

Hematologic outcomes and erythropoiesis-stimulating therapy costs in epoetin alfa- and darbepoetin alfa-treated cancer patients: results of the Dosing and Outcomes Study of Erythropoiesis-stimulating therapies (DOSE) registry

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Origin of Study	USA
Type of Study	PROSPECTIVE, OBSERVATIONAL STUDY
Objectives	Investigate dosing patterns, hematologic outcomes, and costs of erythropoiesis-stimulating therapies using the Dosing and Outcomes Study of Erythropoiesis-Stimulating Therapies (DOSE) Registry, an ongoing, prospective registry that is collecting data on real-world practice patterns and outcomes in cancer patients treated with erythropoietins.
Study Design	<p>Considerations for dosing analysis included frequency based on the mean treatment interval between erythropoietin dosing (every week, ≤ 9 days; every 2 weeks, 9.1–18.0 days; every 3 weeks, > 18.0 days). The mean cumulative dose was calculated as the sum of all erythropoietin doses. Dosing after a treatment gap of > 35 days was excluded.</p> <p>Hematologic outcomes assessed during the therapy included hemoglobin level and change from baseline at weeks 4, 8, 12, and 16 following start of erythropoietin; the area under the curve change by week 16 (AUC_{16}); the proportion of patients requiring red blood cell (RBC) transfusion; and the mean number of RBC units given to each patient.</p> <p>Considerations for the hematologic outcomes analysis included calculation of therapeutic duration from the date of the first to the last erythropoietin dose plus the patient-specific treatment interval, excluding outcomes after a treatment gap of > 35 days and hemoglobin values within 28 days following blood transfusion. The hemoglobin AUC_{16} values were determined using a sequential trapezoidal methodology.</p> <p>The dose conversion ratio (U, epoetin alfa [Procrit]:μg, darbepoetin alfa [Aranesp]) describes the relative effectiveness of the agents; it was calculated based on the mean cumulative administered dose and overall hematologic effectiveness as assessed by hemoglobin AUC_{16}.</p> <p>The epoetin alfa and darbepoetin alfa costs were calculated based on the mean cumulative administered dose and the wholesale acquisition cost as of May 2006 (epoetin alfa, \$12.17/1,000 U; darbepoetin alfa, \$4.45/$\mu\text{g}$). The cost of packed RBCs was based on the mean units and cost/unit from the published literature (\$469/unit). The erythropoietin administration cost was based on the number of administrations and cost/administration from the published literature (\$19.13/injection). The cost of hemoglobin monitoring was based on the number of hemoglobin determinations and Current Procedural Terminology 85027 (\$12.22/determination).</p>
Patients	<p>In total, 861 patients from 45 sites were identified; 312 were treated with epoetin alfa (mean age, 62.9 years; 63% female; mean hemoglobin level, 10.4 g/dL), and 549 were treated with darbepoetin alfa (mean age, 62.1 years; 65% female; mean hemoglobin level, 10.5 g/dL). Baseline characteristics were similar, except more patients given darbepoetin alfa received iron supplementation.</p> <p>The most common malignancies were those of the breasts, lungs, and gastrointestinal tract.</p>
Observations	Dosing frequencies of at least every other week were seen in both groups; further, both groups had

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similar mean treatment duration (approximately 8 weeks) and number of hemoglobin determinations (approximately 8). When compared with the epoetin alfa group, the darbepoetin alfa group incurred significantly more office visits and fewer erythropoietic agent injections.

The mean cumulative doses of epoetin alfa (373,827 U) and darbepoetin alfa (1,185 μg) were associated with drug costs of \$4,550 and \$5,267, respectively. The mean hemoglobin level was ≥ 11 g/dL at all postbaseline time points in the epoetin alfa-treated group and < 11 g/dL in the darbepoetin alfa-treated group at weeks 12 and 16. The mean hemoglobin level was significantly higher in the epoetin alfa-treated group at week 12 (epoetin alfa, 11.3 g/dL; darbepoetin alfa, 10.8 g/dL; $P = 0.03$).

Conclusions

Baseline characteristics were similar between the groups, except for more patients given darbepoetin alfa than epoetin alfa using iron supplementation.

The darbepoetin alfa patients had significantly more office visits.

The National Comprehensive Cancer Network (NCCN) target hemoglobin level (11 g/dL) was achieved and maintained in the epoetin alfa group at all assessed time points; this was not true in the darbepoetin alfa group.

The mean hemoglobin level and hemoglobin level change from baseline were significantly greater at week 12 in the epoetin alfa group than in the darbepoetin alfa group.

Discussion

The NCCN guidelines for treating anemia recommend maintenance of hemoglobin levels between 11 and 12 g/dL. This study investigated hematologic outcomes and the costs of erythropoiesis-stimulating therapies using data from the Dosing and Outcomes Study of Erythropoiesis-Stimulating Therapies Registry, which is an ongoing, prospective registry of data on real-world practice patterns and outcomes in cancer patients treated with these agents.

The analysis included 861 adult patients with a nonmyeloid malignancy who received at least two doses of either epoetin alfa or darbepoetin alfa. The cost of treatment was based on May 2006 wholesale acquisition costs.

Mean hemoglobin changes were similar for weeks 4 and 8 but were greater with EPO at weeks 12 and 16. The proportion of patients requiring blood transfusion (about 18%) and the mean number of transfused RBC units per patients (0.6 U) were similar between the treatment groups.

Mean anemia-related costs were \$666 lower in the epoetin alfa group: \$5,079 versus \$5,745 for darbepoetin alfa. Most of the treatment costs were related to the cost of the agents.

Key Points

- The cost of iron management was not included in the anemia-related costs.
- The dose conversion ratio of 201:1 (U, epoetin alfa: μg , darbepoetin alfa) was consistent with randomized, comparative clinical trial data.
- Anemia-related costs were 12% lower in the epoetin alfa group than in the darbepoetin alfa group; this difference was significant. The cost of erythropoietic agents represented $\geq 90\%$ of the total cost.

Reference

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