Reevaluating the Neutropenic Diet: Time to Change

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The neutropenic diet historically has been a mainstay in oncology practice, with many providers continuing to adhere tightly to the diet for patients with neutropenia. However, clinically sound evidence remains limited and weak and does not support the diet as a foundation for policy and practice. Therefore, two questions remain: Does evidence exist to support the effectiveness of the neutropenic diet in reducing infection rates in the neutropenic oncology population? Based on limited evidence supporting the neutropenic diet in this population, what clinically sound diet strategies are best for these patients?

The neutropenic diet was established as the so-called rules of the road for patients with absolute neutrophil counts less than 1,000 cells/mm³. The diet restricted all fresh fruits and vegetables from patients with neutropenia, with the intent to support germ-free or germ-reduced environments. In some cases, diet principles and restrictions were softened to allow family members to peel foods, such as oranges or bananas, to give to the patient (Jubelirer, 2011).

The neutropenic diet originated in the 1960s and 1970s when diets were treated as sterile—autoclaved and irradiated, then given to patient in germ-free environments. That environment was popularized with reference to the television character “The Bubble Boy” (Jubelirer, 2011).

Meanwhile, patients prescribed a neutropenic diet have been shown to have poor nutritional status, to the extent that a nutritional consultation is required. As a result of the restrictive diet, some patients even require supplementation via total parenteral nutrition (Murray & Pindoria, 2009). The diet and its effects led patients to become dissatisfied with their food choices and restrictions. Therefore, diets for patients with neutropenia eventually were changed to a cooked diet (allowing fully cooked fruits and vegetables and not requiring sterilization), although evidence supporting the change in practice was limited (Jubelirer, 2011).

Although many other restrictions for this population have been lifted, such as strict or reverse isolation, use of the neutropenic diets and their effects on infection rates in patients with neutropenia, and (b) additional research is needed to justify the merits of the diet (Jubelirer, 2011; Trifilio et al., 2012).

Trifilio et al. (2012) reported on a large retrospective study among 726 hematopoietic stem cell transplantation recipients. Half of the patients followed a neutropenic diet and half did not. Study results revealed following a neutropenic diet did not reduce infection. In addition, the diet actually was associated with increased patient risk for infection after the neutrophil recovery period in this study. Clostridium difficile infections also were higher in the neutropenic diet group. Study results suggested decreased bacteria in the gastrointestinal tract of these patients increased their risk of acquiring Clostridium difficile, in combination with the increased antibiotic use known to contribute to infection (Trifilio et al., 2012).

Ching’s (2013) summary review for cancer nursing also noted the need for more high-quality research regarding neutropenic diets and their effects on patient outcomes. No randomized, controlled trials support or refute the use of a neutropenic diet to reduce infection risk in patients with neutropenia in the oncology population (Ching, 2013).
Implications for Practice

So, how do these published studies and their limitations inform clinical practice? As a group and based on previous research, these study results suggest practice focus should move away from a traditional neutropenic diet to principles of safe food handling and patient education about food preparation and choices (American Cancer Society [ACS], 2013; CDC, 2013; Partnership for Food Safety Education [PFSE], 2010). With that clinically validated focus, patient satisfaction may improve and, more importantly, patients’ nutritional status could benefit.

At Virginia Commonwealth University Health System (VCUHS), for example, the Oncology Safe-Handling Diet is recommended in practice. The diet used the “Fight BAC!” campaign, from the CDC and a government/industry partnership with PFSE, as its model (CDC, 2013; PFSE, 2010). The Oncology Safe-Handling Diet has been in practice since 2012 at VCUHS; no statistical data have been collected, but incidences of neutropenic infection rates do not appear changed since implementation. In addition, patients’ nutritional statuses have not been compromised by not following a neutropenic diet (Foster, 2013).

Principles of the Oncology Safe-Handling Diet include

- Teaching patients and family members how to wash produce, hands, and surfaces often
- Counseling patients and family members how to rewash produce labeled “prewashed”
- Cooking foods to the proper temperatures
- Avoiding unpasteurized dairy products and beer.

An overriding principle of the Oncology Safe-Handling Diet is to encourage patients to eat healthy, well-balanced diets designed to sustain their nutritional status throughout chemotherapy treatments (see Figure 1).

Clinicians experienced in implementing a change from the previously prescribed neutropenic diet used a comprehensive strategy toward effective outcomes. Components of an education and communication strategy include

- Consistent resources and education materials with instruction on safe food handling, preparation, and storage for patients and family members
- Collaboration with interdisciplinary team members targeting inpatient and outpatient providers, operations, and support staff to ensure consistency in instruction and practice (Foster, 2013; Tarr & Allen, 2009)
- Published resources to guide and support nutrition and food safety for patients with cancer, including the CDC’s “Fight BAC!” campaign (CDC, 2013; PFSE, 2010), the ACS (2013), and U.S. Department of Agriculture.

Conclusion

Despite limited evidence to support the merits of the neutropenic diet for patients who are immunocompromised, the restrictive diet continues to be prescribed in the oncology community. By

| TABLE 1. Studies of the Neutropenic Diet in Patients With Cancer (2009–2013) |
|--------------------------------|---|----------------|------------------|-----------------|
| Study                        | Purpose                               | n   | Method         | Results                                   | Summary                                      |
| Jubelirer, 2011              | To debunk myths related to neutropenic diets | N/A | Literature review | Current research does not support the use of neutropenic diet. | Additional research is needed. |
| Tarr & Allen, 2009           | To evaluate the effectiveness of a neutropenic diet | N/A | Literature review | Eliminated the use of a neutropenic diet at Duke University Medical Center | Medical center replaced former diet with patient education regarding food hygiene and safe food handling. |
| Trifilio et al., 2012        | To replace a neutropenic diet with a modified general diet that permits black pepper; fresh fruits and vegetables; and homemade, freshly squeezed juice, but excludes raw tomatoes | 648 | Randomized, controlled trial | No differences were found between groups. Trend toward a higher incidence of Clostridium difficile in the neutropenic diet groups was observed. Significantly higher incidence of new positive surveillance cultures of VRE on rectal swabs was observed in the neutropenic diet groups. | Additional research in a similar area needs to be conducted. |

N/A—Not available; VRE—vancomycin-resistant enterococci

**Foods to Avoid**

- Raw and undercooked meats, tofu, eggs, and egg substitutes
- Unpasteurized dairy products and juices
- Soft cheeses and those with molds, chili peppers, or uncooked vegetables
- Raw vegetable sprouts
- Raw or non-heat-treated honey
- Moldy or outdated food
- Well water (unless tested daily)
- Unroasted nuts or roasted nuts in the shell
- Raw grain products
- Raw egg-containing foods (e.g., cookie dough)
- Eating at delicatessens

**Foods That Can Be Eaten**

- Hard or processed cheeses and soft cheeses from pasteurized milk
- Fully cooked smoked fish or seafood
- Hot dogs reheated to steaming hot
- Grilled sandwiches with steaming hot meat or poultry
- Fully cooked fish
- Fully cooked eggs
- Fruits and vegetables that are washed thoroughly (even those with skin that will be peeled or those items stating they are prewashed)
- Cooked vegetable sprouts

**FIGURE 1. Dietary Recommendations for the Oncology Safe-Handling Diet**

*Note. Based on information from American Cancer Society, 2013; Centers for Disease Control and Prevention, 2013.*
championing the principles of safe food handling, healthcare providers are providing more holistic and comprehensive care to a vulnerable patient population. Reliable and easily available resources support the focus on safe food handling, preparation, and food choice for patients with neutropenia.

References


Foster, M. (2013, November). Down with the neutropenic diet (C2-0174). Poster session presented at ONS Connections: Advancing Care Through Science, Dallas, TX.


