

## **Additive homeopathy in cancer patients: Review of survival data from a homeopathic outpatient unit at the Medical University of Vienna**

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### **Abstract**

In a recently published retrospective study the authors compared survival data of cancer patients who underwent an additional homeopathic treatment to data found in literature. There was a considerable variance in the time the patients started their additional treatment, some did so even later than median expected survival time from literature. The authors found a substantially longer survival time in the patients treated with homeopathy.

However, by the way the data from literature were deployed, the authors the authors included the time prior to their homeopathic treatment into the treatment effects while ignoring patients that did not survive long enough to join the study. This creates a considerable bias in favor of the adjunct treatment.

By proper deployment of literature survival data to the subgroup of patients with pancreatic cancer, median expected survival was found to be 13.3 months instead of 6.6 months, median gain in reached survival time was found to be 0.7 months instead of 10.9 months.

Even if this was a preliminary study, it may well be used as evidence of efficacy of homeopathy for cancer indications, which would be hardly justified. Therefore the authors should review their calculations and publish an erratum - or even a completely revised report.

### **Introduction**

In 2014 Gaertner et al. published their retrospective study about the impact of adjunct homeopathic therapies on cancer patients in this journal [1]. The authors found that median survival times of patients that underwent such a treatment was prolonged considerably and could reach up to four times of what could be expected by conventional cancer treatment alone.

This review is to show that much - if not all - of the patients' advantage after their homeopathic treatment results from improper deployment of survival curves to establish the expected survival times of the individual patients. In that the study is very misleading and especially table 4 and figure 2 may lead practitioners to recommend useless therapies to very seriously ill patients.

Of course, Gaertner's study is of retrospective and preliminary nature only. But homeopaths are constantly using preliminary and pilot studies as evidence of the efficacy of the treatment, disregarding the fact that they are not. In a recent review, Mathie et al. performed a meta-analysis of 22 studies on individualized homeopathy [2]. Eight of these proved to be pilot studies only - without a consecutive PCT to follow after ten or even twenty years. Two out of the three studies Mathie et al. rated as 'reliable evidence' were mere pilot studies only. Preliminary studies were deployed just with the same weight as full fledged PCTs and contributed to Mathie's outcome.

So there is a definite chance that, if the results of Gaertner's study will fail to be replicated in a PCT, this fact might not find its way into literature. Thus the preliminary study may receive the status of reliable evidence by people having interest in homeopathy. Therefore the authors of the study should be requested to reevaluate their data and publish the results as an erratum or it even might prove that this paper has to be withdrawn completely.

## **Methods**

Gaertner et al. reviewed files on cancer patients that have approached a homeopathic outpatient unit and compared survival data of these patients to data found in the literature. In their table 3 the authors give all the data of the 54 patients included into the study who suffered from seven different types of cancer and had a fatal prognosis.

The inclusion criteria state that the patients would have to have completed at least three homeopathic sessions to join the study. While it is understandable that the patients included in the homeopathy group should have participated in such a treatment, the time involved until this is done offers some complications which the authors selected to ignore. They give survival time and annual survival rate for their patients and from literature, ignoring the fact that the delays to join has some impact on the comparison. Roughly speaking this is the well known fact that the chances to survive say for one year increase for every month the patient lives nearer to this point.

This review deals with one of the seven subsets of patients from Gaertner's study, namely the patients

(n = 8) that suffered from pancreatic cancer (PC).

Unfortunately Gaertner's report shows some inconsistencies of data that make the comparison slightly difficult. In table 3, the expected survival is given "according to experts' assessment and literature data", namely either 8 or 22 months for the PC-patients. In table 4, however, expected median survival "according to literature data" is given for the same patients as 6.6 months, smaller than any of the data of table 3. The p-values in table 4 are based on still another set of figures defined as "individually estimated survival times according to experts' assessments" without those data to be found anywhere in the paper.

Because the final result in table 4 and figure 2 of Gaertner's paper is compiled utilizing literature data, this paper follows the same tracks and elaborates on the deployment of literature based survival curves to define expected median survival time for a cohort that joined the study at different points in time.

### **Establishing expected median survival time**

A survival curve or its estimate by a Kaplan Meyer Plot (KMP) gives the expected percentage of survivors over time. The total of the population starts at time point 0 and the curve gives the percentage of patients still alive vs. time. Median survival time is the time when 50 % of the original population have died. Annual survival ratios are given by the percentage of the total population alive at 1, 2 or 3 years of time respectively.

Gaertner uses a paper authored by Boyd et al. as source for survival data for PC patients [4]. But unfortunately they deploy different survival curves to establish expected survival ratio for one and two years and median survival time of the PC-patients:

- expected one year survival seems to be taken from fig 4 of [4], given for metastatic pancreatic adenocarcinoma only
- expected two year survival rate seems to be taken from fig 1 of [4], given for overall pancreatic adenocarcinoma only
- expected median survival rate seems to be taken from fig 2 of [4], given for locoregional pancreatic adenocarcinoma

While the authors do not disclose the reason for this shift in control population, one of the co-authors

(MF) confirmed that the data should be taken from fig 2., which is used here for all the evaluations throughout this paper. This curve is characterized by 28.6 % and 12 % for one and two year survival rate respectively and 6.6 months median survival time.

The patients in Gaertner's study each joined the study at different points in time by presenting themselves to the homeopathic outpatient unit and completing their three sessions. Some did so even later than median survival time, so this delay may be of some impact. There can be no doubt that the adjunct homeopathic treatment could not have had any effect before it was started, so the survival until joining the study cannot be considered as an effect of this treatment.

The effect should be checked for each patient on an individual basis. By presenting themselves to the outpatient unit they prove that each one is a member of the subgroup of patients that did survive up to this point in time. If the adjunct homeopathic treatment had any positive effect then most of the patients should outlive median further survival time of this subgroup of their untreated fellow survivors.

Let  $T_1$  be the time when the effect of homeopathy affects the patient and  $P_1$  the percentage of patients surviving to this time. The expected median survival time  $T_2$  for this patient can be found when half of the patients alive at  $T_1$  have died. That is when the percentage of survivors  $P_2$  is half of  $P_1$ . After this evaluation is performed for every patient the median expected survival time and median reached survival time are set by the middle patient of the cohort or - in the case of even numbers of patients - as the average values of the two patients in the middle of the cohort.

Using the time of the first homeopathic session as  $T_1$  implicitly assumes that homeopathy got effective immediately. In defining their inclusion criteria of having completed three homeopathic sessions the authors account for the fact, that the first remedy may not have been the optimal selection. But at the latest the third one should have hit the mark [4]. On average it took five months for first to third session. So in case of the assumption of being effective right after the first session may be argued, I performed a second evaluation with  $T_1$  being defined by the time the patient started his homeopathic therapy plus 5 months.

### **Annual survival rates**

Annual survival rates are the percentage of survivors after one, two or three years of the totality of the population at first diagnosis. For a given patient, once he had lived for any amount of time after his first diagnosis, the chances to survive say the first year are much increased compared to the situation at the beginning. If  $P_1$  for a given patient is less than unity, which of course is the case when any of the

other patients have died, then his chances to reach one, two or three years are increased by the factor  $1 / P1$ . So the expected annual survival must be established individually for each patient and there is a median expected annual survival rate.

In order to establish reached annual survival rates it is important that the number of the patients in the cohort must be corrected, which Gaertner, however, chose not to do. Some patients started their homeopathic treatment later than one or even two or three years after their diagnosis. It should be clear that these patients cannot be counted in the achieved actual annual survival rate at times when they had not yet started their homeopathic treatment - for homeopathy did not play any roll in this achievement.

For the same reason as above two evaluations were performed: one with T1 set to the start of homeopathic treatment, the second with T1 set to five months later.

## Results

The cohort of Gaertner's patients contains eight patients diagnosed with pancreatic cancer, for one patient, however, there is no time given when homeopathic treatment was started, so this patient had to be censored.

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Table 1: Comparison of achieved survival time of PC patients to expected median survival time

Patient #	T1 (months)	P1 (%)	T2 (months)	survival (months)	gain (months)
37	4	64.2	10.8	15	4.2
38	9	38.2	16.9	25	8.1
39	10	34.6	18.3	19	0.7
40	24	12.0	>> 24.0	26	< 0
41	1	87.6	7.7	1	- 6.7
42	not available	undefined	undefined	36	undefined
43	6	52.0	13.3	14	0.7
44	2	77.8	9.2	20	10.8

Captions:

T1: time from first diagnosis to first homeopathic session [1, tab. 3]

P1: probability of survival at T1\*

T2: expected median survival time of the patients alive at T1\*

survival: individual survival time [1, tab. 3]

gain: (T2 - survival), < 0 if patient died before T2 was reached

\* P1, T2: established by digitizing survival curve fig 2 in [4]

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 Table 1 is to illustrate the evaluation and shows the spreadsheet for T1 set to the first homeopathic session. Expected median survival time reaches 13.3 months (Gaertner: 6.6 months), median gain in survival was 0.7 months only (10.9 months). If T1 is set to five months later to account for elapsed time till three homeopathic sessions were completed (data not shown), expected median survival time is 18.3 months which was missed by 4.3 months (median).

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 Table 2: Evaluation of annual survival rate

Patient #	P1A	alive 1	P2A	alive 2	P3a	alive 3
37	44.5	yes	18.7	no	no data	no
38	74.8	yes	31.4	yes	no data	no
39	82.7	yes	34.7	no	no data	no
40	not started	not used	100.0	yes	no data	no
41	32.6	no	13.6	no	no data	no
42	undefined	not used	undefined	not used	no data	not used
43	55.0	yes	23.0	no	no data	no
44	36.7	yes	15.4	no	no data	no

Captions:

P1A: patient's probability to be alive one year after first diagnosis

P2A: patient's probability to be alive two years after first diagnosis

alive x: status of patient's survival x years after first diagnosis, [1, table 3]

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 Table 2 shows the results for the annual survival rates of the same eight patients. Median expected survival rate for one and two years respectively was 49.8 % (8 %) and 23.0 % (5.8 %). For three years there were no data available. Achieved survival rate for one, two and three years was 83.3 % (87.5 %), 28.6 % (37.5 %) and 0.0 % (12.5 %) respectively. Expected survival rates are increased by using the proper curve and observing the late time to join. Achieved survival rates are decreased by omitting patients that have not yet started their treatment.

The advantage of a survival rate being ten times as long after one year and five times as long after two years in the study dwindles to less than twice after one year and an inferior rate after two years.

If T1 is set to five months later, then expected median survival rates for one and two years amount to

38.4 % and 35.6 % while reached survival rates are 75 % and 16.7% respectively (data not shown). These data are much influenced by adjusting the cohort for patients that did not yet complete their sessions after one or two years.

## **Discussion**

Gaertner's et al. study is a preliminary one with retrospect design and as such cannot yield any evidence, if it was homeopathy that produced the favorable outcomes in the patients. This the authors very clearly state for themselves. However, there are other shortcomings deriving from the study design that may turn the table. When comparing actual survival data from one clinic to data taken from literature, there are a lot of issues. Differences in demographics, treatments, staging, number of patients involved and many more may well be of major impact. For instance mean age of the patients in Boyd's cohort was 78.1 years, median age of Gaertner's PC-patients was 62 years only.

But the main issue here is that apparently the authors did not allow for the impact on statistics when not all the patients joined at point 0 but joined by and by while they propagated in the course of their disease and treatment. This paper shows that at least for one subset the positive outcome vanishes to nearly nil when the statistical comparison is performed properly. However, this result is hampered by many of the same issues as is the study under discussion.

One is the smallness of the subgroups' populations with only seven patients with PC yielding usable data. The eighth had to be scratched because the time when treatments started was not given - but this was the patient with the longest survival time in this subgroup, a fact that may be of some influence on the result.

Then it is only one out of seven subgroups that was reviewed here, four out of the seven could not be evaluated: For two indications Gaertner's data on start of treatment and expected/reached survival time are not based on the same point in time [3] (MSARC, MRCC), for one the source did not include a survival curve or Kaplan-Meier-Plot (SCLC), for one the source could not be procured (NSCLC). So it might well be that by chance the worst example was reviewed here. But this should be enough to indicate that there is a major problem with the deployment of statistics in this study.

One of the major problems in this review is the lack of consistency in the data given in the report. I had to make some assumptions as to what the data mean and where they come from. By personal contact with one of the co-authors some issues could be clarified. For instance, that according to tab. 3 in [1] some of the patients must have been dead for a couple of years already before they started their

homeopathic treatment (#18, #19, #24). This was explained that in case of metastasized carcinomas the time from diagnosis to start of homeopathic treatment refers to the basic disease while the expected survival time is based on the time of diagnosing the first metastasis.

## **Conclusion**

Homeopathy very much regards preliminary and pilot studies as reliable evidence, not only in the laymen discussions but in systematic reviews and meta-analyses published in peer reviewed journals. The study of Gaertner et al. might well be used as 'scientific evidence' by homeopathic practitioners and laymen to push homeopathy - which might be misleading and imply unjustified hopes in patients with a very severe health problem. "Survival time could be quadrupled - the devil may care what restraints these scientists have, let me have this remedy." Who knows what consequence the patient may draw for his conventional treatment?

Therefore, there cannot be any other conclusion, Gaertner et al. should recalculate their results and publish an erratum - or even republish the study in total. And while doing so, they should put a little more consistency to their published data.

## **References**

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