STUDY SUMMARY

Guidelines recommend assessing the risk of febrile neutropenia (FN) at the start of each cycle of a chemotherapy course. However, previous studies have focused on predicting risk of FN in the first cycle only. Inevitably, those at highest risk of FN in the first cycle and who survive to start a subsequent cycle are at greater risk during subsequent cycles. However, some risk factors—for example FN in a previous cycle or having a dose delay—can appear only in cycle 2 and onwards. That being the case, we sought to expand our initial FENCE score (predicting risk of FN in the first cycle) to predict subsequent risk of developing FN in cycles 2-6 based on a combination of the FENCE score and cycle-specific risk factors.

We followed a large cohort of patients with solid cancers treated with standard first-line chemotherapy through cycles 2-6. A risk score for predicting risk of FN at cycle initiation was developed and internally validated. The score had good discriminatory ability and is the first published method to estimate cycle-specific risk of FN.

METHODS

Patients with solid cancers treated with standard first-line chemotherapy were included in 2010-2016 from a single site and followed through cycles 2-6. Cycle-specific risk factors were assessed by Poisson regression using generalised estimating equations adjusted for repeated events per patient and random split-sampling.

REFERENCES


RESULTS

We included 6,885 patients and randomly split them 2:1 into a derivation and validation cohort (Table 1). FN developed in 324/15,419 (2.1%) cycles in the derivation cohort. Higher FENCE risk group, anaemia, platinum- or taxane-containing therapies, concurrent radiotherapy, treatment in cycle 2 compared to later cycles, previous FN or neutropenia, and not receiving prophylactic G-CSF predicted FN (Table 2). Risk stratification of patients according to the risk score is shown in Figure 1 with good discriminatory ability and performance of the risk score in the derivation (Harrell’s C-statistic 0.79, 95% CI, 0.77-0.81) and validation cohorts (Harrell’s C-statistic 0.76, 95% CI, 0.72-0.79) (Table 3).

CONCLUSION

• We developed and validated the FENCE risk score for predicting risk of FN in chemotherapy cycles 2-6 using nationwide data sources that allowed almost complete ascertainment of outcomes.

• To the best of our knowledge, this is the first study to present a risk score that estimates cycle-specific risk of FN.

• The score had good discriminatory ability (Harrell’s C-statistic 0.79) to predict underlying risk of FN at cycle initiation as guidelines recommend.

• The FENCE risk score can be used to guide initiation of preventive measures and intensity of patient monitoring.

• An online risk calculator will be available at https://chip.dk/Resources/Clinical-risk-scores.

• External validation of the results is needed.

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