CORRESPONDENCE

Number needed to treat in COPD: exacerbations versus pneumonias

Number needed to treat (NNT) is an attractive concept for clinicians, but its application to a treatment that reduces the frequency of COPD exacerbations is not straightforward. Dr Suissa[1] proposes a method for calculating the NNT based on the Kaplan–Meier curve of time to first exacerbation. This approach ignores all exacerbations beyond the first one experienced by the patient and does not appropriately reflect the benefit of a treatment that reduces multiple exacerbations in the same patient.[2] From a statistical viewpoint, the approach is not efficient as it does not use all the exacerbation data collected. Dr Suissa has himself previously advocated methods of analysis of exacerbations that account for multiple events.[3]

The paper states that 'the proper calculation resulted in a NNT of 14 patients who need to be treated for 1 year to prevent one COPD exacerbation'. This interpretation of the patient-based NNT is incorrect. As the only data used is the time of the first exacerbation, the calculation performed is of the NNT needed to prevent one patient from experiencing *any* exacerbations in the year.

For the Towards a Revolution in COPD Health (TORCH) study, the author converts event rates to probabilities of an event using a formula based on the Poisson distribution, which does not account for the correlation of events within an individual. This calculation gives incorrect estimates of incidence rates and, therefore, the patient-based NNT for TORCH is considerably wrong. This error is surprising as Dr Suissa has criticised others for neglecting this extra-Poisson variability.[3] The Investigating New Standards for Prophylaxis in Reducing Exacerbations (INSPIRE) study[4] compared two active treatments, not simply an ICS treatment versus no use of ICS, so it is misleading to include this study in table 2 of the paper.

Using a single point from a Kaplan–Meier curve to estimate the probability of an exacerbation reduces a complex dataset to the dichotomous presence or absence of at least one exacerbation in that time interval. Statisticians, Senn and Julious,[5] have criticised this practice stating: 'it is totally unacceptable to create dichotomies purely in order to be able to calculate NNTs'. In the extreme, if all patients experience at least one event, then the patient-based NNT is infinite.

In summary, the patient-based NNT does not accurately describe the benefit of a treatment that reduces the frequency of exacerbations. We believe that this requires a statistical analysis[2] that recognises the repeated nature of these events, as Dr Suissa has previously recommended.

Oliver N Keene,[1] Antonio Anzueto,[2] Gary T Ferguson,[3] Peter M A Calverley[4]

[1]Clinical Statistics, GlaxoSmithKline, Uxbridge, UK
[2]Pulmonary/Critical Care Division, University of Texas Health Science Center, San Antonio, Texas, USA
[3]Pulmonary Research Institute of Southeast Michigan, Livonia, Michigan, USA
[4]School of Aging and Chronic Disease, University of Liverpool, Liverpool, UK

Correspondence to Oliver N Keene, Clinical Statistics, GlaxoSmithKline, 1-3 Iron Bridge Road, Uxbridge UB11 1BT, UK; oliver.n.keene@gsk.com

Contributors All authors contributed to the content of this letter.

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