

Reinterpreting The Effect Of Amiodarone In Arrhythmia In Diabetic And Non-Diabetic Patients In The Light Of Statistical Test's Power

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Abstract

The interpretation of results obtained by using a statistical tool should also include the potential (power) of the tool itself. If a test yields non-significance, it should not be assumed that there is no difference, rather it may be the weakness of the test to detect otherwise significant difference. A statistical test's power is the probability that the test procedure will result in statistical significance. Power is the probability of correctly rejecting the null hypothesis. Power increases when effect size and /or sample size increases. For determining power of the test after a study has been carried out, post-hoc power analysis is done for given sample size, significance level and the observed effect size which helps in explaining the non-significant results.

In a study titled "The Response to Antiarrhythmia Therapy with Amiodarone in Diabetic Patients Undergoing Coronary Artery Bypass Grafting" published in The Internet Journal of Cardiology, Vol.1, No.2, researchers have compared the effect of amiodarone administration in diabetic and non-diabetic patients for the management of arrhythmia occurring after coronary artery bypass grafting operation. It has not been mentioned in the paper the basis of deciding size of samples though a good care has been taken to maintain homogeneity. If power analysis would have been done it might have enabled to interpret more elaborately. The study shows statistically non-significant difference between the mean heart rate after amiodarone administration (87.04 ± 6.11 beats/min in the diabetic group and 85.92 ± 6.86 beats/min in the non-diabetic group). Post-hoc power analysis^[1] in this case gives very low power. It shows that the t test here, when samples are of size 25 each is not so

powerful to detect the observed effect size. A popular statement is worth quoting here 'absence of evidence is not evidence of absence'^[2]. Thus the possibility of difference in average heart rate in diabetic and non-diabetic groups of patients may not be ruled out.

The mean post-operative arrhythmia appearance time was smaller in diabetic group than non-diabetic group though the difference was not statistically significant. Post-hoc power analysis in this case revealed a very low power (power=0.3189). Conventionally required power is generally 0.80 or above. In this case when the effect size is 0.4296, to get a power of 0.80 will require samples of size 86 each (if equal) which may not be feasible in such situations.

The response to amiodarone therapy for arrhythmia found to be delayed in diabetic patients (20.80 hours) compared with that in non-diabetic patients (7.2 hours). With the sample of size 25 each, power in this case comes 0.9733 due to large effect size (1.1235). A connection between early/delayed onset of arrhythmia, average heart rate after amiodarone and delayed response of amiodarone in diabetic group may also need to be investigated. Other observed variables may also require similar approach of viewing and interpreting the results in the light of power calculations.

References

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