D-index and Prediction of Infection

We read with interest the article “Retrospective Evaluation of the Area Over the Neutrophil Curve Index to Predict Early Infection in Hematopoietic Stem Cell Transplantation Recipients” by Kimura et al. [1]. In this article, they evaluated the impact of the D-index and the cumulative D-index (c-D-index) on the early development of bloodstream infections (BSI) and pulmonary infections after autologous and allogeneic hematopoietic stem cell transplantation, and compared the D-index with total duration of neutropenia (<500/μL), total duration of profound neutropenia (<100/μL), cumulative duration of neutropenia, and cumulative duration of profound neutropenia. None of the cumulative indexes was predictive of BSI. This probably happened because most BSIs tend to occur early in the course of neutropenia, and duration neutropenia may not be a major determinant of the risk of BSI in such patients. By contrast, both the D-index and the c-D-index predicted pulmonary infections. Interestingly enough, they found that a cutoff of 5500 for the c-D-index was predictive of pulmonary infections, a value comparable to our cutoff of 5800 for invasive mold infections [2], suggesting that most cases of pneumonia in the present study were of fungal origin.

Conceptually, the c-D-index should work as a risk factor for late events occurring during neutropenia. This was true for invasive mold infections, as we reported in our study [2], and perhaps breakthrough (but not early) bacteremias, another event that typically occurs later during neutropenia [3]. Therefore, we are not surprised that the c-D-index did not work for BSI in the present study.

What the c-D-index may add to simple cumulative duration of neutropenia is its ability to discriminate between patients with the same duration but different intensities of neutropenia. If we observe the regression curve (linear) of D-index and duration of neutropenia, many points do not fit the regression line. For example, in our article, we found one patient with 14 days of neutropenia and a D-index of 5395 and another with 21 days of neutropenia and a D-index of 4531 [2]. In such a case, the D-index may discriminate better than the duration of neutropenia. The role of the D-index as a tool in neutropenic patients either as risk factor for infection or as a prognostic marker remains to be clarified, as well as the situations where it equals the more simple duration of neutropenia.

REFERENCES

Rodrigo Doyle Portugal, M.D.
Márcia Garnica, M.D.
Mário Nucci, M.D., PhD
Faculty of Medicine, Federal University of Rio de Janeiro
Rio de Janeiro, Brazil

Update to Vaccination Guidelines

Last year several scientific organizations collaborated in the production of guidelines for prevention of infections after hematopoietic stem cell transplantation (HCT) [1,2]. One set of guidelines dealt with vaccination of transplant recipients, and in these guidelines the conjugated heptavalent pneumococcal vaccine (PCV7; Prevnar; Pfizer, Inc. New York) was recommended based on several studies showing both immunogenicity and safety of this vaccine in HCT recipients. Earlier this year, a 13-valent vaccine (Prevnar13; Pfizer, Inc.), which is produced in a similar way to the 7-valent vaccine, was licensed in both the United States and Europe after the completion of large clinical trials in healthy children. This vaccine contains the same 7 pneumococcal serotype antigens contained in the PCV7, together with antigens from additional 6 serotypes. After licensure, it was decided that the heptavalent vaccine will be withdrawn from the market, and therefore the published recommendations cannot be followed. Presently a clinical trial is ongoing with this 13-valent vaccine in allogeneic HCT recipients. In
addition a 10-valent pneumococcal vaccine (Synflorix; GSK, Brentford, UK) conjugated to another carrier protein has also been licensed in Europe for which no data yet exists in immunocompromised patients. The alternative to these conjugated vaccines are polysaccharide vaccines that have shown decreased immunogenicity compared to conjugate vaccines in allogeneic HSCT recipients. Despite the lack of data, we recommend that the 13-valent vaccine be used as replacement for the heptavalent vaccine when this is no longer available until additional studies have been performed.

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REFERENCES

Per Ljungman
Trudy N. Small
For the vaccination recommendations writing group