

Cancer patients' attitudes toward treatment options for advanced non-small cell lung cancer: implications for patient education and decision support

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Received 4 December 2000; received in revised form 19 April 2001; accepted 21 April 2001

Abstract

The purpose of this study was to determine how people weigh both median survival time and 1-year survival probability when considering a choice between palliative Cisplatin-based chemotherapy with best supportive care (C + BSC) versus best supportive care alone (BSC) as treatment for advanced non-small cell lung cancer (NSCLC). Sixty people, previously treated for cancer, were interviewed as surrogate patients making a treatment decision. The interview included a structured description of the treatment options, and trade-off exercises used to clarify the participants' attitudes pertaining to the survival probabilities associated with each treatment.

Participants' attitudes ranged from choosing the more toxic treatment if it offered no survival advantage to declining C + BSC no matter how large its advantage. Fifty-seven percent of participants would choose chemotherapy if the 1-year survival were 10% higher with C + BSC than with BSC alone. For 44 participants (76%), both their median survival and 1-year survival thresholds for accepting C + BSC were consistent, and for two (3%), neither threshold was consistent with their stated treatment preference. For the remaining 12 (21%), one threshold was discordant, but in all cases, this threshold was less relevant to his/her decision. Participants' thresholds could not be predicted reliably on the basis of patient age, sex, education, preferred role in treatment decision making, or previous treatment with chemotherapy. All but one participant recommended the interview as a decision-support strategy for actual patients.

The findings suggest that patients with advanced NSCLC should be offered more than one treatment option, and that a systematic process for educating patients and for eliciting their preferences is desirable. The process described herein has potential for use in this clinical setting. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Carcinoma; Non-small cell lung; Decision support; Chemotherapy; Patient preferences

1. Introduction

The question of whether systemic treatment constitutes the most appropriate treatment for patients with advanced non-small cell lung cancer (NSCLC) has been a topic of considerable debate in the oncology literature. Several clinical trials in this setting have demonstrated that palliative systemic treatment with Cisplatin-based poly-chemotherapy results in longer patient survival times compared to supportive care without chemotherapy, and four meta-analyses of these clinical trials have now been reported [1–4].

These analyses have generally been accepted as conclusive evidence that chemotherapy affords a modest but statistically significant prolongation of survival time, at least for patients who are characteristic of those enrolled in the trials [5,6].

Although the improvement in patient survival afforded by cisplatin-based chemotherapy has been established, the preferred treatment in the case of each individual patient is not as clear, and can be expected to vary according to the perspectives of both the physician and the patient, among other factors [7]. With regard to variation among physicians [8,9], some authors advocate chemotherapy as standard treatment for patients with advanced NSCLC because systemic treatment offers the possibility of objective disease

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response, increased patient survival, symptom improvement, and improved quality of life [5,6]. Others argue that while chemotherapy offers potential benefits, the response rates are relatively low, and may be outweighed by concerns regarding toxicity [5,10] and treatment cost [2,10]. The documented variation among physicians' attitudes [8] and practice [11] suggests that a practice guideline addressing the use of chemotherapy in the setting of advanced NSCLC might be appropriate, but as Eddy [12] has pointed out, knowledge of variation in patients' preferences for the available treatment options is central to the development of such a guideline. Hence, we were interested in how patients might weigh the risks and benefits of systemic treatment in the context of advanced NSCLC.

Patients who wish to participate in deciding what treatment they are to receive must have the opportunity to understand the risks and benefits of the available treatment options and to express their values pertaining to those risks and benefits. The notion that patients' wishes regarding treatment be respected is established by the ethical principle of respect for the autonomy of the patient and is central to the legal doctrine of informed consent [13]. It follows that if a practice guideline addresses a decision that is sensitive to the values held by a specific individual, then the appropriate implementation of the practice guideline requires a reliable process for informing patients and for evaluating their relevant values [14]. The need for such a process is emphasized by research showing that lung cancer patients frequently hold misconceptions about their prognosis, that they frequently overestimate the likelihood of benefiting from treatment, and that their physicians frequently fail to recognize their patients' misconceptions [15]. In this study, we describe a pilot evaluation of such a process and provide further evidence for the importance of having such a process.

The first goal of this study was to investigate how people balance the risks and benefits of chemotherapy when acting as surrogate decision makers for patients with advanced NSCLC. Previous studies have shown that individuals, when acting as surrogate decision makers, may accept or reject cancer treatment in contexts similar to that of advanced NSCLC [16–18]. Silvestri et al. studied variation in patients' attitudes toward accepting chemotherapy [10]; they asked patients who had already received chemotherapy to indicate the minimum survival benefit they would require to choose chemotherapy in three hypothetical situations. We chose not to study patients who had received chemotherapy for lung cancer because we were interested in the judgements of people who had not yet experienced the relevant health state, as would be the case for a new patient deciding between two treatment options. In addition, we were concerned that patients' treatment-related outcomes would substantially bias their consideration of the hypothetical scenario. We chose, instead, to study the judgements of patients who had experienced a diagnosis of, and treatment for, cancers other than lung cancer, because we believed that such patients

may be able to draw on their own experience at the time of diagnosis and reflect carefully on the case scenario. We elicited patients' judgements using a method that we previously demonstrated to be reliable in the setting of locally-advanced NSCLC [18].

Our second goal was to determine which survival end-points are most important to patients' decisions. It is known that framing the description of survival outcomes either as the probability of death or as the probability of living influences patients' declared preferences [17,19,20]. Less is understood about how different types of descriptions of expected survival would affect patients' judgements; life expectancy [10,17], median survival [3], and the probability of 6-month survival [2] or 1-year survival [21] have all been suggested as appropriate endpoints in considering the benefits of treatment. We elected to study 1-year and median survival because they are the two most commonly cited end-points in this disease [21].

Our study had six objectives that addressed these goals. We wished to determine: first, each participant's judgement about the magnitude of survival advantage that he/she felt would justify chemotherapy treatment; second, whether the median survival time or the probability of 1-year survival, or both, is information that is important to the decision; third, the extent to which participants' judgements on the survival benefit needed to choose chemotherapy were related to their stated treatment preferences; fourth, how actively participants would prefer to be involved in making the decision should they be diagnosed with advanced NSCLC; fifth, to determine whether participants' role preferences or their demographic characteristics were associated with their willingness to accept chemotherapy; and, finally if our method for presenting information and for clarifying individual's values would be acceptable to them if they were to actually face the treatment decision.

2. Methods

2.1. Study participants

The study population was comprised of consecutive eligible patients who were being followed for a previously treated cancer (other than lung cancer) in the ambulatory clinics of a regional cancer center. Study eligibility criteria required that the participant had: no history of previous lung cancer; routine follow-up appointments scheduled at least 3 months apart; no active malignant disease or cancer treatment according to the last clinical record; and no history of brain metastases or major affective disorder. For each potential participant, the patient's attending physician signed a letter of invitation in order to maintain patient confidentiality. Interested patients were instructed to contact a research associate either by telephone or by mail. All participants provided written consent prior to commencing the interview.

Table 1
Participant characteristics and decision role preferences

Sex	
Female:male	30:30
Age	
Mean (S.D.)	68.3 (10.9) years
Education	
Less than high school	7 (12%)
Some high school	10 (17%)
Finished high school	20 (33%)
Post Secondary	23 (38%)
Smoking history	
Current smoker	10 (17%)
Previous smoker	14 (24%)
Never smoker	36 (59%)
Previous chemotherapy	
Not given	51 (85%)
Given	9 (15%)
Decision role preference	
(a) "I prefer to make the final selection of which treatment I will receive"	8 (13%)
(b) "I prefer to make the final selection of my treatment after seriously considering my doctor's opinion"	16 (27%)
(c) "I prefer that my doctor and I share responsibility for deciding which treatment is best for me"	19 (32%)
(d) "I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion"	10 (17%)
(e) "I prefer to leave all decisions regarding my treatment to my doctor"	7 (11%)

2.2. Interview method

Each patient was interviewed individually by a research associate using a structured format. The interview began by asking the participant to imagine being in a health state representing a patient with a new diagnosis of advanced NSCLC. A scenario card was used to describe a patient with symptomatic thoracic disease and a painful bone metastasis involving one hip. The card was available to the patient to refer to throughout the interview.

After establishing the hypothetical situation, we ascertained the participant's preferred role in making the hypothetical treatment decision. We showed participants the five statements listed in Table 1 and asked them to choose the one statement that best described their preferred role [22].

We then described the two treatment options. We first described the "best supportive care" option (BSC) which consisted of palliative radiotherapy to the chest (five fractions) and to the painful hip metastasis (one fraction). Second, we described the "best supportive care plus chemotherapy" option (C + BSC) which consisted of palliative chemotherapy (cisplatin and vinorelbine) with palliative radiation to the painful hip metastasis (one fraction). Treatment description cards were read, then displayed sequentially, such that the two treatments could be viewed side-by-side. We used seven description components: details of the actual treatment regimen; early side effects (and their

frequencies); late side effects (and their frequencies); and possible effects of the treatment on personal functioning, on emotional state, on social interactions, and on disease symptoms.

After describing the treatment options, we used two treatment trade-off exercises to clarify participants' values pertaining to survival outcomes in light of the treatment descriptions. One exercise was designed to determine the absolute increase in 1-year survival probability that the participant believed justified choosing C + BSC; the other was designed to determine the increase in median survival time that the participant believed justified choosing C + BSC. In the exercises, participants were told explicitly that neither treatment would cure the lung cancer. Survival information was expressed as a frequency and was described to participants as the number of people out of 100 who would be alive at a given point in time [23]. This information was represented graphically using a sliding vertical bar that indicated the number of people alive (out of 100 people receiving treatment). The scale was placed at a particular point on a 1 m-long time-line, as displayed schematically in Fig. 1.

The trade-off involving the probability of surviving 1-year was first performed. At the 12-month point on the time line, the survival for BSC was shown to be 15/100 and that for C + BSC was shown to be 25/100 (i.e. literature-based estimates [1] were displayed schematically as shown in Fig. 1, Panel A). Each participant was asked which treatment he or she would prefer given the treatment descriptions and the displayed 1-year survival probabilities. To determine his/her trade-off threshold, the probability of surviving 1-year with C + BSC was then systematically increased (if the initial preference was for BSC) or decreased (if the initial preference was for C + BSC) until the participant indicated a change in treatment preference.

Consideration was then given to a parallel trade-off exercise involving the median survival endpoint. In this exercise, the median survival was described to the participant as the time when 50 of the initial 100 patients had died and 50 remained alive. It was further explained that differences in median survival time between treatments was an expression of the "average" increase in length of life afforded by the more toxic treatment, emphasizing that some people live longer than the average and some people live not as long as the average. The median survivals were displayed as 4.5 months with BSC and as 6 months with C + BSC [1]. The patient's initial preference and his/her point of preference switch were then ascertained using the method described above for the 1-year endpoint. This threshold time was the minimum increase in median survival required by the participant in order to choose the more toxic treatment (Fig. 1, Panel B).

Participants were then told that the initial displays of 1-year survivals (15% versus 25%) and of median survival differences (4.5 months versus 6 months) represented the actual estimated survival benefits of chemotherapy, and

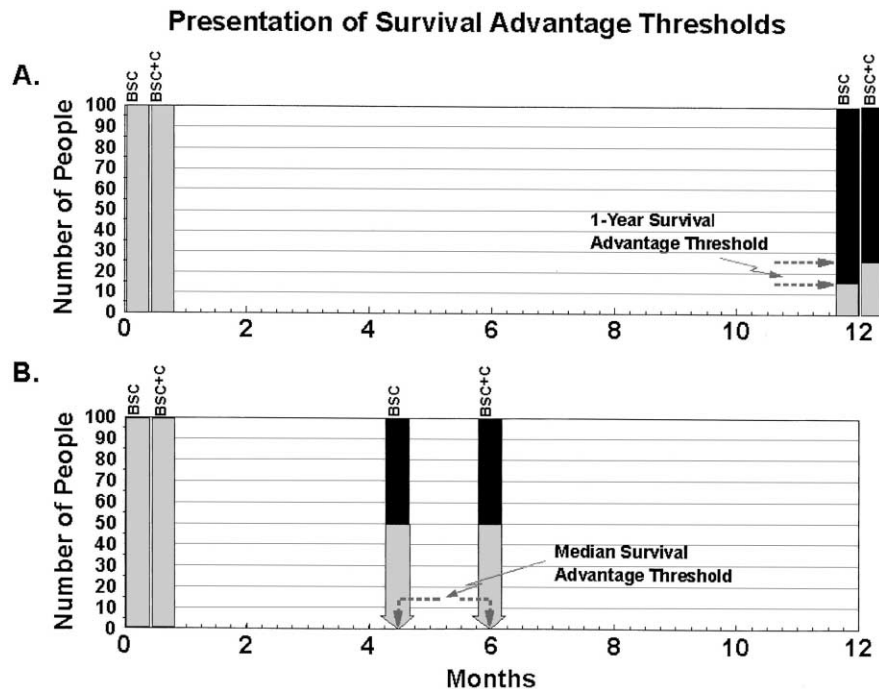


Fig. 1. The probability of survival after treatment was displayed on a 1 m-long time-line. The grey areas in the figure were displayed in yellow (representing the number of people out of 100 alive at a point in time) and the black areas were displayed in blue (representing the number of people dead at the same point in time). The descriptions of the 1-year survival trade-off (Panel A) and the median survival trade-off (Panel B) are found in the text.

these differences were again displayed (Fig. 1). Participants were asked if they wished to revise either of their declared preference switch points, given their new knowledge of the actual benefit conferred by C + BSC.

Finally, participants were asked to indicate their strength of treatment preference on a 7-point Likert scale with the following categories: (1) definitely wish BSC; (2) strong preference for BSC; (3) weak preference for BSC; (4) no particular preference; (5) weak preference for C + BSC; (6) strong preference for C + BSC and (7) definitely wish C + BSC. The participants were then asked which of the two survival endpoints (1-year survival probability or median survival time) was more important to them when making a treatment choice.

At the conclusion of the interview, demographic information was collected for each participant in addition to their history of smoking, and whether they had received chemotherapy as part of their treatment for cancer. Participants were also asked, using an open-ended question, if the decision aid was clear and understandable, and if they thought such an interview would be useful to actual lung cancer patients facing the decision outlined in the scenario.

2.3. Development of the treatment descriptions

A number of different sources were used to compile the information used in the trade-off interview. The health state description for the surrogate patient and the treatment descriptions were modified from those used in a previous study of stage III NSCLC [18]. The description of each

treatment experience was based on information from the clinical trial, nursing, and quality of life literature, combined with information gathered by questionnaires completed by the regional cancer center physicians, nurses, and radiation therapy technologists who were experienced in the management of patients with lung cancer. In addition, eight patients with advanced NSCLC attending ambulatory clinics participated in interviews conducted by a research associate. Five patients had received palliative chemotherapy and three had received palliative radiotherapy without chemotherapy. Open-ended interviews were used to allow patients to recount their experience with their cancer and their treatment, and these interviews were used to modify the treatment descriptions used in the previous study. The probability of side effects and symptom response rates for the two treatment options were taken from clinical trials of the described treatments [24–26]. Survival data were taken from the meta-analysis of cisplatin-based chemotherapy [1] that employed an analysis of individual patient data [21].

2.4. Calculation of survival advantage threshold values

For each trade-off, each participant's survival advantage threshold (SAT) was obtained as illustrated in Fig. 1. For the 1-year trade-off, the SAT is the percent survival conferred by C + BSC minus the 15% survival conferred by BSC. For example, if a participant preferred C + BSC when the survival (with that treatment) was 20%, the SAT for that participant was $(20\% - 15\%) = 5\%$. The SAT was $<0\%$ if the participant preferred the more toxic treatment with a survival percentage

lower than that offered by BSC. Likewise, for the median survival time trade-off, the SAT is the median survival conferred by C + BSC minus that conferred by BSC.

2.5. Statistical considerations

For each endpoint (1-year and median survival), we computed a cumulative distribution of participants' final SATs and calculated the proportion of participants declaring SATs less than or equal to the estimate of actual treatment benefit. We calculated 95% confidence limits around the estimated proportion based on the binomial distribution. Our sample size considerations were based on our desire to have reasonable confidence in this estimate, and we arbitrarily set the confidence limits at $\pm 15\%$. We chose this value as a reasonable compromise between having statistical confidence in our observations and being sensitive to the practical resource limitations on interviewing volunteer cancer patients. We used Spearman correlations (ρ) to test for associations between participants' final SATs and other study variables because some participants had no (numeric) threshold survival advantage for choosing chemotherapy (i.e. would not choose chemotherapy no matter how large the survival advantage). To test our hypothesis that participants' declared SATs ought to be correlated with their strengths of treatment preference, we calculated Spearman correlation coefficients between participants' strengths of treatment preference and their median survival SATs and 1-year SATs, respectively. To examine the extent to which 1-year SATs and median survival SATs were correlated, we calculated a Spearman correlation coefficient between these two variables. Finally, we calculated correlations to examine possible associations between participants' SATs and their age (continuous), sex, educational status (less than or equal to high school versus higher than high school), preferred role in decision making ([a, b] versus [c] versus [d, e]) and previous treatment with chemotherapy (yes versus no).

3. Results

3.1. Participant characteristics

One hundred and eighty-seven letters of invitation were sent to consecutive patients meeting the study eligibility criteria. Sixty (32%) patients participated, 26 (43%) of whom had GU malignancies, 26 (43%) of whom had breast cancer, and 8 (13%) of whom had skin cancer. Characteristics of participants are listed in Table 1. Characteristics of non-responders were not recorded.

3.2. Participants' decisional-role preferences

As illustrated by Table 1, the majority of patients wished to have a predominantly active or a shared role in the treatment decision (40 and 32%, respectively).

3.3. Participants' willingness to take chemotherapy: survival advantage thresholds

Two participants were unable to declare a 1-year SAT. Fig. 2 shows the cumulative frequency distribution of the SATs of the remaining 58 participants. Participants' final 1-year SATs ranged from choosing the toxic treatment if it offered no survival advantage ($SAT \leq 0$) to declining chemotherapy no matter how great its survival advantage (no numeric threshold). Fifty-seven percent (95% CI: 43–70%) would choose C + BSC for an absolute 1-year survival advantage of 10% (the actual estimated benefit).

Two participants were unable to declare a median survival threshold (one of whom also could not declare a 1-year SAT). Fig. 2 shows the cumulative frequency distribution of median SATs of the remaining 58 participants. As the figure shows, participants' final median SATs were also distributed over a range of values ranging from <0 to no numeric threshold. Thirty-six percent of participants (95% CI: 24–50%) would choose C + BSC for a median survival advantage of 1.5 months (the actual estimated benefit).

After participants completed the trade-off exercises, the actual estimated benefits of C + BSC were disclosed, as described earlier, allowing participants to compare their declared thresholds with the actual 1-year and median survival benefits conferred by C + BSC. Only four participants revised either of their declared SATs. Three participants, who all initially declared 1-year SATs of 6% (i.e. within the range of benefit conferred by C + BSC) revised their SATs to 15, 25, and 25%, respectively. In all three cases, the participant's median SATs exceeded the anticipated treatment benefit, and all three declared a preference for BSC. One additional participant declared a median SAT of 2.5 months (i.e. in excess of the treatment benefit) and revised this to 1.5 months after disclosure. He declared a 1-year SAT of 8% — less than the anticipated benefit of C + BSC — and declared a preference for C + BSC in keeping with this SAT.

3.4. Relative importance of the survival endpoints

Participants' views regarding the relative importance of the survival endpoints to their decision varied. Fifteen (25%) participants selected the 1-year survival, and seven (12%) selected the median survival as being more important, respectively, while the remaining 38 (63%) participants stated the endpoints were of equal importance.

3.5. Participants' treatment preferences and their relationship to the survival advantage thresholds

Participants' stated treatment preferences were evenly divided between the two treatments with 31 (52%) preferring BSC and 28 (47%) preferring C + BSC. One participant was unable to state a treatment preference. Across participants, the declared 1-year SATs were strongly associated

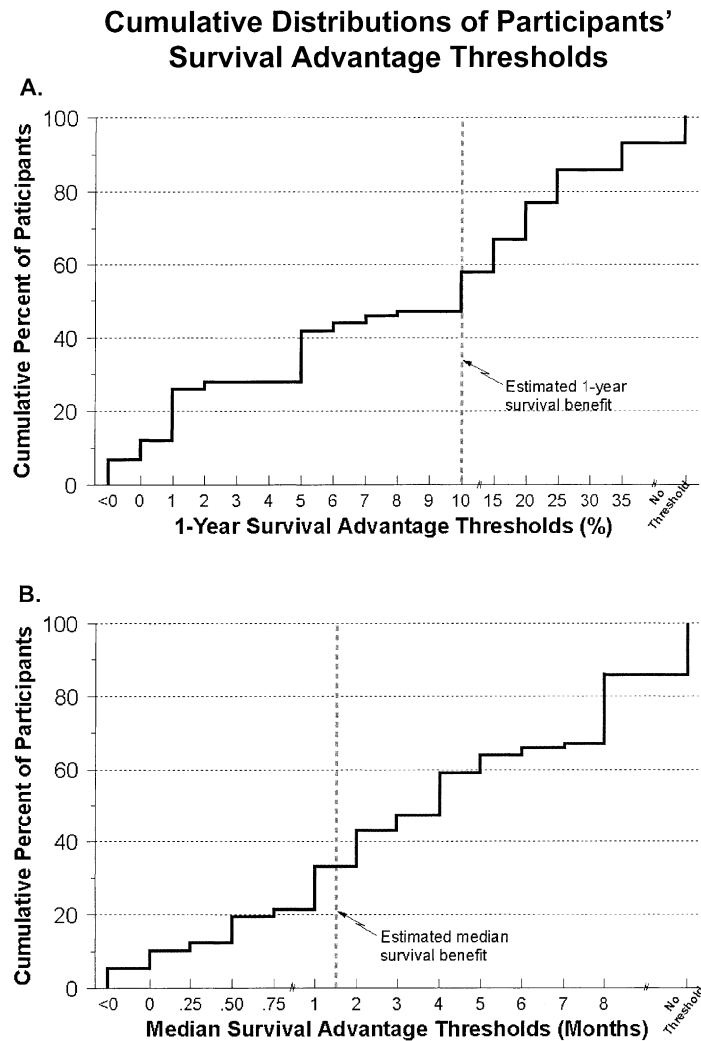


Fig. 2. The cumulative proportion of participants who had 1-year survival advantage thresholds less than or equal to a given value is shown in Panel A. The corresponding distribution of participants' median survival advantage thresholds is shown in Panel B. The estimated treatment benefits are taken from a meta-analysis.

with treatment preference ($\rho = 0.70$, $P < 0.001$). Five participants, however, declared 1-year SATs that were discordant with their indicated strength of treatment preference; four of these five patients indicated a preference for BSC but declared 1-year SATs lower than the estimated treatment benefit. Likewise, participants' declared median SATs were strongly associated with strength of treatment preference ($\rho = 0.73$, $P < 0.001$), although seven participants (six of whom preferred C + BSC) demonstrated discordance between their median SATs and their indicated treatment preference.

The relationship between each participant's 1-year SAT, median SAT, preferred survival endpoint, and direction of treatment preference is summarized in Fig. 3. The median and 1-year SATs were strongly associated ($\rho = 0.83$, $P < 0.001$). Fifty-six participants were able to state thresholds for both time points and indicate a treatment preference. Of these, 14 participants had a treatment preference that was discordant with at least one of their declared SATs. For 2

participants, neither SAT was consistent with their stated treatment preference. Of the remaining 12 participants, only one SAT was discordant with their treatment preference; for all 12 people, the SAT selected by the participant as being more important to their treatment choice was, indeed, consistent with their treatment preference.

Participants' median SATs were found to be significantly, albeit weakly, associated with two participant characteristics. Older participants tended to have higher SATs ($\rho = 0.30$, $P = 0.02$) as did participants who had no post-secondary education ($\rho = 0.31$, $P = 0.02$). No significant associations were found between participants' median SATs and their gender ($\rho = 0.01$, $P = 0.94$), preferred role in treatment decision making ($\rho = 0.04$, $P = 0.73$), or previous experience with chemotherapy ($\rho = 0.07$, $P = 0.61$). Participants' 1-year SATs were not significantly associated with any of the examined participant characteristics.

All participants indicated that the decision aid was clear and understandable, and all but one participant recommended

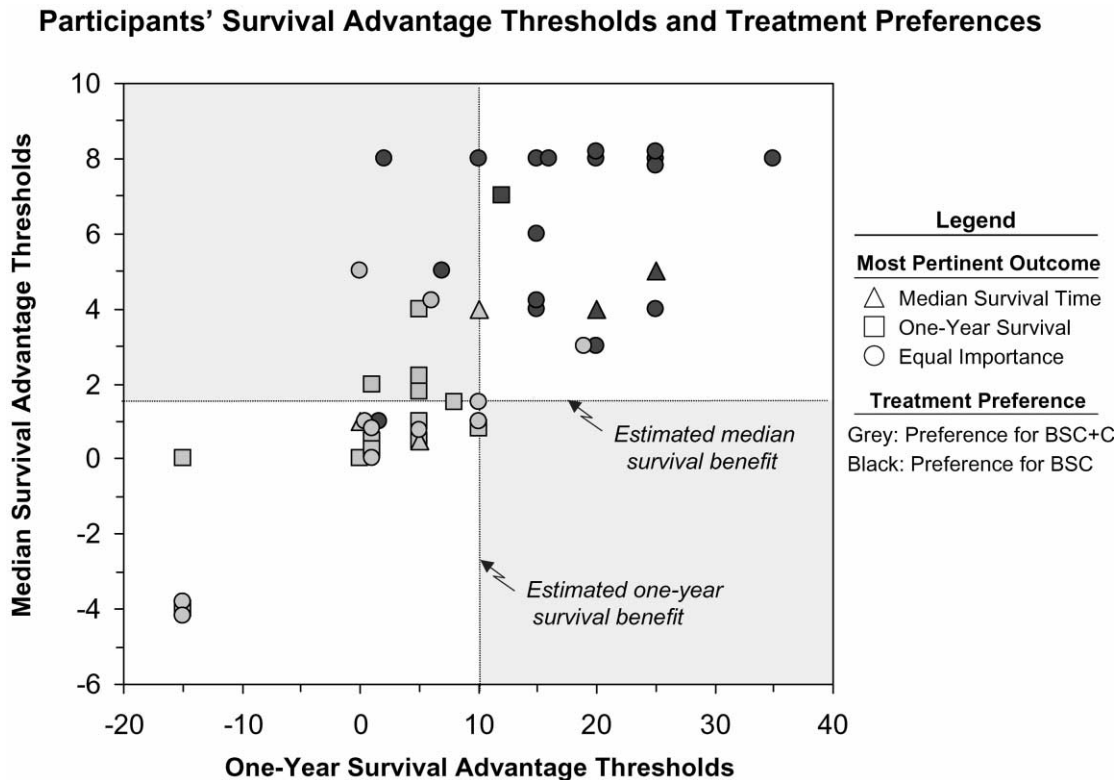


Fig. 3. Median survival advantage thresholds as a function of 1-year survival advantage thresholds. Participants with a preference for chemotherapy are depicted by grey markers; those with a preference for best supportive care are depicted by black markers. Participants' attitudes as to which each endpoint is more pertinent to the decision are depicted by the marker shape. The shaded quadrants represent combinations of discordant survival threshold values (neither both less than or both greater than the respective estimated treatment benefits).

the use of the interview for patients actually making a treatment decision.

4. Discussion

We have demonstrated variation in people's attitudes about the magnitude of benefit, in terms of length of life afforded by chemotherapy, that would justify their choosing chemotherapy for treatment of NSCLC. The variation suggests that patients who wish to participate in treatment decision making would benefit from an intervention that ensures their understanding of their situation and that helps to clarify their attitudes towards the risks and benefits associated with each treatment option.

Our observation that 47% of participants indicated a preference for chemotherapy confirms that guidelines addressing the use of chemotherapy in advanced NSCLC should acknowledge the value-sensitive nature of the treatment choice. In Eddy's taxonomy [12], his "option with preferences split" policy best describes this situation, namely, a relatively balanced distribution of patients' preferences both for and against C + BSC. Silvestri et al. also demonstrated a division of preferences of patients who had completed chemotherapy, wherein 22% of patients would choose chemotherapy in a hypothetical case [10]. Our

observations are also consistent with studies of patients' attitudes in other oncological contexts [10,16,17,27], and further suggest that a substantial proportion of patients would wish to be involved in the decision as to what treatment is best for them. Further research is required to determine if NSCLC patients who are actually making this treatment decision have treatment preferences that are distributed differently from those expressed by the surrogate patients in this study.

Our presentation of the treatment information and values-clarifying exercises seemed to be understood by most participants. Our findings that both participants' median and their 1-year survival thresholds were highly correlated with their stated treatment preferences provides evidence of convergent validity of the study measures. Moreover, participants' survival thresholds that were discordant with their stated treatment preferences were explained, in most cases, by that survival endpoint being deemed by the participant to be the less important time-point to the decision. Some patients had SATs lower than zero, which, from a normative perspective, would appear to represent an irrational preference for chemotherapy even when it offered a lower probability of survival compared to best supportive care. Patients who expressed this preference added, qualitatively, that they wished to take the more aggressive treatment despite the lower likelihood of benefit to the group because they

believed that this choice would provide them with the best personal chance of success (a phenomenon that has been demonstrated in other clinical contexts [28,29]). Our findings of wide variation in participants' attitudes are, thus, unlikely to be due to their poor understanding of the interview tasks.

Given that patients' preferences for chemotherapy in this setting are likely to be sensitive to their personal values, they need relevant, specific information about the treatment options, presented in a format that they can understand [30]. A process for providing such information and for the explicit assessment of preferences may benefit both patients and physicians in selecting treatment for an individual [14]. Our results substantiate the need for such a process, given the observed variation in people's willingness to accept chemotherapy, and given the fact that their preferences could not be reliably predicted on the basis of their age, gender, or educational status. Our study further suggests that such a process will require representation of the treatment survival benefit in terms of both 1-year survival probability and average increase in length of life. For a substantial number of participants, their consideration of median survival benefit dominated their treatment preference, while for others, the 1-year survival benefit dominated. This variation is not surprising, since the information provided by each endpoint is conceptually distinct, and it is quite reasonable for patients to value them differently. The increase in median survival denotes a measure of the central tendency of average benefit across patients, and denotes a "typical" increase in length of life afforded by chemotherapy. In contrast, the 1-year survival benefit denotes the probability of a patient being alive after a certain period of time, and represents an outcome that only a few patients will experience.

It is quite possible that some patients' preferences may be based on considerations other than a potential survival benefit. Silvestri et al., for example, reported that over two-thirds of patients would prefer chemotherapy if it substantially reduced symptoms without prolonging life [10]. We have previously demonstrated patients' need for information on quality of life and symptom response in the setting of locally-advanced NSCLC [29,31]. Our focus was on survival outcomes because few randomized clinical trials have reported symptom response rates [32] or quality of life evaluations [33], and meta-analyses of clinical trials have focused exclusively on survival outcomes. Evaluation of treatment benefits other than survival endpoints in future clinical trials of emerging therapies will be important for informing patients and for determining their treatment preferences.

Some limitations in the interpretation of our findings are noteworthy. First, the relatively small sample size limited the power to detect associations between patients' characteristics and their treatment preferences. However, we were only interested in detecting associations large enough to have clinical relevance. Second, we used survival data based on a

meta-analysis of cisplatin-based polychemotherapy, which some clinicians consider outdated. New chemotherapeutic regimens promise higher response rates and lower toxicity [32], but there is no reason to believe that all patients would willingly accept such treatment. Third, as noted earlier, the information we provided on quality-of-life outcomes with each treatment was limited by the paucity of information in the relevant NSCLC literature — future decision-support strategies would benefit from new quality of life information which is relevant to new treatment regimens, summarized in a way that is interpretable by patients and clinicians alike. Fourth, our use of median survival as a representation of "average" benefit may be challenged. We chose not to display life-expectancy information because clinical trials of lung cancer treatments typically report median survival differences between treatment regimens, and because physicians are more familiar with the median survival endpoint. Likewise, we did not examine whether an explicit display of the variance, or uncertainty, in treatment outcomes would influence patients' willingness to accept chemotherapy. Fifth, we did not examine the effect of altering the frame used in describing the treatment outcomes (for example, the probability of *not* being alive 1 year after treatment) because, while we assume that a framing effect could be demonstrated [19,34], the frames used in our treatment descriptions represent the conventional way clinicians would present the information to patients. Sixth, we did not evaluate whether patients' preferences for survival endpoints, or their SATs, would change according to which representation was first presented. Finally, we acknowledge that the relatively "well" population recruited in this study may have been able to understand and complete the tasks better than would actual NSCLC patients at the time of treatment decision making.

5. Practice implications

We conclude that there is wide variation in surrogate patients' thresholds for choosing C + BSC over BSC alone. Moreover, some participants base their treatment preference on median survival, whereas others base it on 1-year survival. Participants' thresholds cannot be predicted reliably from their demographic characteristics. These findings suggest that the choice of treatment is best judged by the patient, and that different aspects of the treatment descriptors will be important to different patients. As such, it is appropriate that guidelines for the treatment of patients with advanced NSCLC recognize more than one treatment option. Effective implementation of guidelines will require a process for informing patients and for eliciting their preferences. Given the complexity of information to be weighed in the treatment decision, the trade-off interview method represents a potentially useful process for systematically eliciting patients' desire to participate, for informing them, and for clarifying their treatment preferences.

Acknowledgements

We thank the patients who gave their valuable time to participate in this study, as well as the volunteers who contributed to the pilot testing of the study instruments. We also thank the anonymous reviewers for their helpful comments on an earlier draft of this manuscript. This work was supported in part by a grant from the National Cancer Institute of Canada.

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