

THE FIRST DOCUMENTED CONTROLLED TRIAL IN HISTORY

Gideon Koren, Hospital for Sick Children, Toronto, Canada

ABSTRACT

The first reported controlled human trial was conducted 2500 years ago by the Biblical judge Gideon Ben Yoash, who challenged God's Angel: "I will put a fleece of wool on the threshing floor. If there is dew on the fleece only, and it is dry on all the ground, then I will know that Thou wilt deliver Israel through me, as Thou hast spoken". In the control part of the trial he asked the Angel to keep the wool dry while the ground around it will be soaked with morning dew. It is unfortunate that these principles were not practiced for thousands of years thereafter, as many medical challenges could have been solved earlier.

INTRODUCTION

In today's medical agenda the controlled clinical trial has a central role in separating the relevant from the irrelevant, the effect in question from its confounders. For centuries the number of controlled medical experiments was scarce and medicine was often blamed for being anecdotal, biased and uncontrolled. Subsequently, numerous diagnostic and therapeutic modalities crushed when controlled studies showed their futility. It is generally accepted that the school of thought leading to controlled trials was developed only during the last few centuries. It is therefore enlightening and refreshing to discover that the first reported controlled trial in man history took place more than 2500 years ago.

Gideon Ben Yoash, a judge and warrior, is better remembered for his qualities in the battlefield. Only a careful review of his activities, as described in the Old Testament (Book of Judges, Chapter 6), reveals the first documented controlled trial in history.

The rise of Gideon concurred with the serious distress to the Israelites by the invasion from the desert by the Midianites. This invasion caused unbearable damage to the economic infrastructure of the tribes of Israel. Gideon himself, being a farmer, admitted that "my family is the least of Menashe, and I am the youngest in my father's house (6:15). Similar to most men in his tribe, he tried to hide from the Midianites in an attempt to minimize their ability to steal and damage his crops. Hence, the Angel of God finds him "beating out wheat in the winery press" and not, as expected, outdoor in the field "in order to save it from the Midianites" (6:12).

In this grim reality Gideon becomes aware of Israel's need for leadership. His serious doubts regarding his abilities to lead the Israelites are presented by the biblical author through a series of meetings between himself and God's angel, each of which is presented as part of a controlled trial.

The First Controlled Trial

To be convinced that the Angel was truly sent by God, Gideon asks the Angel to cause a piece of wool to be soaked by morning dew, while keeping the ground around it dry ("behold, I will put a fleece of wool on the threshing floor. If there is dew on the fleece only, and it is dry on all the ground, then I will know that Thou wilt deliver Israel through me, as Thou hast spoken" (6:37). Like any other controlled experiment, there was a hypothesis underlying this design: Gideon assumed that God is almighty, and hence, if the Angel truly represents Him, he should be able to do anything, even against the regular discourse of nature. The objective of the experiment was to prove or reject this hypothesis. The proof for the prompt execution of this experiment is presented in the next sentence: "And it was so. When he arose early the next morning and squeezed the fleece, he grained the dew from the fleece, a bowl full of water (6:38)".

Anyone who has ever been engaged in a scientific experiment and has stumbled across potentially important results is familiar with the feelings of doubts whether the results reflect chance only and hence may not necessarily prove cause-and effect relationship. Is it possible that other factors (such as confounders) have led to the

potentially important results, and not necessarily the purported “independent variable” as the scientist wished to believe? In our case, Gideon, as an experienced farmer, is aware of the hygroscopic qualities of the wool. Is it possible that the documented results reflect a law of nature, unrelated to the hypothesis that mighty God can do miracles against nature?

Gideon is experiencing a difficult dilemma, whether his doubts justify the continuation of the experiment, or whether he should accept the results of the first phase as final. These types of doubts are part and parcel of any scientific activity: Is there ethical or economical justification to continue a trial? In Gideon’s case he is afraid that the very simple act of continuing doubts of God’s power may harm him. Anyone who has ever tried to challenge an authoritative scientific supervisor or mentor will sympathize with Gideon. Gideon expresses his fears in a direct plea to God: “Please let me make a test once more with the fleece”. Here he defines the whole event as an experiment, indicating that the fundamental principles of the controlled trial underline his actions, demanding a proof beyond reasonable doubt. We would probably call it today “statistical significance”.

Gideon has at this stage several options of design for his continuing trial. If he was reporting to the Food and Drug Administration he would probably ask the Angel to repeat the experiment with, say, five or ten pieces of wool, to increase the statistical power of the observation. But this option would not have addressed the confounding factor of the hygroscopic nature of the wool.

Hence, Gideon plans an innovative design which creates an ideal control group for the first part of the experiment: “Let it now be dry only on the fleece, and let there be dew on all the ground” (6;39). He asks the Lord to keep the wool dry this time despite its hygroscopic tendency, while the soil around should be wet. The second part of the experiment was executed that night and the results were unequivocal: “And God did so that night for it was dry only on the fleece, and dew was on all the ground (6;40).

It is unfortunate that these principles, practiced by the judge Gideon were not practiced

for thousands of years thereafter, as many medical challenges could have been solved earlier.

Gideon’s Second Trial

The second trial conducted by Gideon is undoubtedly better known, as it dealt with selecting his warriors for the confrontation against the Midianites. His experiment was driven by two hypotheses: The overall hypothesis underlying this experiment is known to all: quality is more important than quantity. Gideon postulated that a limited number of high quality warriors, selected based on high motivation and superior skills will function better than many more soldiers who are lacking these high standards. His second hypothesis was that candidates drinking from the Harod River while leaving their weapons unattended are inferior in their motivation and skills to those who continue to hold their arms while drinking, using only one hand to bring the water to their mouths. The process of selecting his warriors (300 out of 22,000, or less than 1.5%) was based on this criterion.

The proof of the hypothesis was the victory of three hundreds warriors, while using the power of surprise, over a huge Midianite army “as large as the sand on the sea shore”.

The principle underlying this experiment had become an inspiration in many fields: Few, who are better motivated and trained, are capable of achieving more.

EPILOGUE

For the preparation of this piece I asked ten of my Israeli friends who studied the Old Testament in school, what did they remember of the biblical Gideon? All of them remembered the way he chose his warriors on the shores of the Harod River, but none remembered the story of the fleece. Me too, until several years ago, I was not aware of the wool-dew experiment. Then, during one of my scientific trips, in a hotel room in Columbus Ohio, I found a Gideon’s bible and discovered the first recorded controlled trial in the history of man.