



Operational characteristics of generalized pairwise comparisons for hierarchically ordered endpoints

Vaiva Deltuvaite-Thomas, Research Statistician, IDDI and Prof. Tomasz Burzykowski, VP Research IDDI have just published an article on operational characteristics of GPC in Pharmaceutical Statistics.

ABSTRACT

The method of generalized pairwise comparisons (GPC) is a multivariate extension of the well-known non-parametric Wilcoxon–Mann–Whitney test. It allows comparing two groups of observations based on multiple hierarchically ordered endpoints, regardless of the number or type of the latter. The summary measure, “net benefit,” quantifies the difference between the probabilities that a random observation from one group is doing better than an observation from the opposite group. The method takes into account the correlations between the endpoints. We have performed a simulation study for the case of two hierarchical endpoints to evaluate the impact of their correlation on the type-I error probability and power of the test based on GPC. The simulations show that the power of the GPC test for the primary endpoint is modified if the secondary endpoint is included in the hierarchical GPC analysis. The change in power depends on the correlation between the endpoints. Interestingly, a decrease in power can occur, regardless of whether there is any marginal treatment effect on the secondary endpoint. It appears that the overall power of the hierarchical GPC procedure depends, in a complex manner, on the entire variance–covariance structure of the set of outcomes. Any additional factors (such as thresholds of clinical relevance, drop out, or censoring scheme) will also affect the power and will have to be taken into account when designing a trial based on the hierarchical GPC procedure.

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