Clinical Trials with Small Sample Sizes

Clinical trials with small sample sizes can provide very useful results in the context of drug efficacy. Not all clinical trials can consist of hundreds of patients due to incidence rates of the disease or recruitment issues. These small clinical trials should not be viewed as meaningless simply due to the sample sizes. In fact, these small clinical trials can be very helpful when determining the meaningfulness of the effect size seen in the efficacy measurements.

Clinical trials that contain small sample sizes put the active treatment at a distinct disadvantage. These small clinical trials will be underpowered to detect significant differences between the active and placebo groups in almost all, if not all, efficacy endpoints. The statistical hypothesis test starts from assumption that there is no difference between the active treatment and placebo. A p-value of less than 0.05 is typically the threshold to reject that hypothesis and claim that the active treatment is superior in terms that specific efficacy endpoint. However, to achieve that threshold with small sample sizes, there must be complete or near complete separation of the result between the placebo and active treatment groups. For example, in the change from screening in FVC, 3 of the 4 changes from screening in the placebo group were less than the smallest change from screening in the GM604 group, leading to a p-value of 0.0476. There is obvious separation between the treatment groups in change from screening in FVC. This result should not be mitigated because of the small sample sizes. In fact, this result should be considered quite strong given the lack of power to detect that difference.

If there was only one significant result, one could argue that it was spurious and even what you would expect with a Type I error rate of 0.05, regardless of the size of the clinical trial. However, when several endpoints show statistical significance and others are trending that way and have p-values near the 0.05 threshold in the presence of small sample sizes, there is an obvious signal that the active treatment is working. The active treatment is demonstrating an efficacious response that should be heralded, not as a random result found due to the small sample sizes, but as a powerful result found in spite of the small sample sizes.

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