The Talpiot Tomb: What are the Odds?

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Abstract

Several statistical studies have been made which estimate the probability that the Talpiot Tomb is the family tomb of Jesus. These studies have provided widely different estimates for this probability. This paper shows that only a small amount of this difference is due to choices in statistical methodology. Rather this paper demonstrates that these wide differences are due to the positions the authors have adopted on selected historical, archeological and epigraphic assumptions. The direction and magnitude of the impact of these assumptions on the probability estimates is assessed.

Introduction

Numerous authors have provided probability estimates for the proposition that the Talpiot Tomb is the family tomb of Jesus of Nazareth. There tends to be little consensus amongs them. They provide widely differing probability estimates and hence support very different conclusions regarding this proposition. [Henceforth, the "proposition" will refer to the statement that the Talpiot tomb is the family tomb of Jesus]. This article is targeted to those readers who are seeking some guidance about what conclusions, if any, can be reached from this body of work.

Readers of this body of work will observe; 1) that these studies often use different statistical approaches and 2) they often disagree on the fundamental factual (i.e. from history, archeology, epigraphy) assumptions that are incorporated into their probability estimates. Using three representative published studies, this paper will demonstrate that the difference in estimates is largely due to differences in factual assumptions and has much less to do with differences in the statistical aspects of the problem.

Therefore, it is this author's conclusion that for most readers their understanding of the likelihood that the Talpiot Tomb is the family tomb of Jesus will be advanced more by directly distilling the work of content experts than it will be through the work of statisticians. Guidance will be provided for judging how ones position on selected important factual assumptions could drive their personal sense of the likelihood that the Talpiot Tomb is the family tomb of Jesus.

This article is intended for those readers who are already generally familiar with the circumstances surrounding the discovery of the Talpiot Tomb and are familiar with some of the statistical studies relating to the proposition of interest. For readers seeking more background information, there are several useful sources available including those listed in the references. Readers should be cautioned that, generally speaking, it is difficult to find a treatment of this subject where one can be completely unconcerned about encountering biases based upon the self-interest or the theological predisposition of those making the factual assumptions.

This paper has been prepared using a minimal amount of statistical jargon. However, before we dive into these statistical studies we have to take a look at some major problems that confront all probability estimates relating to the proposition.

"For fools rush in where angels fear to tread"

Alexander Pope and Frank Sinatra agree that there are situations in which one would be better off by not getting involved. For many, this advice could easily apply to the Talpiot Tomb probability problem. Some experts simply see this problem as beyond the reach of statistical analysis. This primarily arises from three issues.

The first issue is that the Talpiot Tomb contains data which is deceptively difficult to use statistically. The most enticing data for the analyst is the cluster of names from the six inscribed ossuaries found in the tomb. For some this looks like an arrangement of data that could be readily converted into the probability estimate of interest. However, as many of the articles on this subject now have shown, this data can be used for probability estimates only by making a long series of sometimes controversial factual assumptions. Additionally, some authors find that they can only turn these data and assumptions into probability estimates if they employ estimation methods in non-traditional ways that in some cases are subject to scholarly debate.

The second issue is that the Talpiot Tomb opens up questions that are highly relevant but realistically can not be incorporated into a formal probability estimate. A few examples of this are; 1) what is the meaning of the symbol over the entry to the tomb, 2) what is the significance of the multiple languages found on the inscribed ossuaries, and 3) is there any significance to the manner in which the letters were carved onto the Jesus ossuary. The list goes on and it is somewhat personal to each reader. For many readers, answers to these types of questions will weigh significantly alongside any statistically derived probability estimate based on the names found in the tomb.

The third issue is subtle, but critically important. A key principle in forming probability estimates of this type is that one should state certain aspects of their statistical approach before seeing their data. That is, this effort should be performed *a priori*. Clearly this was not realistic in this case given its publicity.

As a result most authors have exercised great care to arrange their analyses so as to be free from the criticism that their estimates are incorrect because they incorporate some bias resulting from having seen the data prior to setting up their analysis. However, for many critics this problem is unavoidable. Some critics feel the most obvious example of this potential problem occurs when studies accept the assumption that Mary Magdalene is an *a priori* candidate for inclusion in a Jesus family tomb. The impact of this assumption will be discussed later in more detail.

So, should one give up and say that this problem is not amenable to statistical analysis? It is this author's position that despite these issues that there is still value in forming these probability estimates, so long as one keeps the above issues "front of mind". If nothing else these probability estimates can help frame the debate on the non-statistical aspects the Talpiot Tomb. As shall be seen later in this paper, by framing the problem in formal statistical language we can get a better sense of the direction and magnitude of certain factual assumptions. Still, for most readers the literal probability estimates will be of minor value in establishing their personal position on the proposition.

Presenting probability estimates

Earlier in this article the promise was made that statistical jargon would be kept to a minimum. However, a small amount of additional background will be offered so as to facilitate the upcoming discussion of actual probability estimates.

Many readers have considered probabilities in light of the classic example of a bag containing some number of white balls and black balls. If the bag is filled with 20 balls, 19 of which are white and 1 of which is black, one understands that the probability of drawing a black ball on any single trial is 5% (5% = 1/20 *100), while the probability of drawing a white ball on a single trial is 95% (95% = 19/20*100).

Often when discussing the likelihood of something many authors prefer to not to report a probability (i.e. percentage) but rather report the "odds ratio" (or more simply the "odds"). The "odds in favor" of an event is then simply the probability that the event will occur divided by the probability that it will not occur. So in our ball example we can see that the odds in favor of drawing a white ball are (95%/5% = 19) 19 to 1 [written as 19:1].

So, for this article we will present final results in terms of odds in favor of the given proposition (i.e. event), where the proposition is that the Talpiot Tomb is the family tomb of Jesus. On some occasions it will be more convenient to speak of the odds against the proposition. So in our example, we could also say that the odds are 19:1 against the event of drawing a black ball.

Which odds estimates are used in this article?

This article will not produce any new odds estimates Instead we will review or adjust the estimates provided by other authors. This author is aware of several works on this subject that are worthy of consideration. However for the sake of brevity, in this article we will focus on the estimates given in the following three papers:

1. Feuerverger, Andrey, March, 2008 [4]
2. Ingermanson, Randall, January, 2008 [5]
3. Kilty, Kevin and Elliott, Mark, June, 2007 [6]

The estimates from these authors were chosen because; 1) they represent the wide range of estimates and associated assumptions found in this overall body of work, 2) they appear to be amongst the most widely read and referenced in this overall body of work, and 3) they are written in sufficient detail so as to allow some comparison to each other.

Before we get into the comparison of the results from the three sources, we first need to discuss the somewhat confusing circumstances surrounding the estimates provided by Feuerverger. Most people first became familiar with the Talpiot Tomb through two related sources, a Discovery Channel special entitled "The Lost Tomb of Jesus" and a book by Jacobovici and Pellegrino entitled "The Jesus Family Tomb"[2]. In both of these sources, it was stated that the odds were 600:1 in favor of the proposition. This odds calculation came to be attributed to Feuerverger.

This statement of odds left the impression that from a statistical point of view it was conclusive that the proposition was true and the Talpiot Tomb must be the family tomb of Jesus. Unfortunately, during early 2007, as this statement of odds got circulated in the press, its meaning got increasingly muddied. It was not until Feurerverger published a formal, refereed article in March of 2008 [4] that it became clear that the original result attributed to Feuerverger was preliminary and that its meaning was somewhat distorted in the retelling. Therefore, all references to Feuerverger's estimates will be from his March 2008 published paper [4].

A note of clarification also needs to be provided for the Ingermanson reference [6]. Ingermanson has actually written several pieces relating to the Talpiot tomb. Whenever this article refers to estimates provided by Ingermanson they will only refer to his paper completed in January, 2008 [6] which was written in support of his contribution as a referee to the Feuerverger article published in March, 2008 [4].

What are the assumptions that drive the results?

Before we present odds estimates we need to recall that all of the odds estimates are heavily driven by multiple factual assumptions. Several of these assumptions have been selected for analysis in this paper and are shown in Table 1. This set of assumptions was selected because 1) they have a potentially significant effect on the probability estimates and 2) the three authors express wide differences of opinion as to which of these assumptions should be accepted or rejected.

Readers will notice three things about the assumptions shown in Table 1; 1) some of these assumptions have been restructured, combined or simplified as compared to the original references, 2) some assumptions (particularly from Feuerverger) have not been selected, 3) all of the assumptions have been framed such that accepting the assumption increases the odds in favor of the proposition, under the Feuerverger method. This arrangement was chosen for the sake of brevity and to simplify the process of comparing odds estimates across the three authors. This author takes responsibility for any distortion or misunderstanding introduced by this process.

What are the odds that the Talpiot Tomb is the family tomb of Jesus?

Each of the three referenced authors provides multiple odds estimates relating to the proposition. Again, for the sake of brevity only what appears to be the author's primary result will be presented here. Table 2 shows these results along with the assumptions that each accepts or rejects. Recall that Table 1 provides a key to the assumption codes.

Selecting a primary result for Feuerverger was problematic because his paper was as much about presenting an estimation method as it was about making a statement of odds regarding the proposition. Therefore, this paper will use a result taken from the middle of the range of the results presented in his paper. (Readers of his paper will recognize that this corresponds to setting Theta = 0.5, where Theta is the probability of that a real tomb of Jesus would reveal a set of names at least as "surprising" as those found in the Talpiot Tomb).

Table 1: Selected Assumptions

A	Mary Magdalene should be an "a priori" candidate for the Jesus family tomb and the ossuary inscribed as Mariamne is an appropriate name for Mary Magdalene and Mariamne is a rare name
B	The ossuary inscribed with Yoseh is the best possible match with the name of one of the brothers of Jesus and Yoseh is a rare name, furthermore Yoseh and Yehosef do not refer to the same person
C	Jesus is just as likely as any other man of Jerusalem to be buried in a ossuary and placed in a tomb
D	Jesus is just as likely as any other man of Jerusalem to be married and have a child named Judah
E	Simon and Judah, the brothers of Jesus, should not be considered tomb candidates
F	Salome, the sister of Jesus, should not be considered a tomb candidate
G	The apporpriate name to use for Mary, the mother of Jesus, is "Marya", as opposed to the more general "Mariam"
H	If a Jesus family tomb exists, it is required that Jesus be in it

Table 2: Odds For or Against the Proposition with Associated Assumptions

Estimate	Odds		Accept	Partial	Reject
Feuerverger	828:1	For	A,B,C,D,E,G		F, H
Kilty & Elliott	1:1	No Preference	B,C,D,F,H		A,E,G
Ingermanson*	50:1	Against	F,H	C,D**	A,B,E**,G

* Ingermanson believes that this 50:1 estimate is an upper bound on favorability for this set of assumptions; so he states that his estimate could be as much as 500:1 against the proposition.

** Ingermanson's estimate partially accepts (or rejects) assumptions "C" and "D". This is also true for assumption "E". However, he states that he has chosen as his primary result an estimate that is heavily weighted toward the rejection of "E".

The reader will observe that there is a very large spread in these odds. At one end we have Feuerverger estimating that the odds are 828:1 in favor of the proposition, while at the other end Ingermanson reports that the odds are (at least) 50:1 against the proposition. We also have an estimate from Kilty and Elliott that suggests that odds for the proposition are about even, meaning that there should be no preference for either alternative.

Which Estimate is Correct?

Which estimate is correct? As suggested in the introduction, it depends. It was stated earlier that that the differences in estimates are driven by two causes. First, there is a difference in each author's statistical choices. The second reason is that, as Table 2 shows, the authors used highly different assumptions in their odds estimation equations.

While the authors make different statistical method choices, this author chooses not to take a position with regard to which implementation is the best. In fact, in this section the author will show that differences in implementation of the estimation equations makes only a small contribution to the differences in odds shown in Table 2.

A quick way to observe this point is to ask what would be the impact if Feuerverger were to have rejected assumption "A", the one relating directly to Mary Magdalene. All of the estimates from the other two authors already reject this assumption. By rejecting "A", the Feuerverger estimate would move from 828:1 in favor of the proposition to 8:1 in favor of the proposition; moving it significantly closer to the estimates of the other two authors.

It is possible to take this further. The author has recalculated the odds estimates for Feurverger and Ingermanson using the assumptions associated with the Kilty and Elliott estimate. This does not imply that this author agrees with their set of assumptions, these are just convenient assumptions to use for making a comparison of the impact from using different statistical methods.

Since Feurerverger made public the computer code used for his analysis, it was possible to adjust his result to match the Kilty and Elliott assumption set. However, it was only possible to perform these calculations in an approximate way for Ingermanson. So, given that caveat, the adjusted odds using "same" assumptions are as shown in Table 3.

Table 3: Odds using the same Assumptions

Source	Odds
Feuerverger	3:1 Against
Kilty & Elliott	1:1 No Preference
Ingermanson	5:1 Against

As Table 3 shows, using the "same" assumptions greatly collapses the range in odds estimates that result from implementing the estimation equations. Recall that the original range was from 828:1 in favor of the proposition to (at least) 50:1 against. It can now be seen that the very large spread in estimates is due almost entirely to taking different positions on the selected assumptions.

Assumption Scenarios

The reader has been provided with information showing the direction and magnitude in which odds estimates are driven when accepting or rejecting the selected assumptions. In an effort to help the reader reach their own conclusions, the author has prepared some scenarios which show how accepting or rejecting certain clusters of assumptions could drive ones personal conclusion regarding the proposition.

- Scenario 1: Highly favorable to the proposition

  The shortest path to becoming highly favorable to the proposition is to accept assumption "A", as is the case in the Feuerverger estimate. This is such a forceful assumption that many experts would be willing to say that no statistical analysis would be required in order to adopt a favorable stance toward the proposition.

- Scenario 2: Favorable to the proposition

  Even upon rejecting assumption "A" one still could find themselves in a favorable stance toward the proposition if they essentially accept all of the other assumptions. A favorable position could also be enhanced by modifying assumptions "C" and/or "D" to assume that Jesus was actually more likely than average to have a son named Judah (see assumption "D") or was actually more likely than average to have been buried in a rock hewn tomb (see assumption "C"). None of the selected authors incorporated such an assumption directly into their analyses, but there are serious adherents to both possibilities.

- Scenario 3: Middle ground between favorable and unfavorable

  Most individuals in this range will reject assumption "A", but they could vary considerably on the pattern of other assumptions that they accept or reject. As shown in Table 3, by accepting the Kilty and Elliott assumption set one could find themselves in a neutral or slightly negative stance toward the proposition.

- Scenario 4: Strongly against the proposition

  By rejecting assumption "A" and most of the other assumptions one would likely find themselves standing strongly against the proposition. This is essentially the position taken in the Ingermanson estimate. As in Scenario 1, if this is your assumption set, you probably don't require a statistical analysis to reach your conclusion.

As we pointed out earlier, the Talpiot Tomb proposition also comes attached with many other questions/issues that have not been incorporated into these scenarios. For many readers their opinions regarding these non-quantifiable questions/issues will also heavily impact their conclusions regarding the overall proposition.

Conclusion

It has been shown that the statisticians who have written on this subject are divided in their odds estimates, mostly because they disagree on the selected assumptions. It has been the thesis of this paper that in the end, the views of most people will be framed more by how they distill a broad range of information from content experts than it will be from odds estimates presented by statisticians.

What then do the content experts believe? Interestingly we can say something about the opinions of this group. In January 2008 Professor James Charlesworth of Princeton Theological Seminary, organized a conference titled "*Jewish Views of the After Life and Burial Practices in Second Temple Judaism: Evaluating the Talpiot Tomb in Context*". At this conference, many of the leading authorities on the subject discussed the possibility that the Talpiot tomb was the family tomb of Jesus. Reports from the conference suggest that an important point was backed by the conference attendees; that the proposition, while not proven, was sufficiently likely that further study of this matter is warranted [7].

This author also hopes that further study and exploration will bring us closer to understanding the likelihood that the Talpiot Tomb is the family tomb of Jesus of Nazareth.

References:

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