1,011 CSF patients in the 2007 National Retrospective CSF Patient Study.

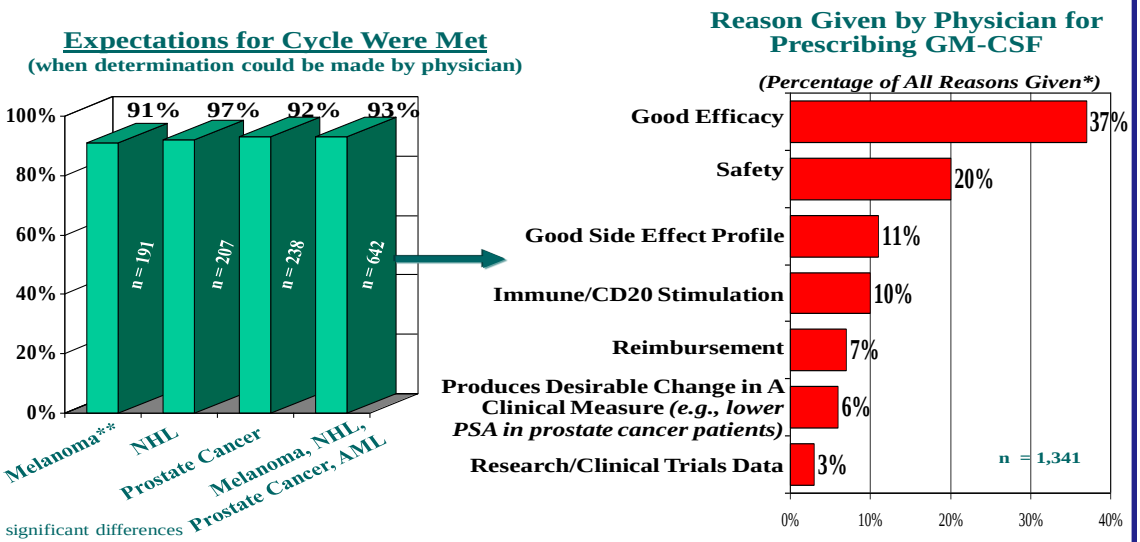
Treating physicians (hematologists/oncologists and oncologists) transmitted study data to researchers by fax or mail. The last patients treated with GM-CSF for immunotherapy by the physician were selected for the study (mean of 3.1 patients per physician). Up to seven follow-up contacts were made with initial non-responding physicians to enhance study participation.

Key Findings of Study

- 93% of the more than 642 cycles of GM-CSF administered as immunotherapy to study patients met the expectations of the treating physician, when the physician could made a determination, distributed as follows:
  - 91% for melanoma
  - 97% for NHL
  - 92% for prostate cancer.

  Differences between treatments were not statistically significant. The physician could not make a determination in 12% of the melanoma cases.

Extent Physician Expectations for GM-CSF As Immunotherapy Met and Reasons for Prescribing



* No significant differences between treatment types.

** In 12% of melanoma cycles, physician indicated that it was "too soon to determine" if their expectation for the cycle were met or physician "did not know."

* No other reason mentioned exceeded 1% of all mentions.

- "Good efficacy" for the condition being treated was the most frequent reason physicians cited for GM-CSF immunotherapy patients collectively. "Safety" and "good side effect profile" of GM-CSF were also cited frequently.

- Selected patient characteristics were as follows:

  - Mean age 62 years (only 20% below 50)
  - Seven of 10 patients were male
  - Almost 9 in 10 had insurance that covered the treatment
  - The tumor stage of 9 in 10 patients was either stage 4 (60%) or stage 3 (30%)
  - Few patients experienced infection during treatment (2%)
  - About 1 patient in 6 received GM-CSF treatment during each of the past 12 months.

These retrospective study findings suggest that on a subjective level, physicians who used GM-CSF as an immunostimulatory agent were generally well satisfied with the results. Because no objective measures of GM-CSF anti-tumor activity or response durability were employed in this study, the results of this study should be viewed with caution. The use of GM-CSF as immunotherapy should be considered experimental or investigational. Additional prospective studies are needed to further clarify usage of GM-CSF as adjuvant treatment for various types of cancer.

About the Authors

Jack R. Gallagher, Ed.D., is a behavioral modeling scientist with more than 25 years of experience in medical and systems research. He is a former member of the University of Virginia School of Medicine faculty and was director of a five-university research consortium. Dr. Gallagher has published many scientific papers, presented at numerous national and international conferences, and has served on the editorial review boards of two national journals. Dr. Gallagher also is author of the book **Changing Behavior: How and Why.**

Thomas Orsagh, Ph.D., is an internationally recognized economist who has made numerous scientific contributions during his career. He attended the Wharton School and has a Ph.D. from the University of Pennsylvania. He has served on the faculties of the University of Pennsylvania, Lehigh University, the University of Karlsruhe in Germany, and the University of North Carolina, Chapel Hill. He was a Fulbright Research Scholar, was an editor of the **Southern Economics Journal,** and served on a national Presidential Task Force.

Kylee Heap has managed a wide range of medical research studies, including studies on basal cell carcinoma, malignant melanoma, renal cell carcinoma, leukemia, NHL, pediatric cancers (leukemia and solid/liquid tumors), prostate cancer, hematopoietic transplantations and PBS mobilizations. She has also managed studies of likely market performance of various investigational drugs and medical devices.