SEQUENTIAL CONDITIONAL PROBABILITY RATIO TEST AND ITS APPLICATIONS IN CLINICAL TRIALS

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The sequential conditional probability ratio test (SCPRT) is a class of sequential test procedures with following special features: 1) The conclusion made at an early stopping is unlikely to be reversed if the trial were not stopped as it should have been but continued to the planned end; 2) The maximum sample size of the test is minimized to the bottom limit; 3) The test is efficient in terms of its expected sample size. In the design of clinical trials, the sample size is determined according to specified treatment difference and nuisance parameters which are usually estimated from preliminary data. The estimations could be quite inaccurate because the sample sizes for preliminary data are usually small, and the setting conditions for preliminary study could differ in someway from that for the current study. An insignificant result of a clinical trial caused by its underpowered design with incorrect setting of design parameters could be devastating. As a remedy for this situation, I will show that by SCPRT designs, the sample size of a clinical trial can be adapted to the true treatment difference (or the true variance) by updated data accumulated during the sequential test process.