Table 1. Length of hospitalisation for patients admitted with febrile neutropenia

	All patients (n = 35)	Discharge ANC < 500/μl (n = 12)	Discharge ANC ≥ 500/μl (n = 23)
Mean no. of days	4.7	4.1	5.1
Median no. of days	4	3	5
Range	2–17	2–9	2–17
≤ 5 days, n	25	10	15
≤ 7 days, n	31	11	20

European Journal of Cancer Vol. 30A, No. 10, pp. 1595–1596, 1994.

0959–8049/94 $7.00 + 0.00

0959-8049(94)00295-9

A Pilot Study of Early Hospital Discharge in Adult Patients With Fever and Neutropenia

N.J. Meropol, K.R. Fox, D.J. Vaughn and N. Zeiber

FEBRILE NEUTROPENIA is a common complication of cancer chemotherapy and an important contributor to the morbidity, mortality and cost of treatment. Whereas agreement exists regarding the principles that govern the initial management of the febrile neutropenic patient, there are little available data on which to base the decision of when to discontinue antibiotics and discharge from hospital those patients who become afebrile on antibiotics without an identified infection [1]. Several retrospective analyses have suggested that subsets of patients with fever and neutropenia can be identified for whom early discontinuation of parenteral antibiotics and hospital discharge may be safe and cost-saving [2–5]. We conducted a pilot study to prospectively test the feasibility of early hospital discharge of a low-risk subset of patients with chemotherapy-associated febrile nbeutropenia. Adults ≥ 18 years old receiving cyclic chemotherapy for solid tumours or lymphoma, and hospitalised with absolute neutrophil count (ANC) < 1000/μl and oral temperature ≥ 101°F, were eligible for immediate hospital discharge without antibiotics if they had an absolute neutrophil count (ANC) ≥ 100/μl and increasing, oral temperature < 99.5°F for at least 24 h and blood cultures obtained before antibiotic institution were sterile at 48 h incubation. Rehospitalisation was required for recurrent fever. These criteria differ from other recommendations in current practice in several ways. First, only the maturity of pre-antibiotic blood cultures required a delay in discharge, with additional cultures obtained during the hospitalisation not impacting upon discharge plans. Furthermore, in-hospital observation of patients after discontinuation of parenteral antibiotics was not required. Finally, attainment of a neutrophil count of 500/μl or 1000/μl was not required; a rising ANC was sufficient evidence of marrow recovery in the current trial.

35 patients, ages 21–68 years, were enrolled and eligible for early discharge. For these patients, median admission ANC was 196/μl (range 0–624/μl) and median ANC nadir was 70/μl (range 0–504/μl). Neutrophil counts at discharge and length of hospitalisations are shown in Table 1. One third of patients could be discharged with ANC < 500/μl. The median discharge ANC for all patients was 888/μl (range 100–56672/μl). The reasons for discharge of patients with ANC > 500/μl were persistant fever or active infection (14 patients), first eligible ANC was > 500/μl (4 patients), awaiting 48-h blood culture incubation (2 patients), and active serositis, failure to thrive, and pain control (1 patient each). Only 1 patient required rehospitalisation with recurrent fever but was *not* neutropenic at the time of readmission. 5 patients were discharged with oral antibiotics for identified infections, and colony-stimulating factors were used in 9 patients, at the discretion of treating physicians.

It is apparent that not every cancer patient with febrile neutropenia is at equal risk of infectious complications. This study shows that a population of febrile neutropenic adult patients may be identified early in their hospitalisation, and safely discharged without parenteral antibiotics. It was not possible in this pilot experience to determine the impact of oral antibiotics or myeloid growth factors on the management of these patients, and these are areas of active investigation. Our ability to modify the management of febrile neutropenic patients based upon risk stratification could measurably improve the care of patients, by reducing hospital days, the toxicity of parenteral medications, health care costs, and improving quality of life. Ongoing and planned multiinstitution trials are attempting to determine whether there is a benefit from the use of myeloid growth factors at the onset of febrile neutropenia [6–9], and whether outpatient parenteral antibiotic therapy is feasible for certain patients [10]. Each of these studies will further characterise the adult febrile neutropenic patient, and allow for individualised treatment based upon prospectively validated well-defined clinical characteristics.

Correspondence to N.J. Meropol at the Department of Medicine, Roswell Park Cancer Institute, Buffalo, New York, U.S.A.
K.R. Fox, D.J. Vaughn and N. Zeiber are at the University of Pennsylvania Cancer Center Philadelphia, Pennsylvania, U.S.A.
Revised 14 June 1994; acepted 12 July 1994.

1. Pizzo PA. Management of fever in patients with cancer and treatment-induced neutropenia. *N Engl J Med* 1993, **328**, 1323–1332.
2. Mullen CA, Buchanan GR. Early hospital discharge of children with cancer treated for fever and neutropenia: identification and management of the low-risk patient. *J Clin Oncol* 1990, **8**, 1998–2004.
3. Griffin TC, Buchanan GR. Hematologic predictors of bone marrow recovery in neutropenic patients hospitalized for fever: implications

for discontinuation of antibiotics and early discharge from the hospital. *J Pediatr* 1992, **121**, 28–33.
4. Talcott JA, Finberg R, Mayer RJ, Goldman L. The medical course of cancer patients with fever and neutropenia: clinical identification of a low-risk subgroup at presentation. *Arch Intern Med* 1988, **148**, 2561–2567.
5. Talcott JA, Siegel RD, Finberg R, Goldman L. Risk assessment in cancer patients with fever and neutropenia: a prospective, two-center validation of a prediction rule. *J Clin Oncol* 1992, **10** 316–322.
6. Maher D, Green M, Bishop J, *et al.* Randomized, placebo-controlled trial of filgrastim (r-metHuG-CSF) in patients with febrile neutropenia (FN) following chemotherapy (CT). *Proc ASCO* 1993, **12**, (abstract 1498).
7. Mayordomo JI, Rivera F, Diaz-Puente MT, *et al.* Decreasing morbidity and cost of treating febrile neutropenia by adding G-CSF and GM-CSF to standard antibiotic therapy: results of a randomized trial. *Proc ASCO* 1993, **12** (abstract 1510).
8. Mayordomo JI, Rivera F, Diaz-Puente MT, Lianes P, Cortes-Funes H. Decision analysis of hematopoietic growth factor use in patients receiving cancer chemotherapy. *J Natl Cancer Inst* 1993, **85**, 1251–1252.
9. Lyman GH, Lyman CG, Sanderson RA, Balducci L. Decision analysis of hematopoietic growth factor use in patients receiving cancer chemotherapy. *J Natl Cancer Inst* 1993, **85**, 1252–1253.
10. Talcott JA, Whalen A, Clark J, Rieker PP, Finberg. Home antibiotic therapy for low-risk cancer patients with fever and neutropenia: a pilot study of 30 patients based on a validated prediction rule. *J Clin Oncol* 1994, **12**, 107–114.