Clinical decision making in cardiopulmonary resuscitation

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Preferences for cardiopulmonary resuscitation; differences in perspectives of doctors, nurses, patients and their partners. (*Submitted*).
ABSTRACT

Preferences for cardiopulmonary resuscitation can differ between those participating in resuscitation decisions. This may be due to diverging expectations of survival after resuscitation and different judgements of the appropriateness of resuscitation in view of the prospects of the illness without cardiac arrest.

Methods

Doctors, nurses, patients and their partners estimated the general survival probability after resuscitation. They also evaluated 16 paper case descriptions of patients with different prospects without cardiac arrest (life expectancy and quality of life). The respondents rated their preference for resuscitation in each case. The influence of the various factors was analyzed by multiple linear regression.

Results

A total of 448 persons participated in this study (122 doctors, 173 nurses, 106 patients and 47 partners); 37% of the doctors, 20% of the nurses, 9% of the patients and 11% of the partners realistically expected the survival probability after resuscitation to be 10 - 20%. Expectations of survival significantly influenced the preference for resuscitation. In case of a short life expectancy without cardiac arrest (< 3 months), doctors were more inclined towards no resuscitation than patients, whereas depression and social isolation were more important for patients and their partners. The preference score of the 4 groups was similarly influenced by aspects of physical condition and selfcare.

Conclusions

The participants in resuscitation decisions have unrealistic expectations about the survival probability and make complex judgements about the prospects without cardiac arrest. The participants need to be informed about the true survival after resuscitation. This may not prevent a misinterpretation of the patients’ preference. Therefore, discussions with patients are required in an early stage of admission.
In decisions whether or not to attempt cardiopulmonary resuscitation, one should consider if survival is to be expected.\textsuperscript{1} If survival is possible, one should also consider the prospects of the patients' current illness without a cardiac arrest. These prospects of life expectancy and quality of life can be so poor that resuscitation seems futile, for example in end-stage cancer.\textsuperscript{2} Although, in principle, patients should decide whether they want resuscitation or not, they are not always able to do so. In the absence of a patient's explicit preference, others such as doctors, nurses, or partners of patients have to take decisions or make recommendations.\textsuperscript{3}

In about 30 to 40 percent of the cases inconsistencies have been reported between patients' preferences and the predictions on their choice as made by others.\textsuperscript{4,5,6} A consequence of such a misinterpretation can be that resuscitation is withheld or attempted against the patient's preference. There is little information about the background of the inconsistencies, but one may hypothesize that they stem from variations in expectations of survival after resuscitation. The realistic general survival probability after in-hospital resuscitation is 10 to 20 percent.\textsuperscript{7} Biased information through television programs, for example, can give patients overoptimistic expectations of this survival,\textsuperscript{8} whereas through personal experience doctors and nurses may have more modest expectations. Another explanation for the inconsistencies is that value judgements of the prospects of the current illness without a cardiac arrest may differ among doctors, nurses, patients and their partner. Patients have to judge the acceptability of the prospects of their own life, whereas doctors, nurses and partners value the life of someone else. Because of the apparent diverging perspectives and the potential consequences, we studied differences in preference for resuscitation between doctors, nurses, patients and their partners by their general expectations of survival after resuscitation, and their value judgements of the prospects of the current condition without a cardiac arrest.

**PATIENTS AND METHODS**

The study was carried out between February and June 1997 in the Academic Medical Center in Amsterdam, a university hospital and tertiary care center with 1030 beds. Doctors, nurses, patients and their partners gave an estimate of the general survival probability after resuscitation, evaluated 16 case descriptions of patients with different prospects without a cardiac arrest (life expectancy and quality of life), and rated their preference for resuscitation in each case.

**Selection of respondents**

All doctors and nurses from 5 departments (cardiology, internal medicine,
medicine, neurology, neurosurgery, general surgery) were eligible for the study. For reasons of feasibility, we randomly selected 50% of the nurses. Data were collected about age, gender, and professional background (working experience, involvement in resuscitation and do-not-attempt resuscitation orders).

Similarly all patients admitted to the 5 departments were eligible. Every 4 weeks, a complete sample was drawn of patients of 18 years and older. Exclusion criteria were: insufficient comprehension of the Dutch language, impaired cognition, and a physically and/or emotionally instable condition as judged by the treating physicians. Patient data included age, gender, and current quality of life as measured with the COOP-charts.9 The patients were interviewed at the bedside after receiving standardized information about the resuscitation procedure.

Partners were husband or wife of the admitted patient or closest relative chosen by the patient. Collected data (with the exception of quality of life data) were similar to those of the patients. The protocol was approved by the medical ethics committee.

**Expected general survival probability after resuscitation**

We measured the expectations of the general survival probability after resuscitation by asking each respondent to estimate the probability on a 7-point anchored probability scale ranging from never (zero) to always (100%).

**Case descriptions, prospects and preference for resuscitation**

We used a set of paper case descriptions to assess the influence of the prospects of the patients’ current condition without cardiac arrest (life expectancy and quality of life) on the preference for resuscitation.

The case descriptions varied on six characteristics: (a) age (50, 70, 85 years), (b) social situation (family and friends versus no family or friends), (c) physical condition (no pain or shortness of breath versus severe pain or shortness of breath), (d) emotional condition (not depressed versus severely depressed), (e) level of selfcare (independence, total dependence at home, and total dependence in a nursing home) and (f) life expectancy (> 5 years, 1 - 5 years, 3 -12 months, < 3 months) (see Appendix, page 123). The selected characteristics were based on interviews with a cardiologist, an internist, a neurologist and a surgeon.

Since 288 case descriptions would have been needed to present all possible combinations of the characteristics, we reduced the number of case descriptions to 16, using an orthogonal main-effects design.10 With this technique, the independent effect of the case characteristics on the preference score are estimated, but interaction effects between the case characteristics can no longer be evaluated.
The phrasing of the text of the descriptions was tailored to the participants' perspective: doctors and nurses were asked to imagine that the described case was their patient. For patients, the cases described themselves under different hypothetical clinical conditions, whereas for partners the cases referred to their relatives. The 16 descriptions were tested, modified and retested in two pilot studies. The descriptions were randomized and presented to the four study groups in the same order. For each case description, doctors, nurses, patients, and partners rated their strength of preference for resuscitation on an anchored 7-point scale, ranging from certainly resuscitation wanted (1 point) to certainly no resuscitation wanted (7 points).

Statistical analysis
We tested the differences in expected general survival probability after resuscitation between doctors, nurses, patients and their partners with the Chi-square statistic. Differences in the mean preference score for resuscitation between doctors, nurses, patients and their partners were analyzed with the one-way-analysis of variance (ANOVA). The association between expected survival probability and preference score for resuscitation was also analyzed with ANOVA.

The independent influence of life expectancy and aspects of quality of life (prospects without cardiac arrest) on the preference score for resuscitation were estimated by linear regression analysis. We used dummy codings for the various levels of life expectancy and aspects of quality of life. By modelling interaction terms between these dummy codings and the four study groups, we tested whether doctors, nurses, patients and their partners were differently influenced by life expectancy and aspects of quality of life (F-statistic). In separate linear models, we subsequently analyzed for each study group the independent impact of life expectancy and aspects of quality of life on their preference score for resuscitation. The effect size was expressed through the corresponding β-coefficients and their 95% confidence limits. By considering the individual respondents as random effects, we took into account that the preference score originated from (16) repeated measures.

RESULTS
Of the 134 selected doctors, 122 (92 men, 30 women) participated in the study (91%). The 12 nonrespondents (9%) said that they were too busy or had no experience with the subject. The mean age (SD) of the participating doctors was 39 (8) years (Table 7.1.). The majority (n=93, 77%) had more than 5 years medical experience, 76 (62%) had performed resuscitation more than 5 times, and 106 (87%) had been involved more than 5 times in do-not-attempt resuscitation decisions. All 173 randomly selected nurses (47 men, 126 women)
agreed to participate. Their mean (SD) age was 35 years (7) (Table 7.1.). The
majority had more than 5 years experience in nursing (n=146; 84%), 57 (33%)
had performed resuscitation > 5 times, and 79 (46%) had been involved in do-
not-attempt resuscitation decisions > 5 times. Of the 310 selected patients 106
entered the study (64 men, 42 women), 127 (41%) were excluded because of
language problems (n=17), a physically or emotionally unstable condition
(n=67), or cognitive impairments/aphasia (n=43). Furthermore, 77 patients
(25%) refused, mainly because they disliked the topic. Age and gender was not
significantly different between the included and excluded patients. The mean
(SD) age of the participating patients was 56 (16) years (Table 7.1.). Of these
patients, 5 (5%) had a do-not-attempt resuscitation order, and 77 (73%) could
only perform (very) light physical activities as determined by the COOP
charts. Fourteen (13%) had moderate to severe emotional problems, 33 (31%)
had moderate to severe pain, and 63 (59%) considered their current health as
moderate to poor.

Table 7.1. Characteristics of doctors (n=122), nurses (n=173),
patients (n=106) and their partners (n=47)

<table>
<thead>
<tr>
<th></th>
<th>doctors (%)</th>
<th>nurses (%)</th>
<th>patients (%)</th>
<th>partners (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>39 (8)</td>
<td>35 (7)</td>
<td>56 (16)</td>
<td>54 (15)</td>
</tr>
<tr>
<td>Gender f/m</td>
<td>30 (25) / 92 (75)</td>
<td>126 (73) / 47 (27)</td>
<td>42 (40) / 64 (60)</td>
<td>31 (66) / 16 (34)</td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- cardiology</td>
<td>18 (15)</td>
<td>31 (18)</td>
<td>27 (25)</td>
<td>12 (25)</td>
</tr>
<tr>
<td>- surgery</td>
<td>23 (19)</td>
<td>39 (22)</td>
<td>21 (20)</td>
<td>11 (23)</td>
</tr>
<tr>
<td>- internal medicine</td>
<td>48 (39)</td>
<td>60 (35)</td>
<td>31 (30)</td>
<td>13 (28)</td>
</tr>
<tr>
<td>- neurology</td>
<td>24 (20)</td>
<td>22 (13)</td>
<td>17 (16)</td>
<td>6 (13)</td>
</tr>
<tr>
<td>- neurosurgery</td>
<td>9 (7)</td>
<td>21 (12)</td>
<td>10 (9)</td>
<td>5 (11)</td>
</tr>
<tr>
<td>Resuscitation experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- none</td>
<td>13 (11)</td>
<td>35 (20)</td>
<td>73 (69)</td>
<td>33 (70)</td>
</tr>
<tr>
<td>- 1 - 2 times</td>
<td>16 (13)</td>
<td>36 (21)</td>
<td>33 (31)*</td>
<td>14 (30)*</td>
</tr>
<tr>
<td>- 3 - 5 times</td>
<td>17 (14)</td>
<td>45 (26)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>- &gt; 5 times</td>
<td>76 (62)</td>
<td>57 (33)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>Do-not-resuscitate orders experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- none</td>
<td>6 (5)</td>
<td>26 (15)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>- 1 to 2 times</td>
<td>7 (6)</td>
<td>41 (24)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>- 3 to 5 times</td>
<td>3 (2)</td>
<td>27 (16)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>- &gt; 5 times</td>
<td>106 (87)</td>
<td>79 (46)</td>
<td>(-)</td>
<td>(-)</td>
</tr>
</tbody>
</table>

* A family member or friend underwent resuscitation. (-) did not occur
Sixty-nine of the participating patients (65%) had a partner, or a close relative to discuss resuscitation. Twenty-two (32%) other partners refused to participate because they disliked the topic or considered it irrelevant. The mean (SD) age of the 47 participating partners (16 men, 31 women) was 54 (15) years.

**Differences in expected general survival probability after resuscitation**

The expectations of the general survival probability after resuscitation were different for the four study groups (Chi square test p < 0.01) (Table 7.2.). Doctors had low to moderate expectations: 83 of the 122 doctors (68%) estimated the probability to be 20% or less. The nurses’ expectations of survival probability were higher: 65 of the 173 nurses (38%) estimated a probability of 20% or less, and 62 (36%) estimated a probability of more than 40%. Patients and partners had the highest expectations: 68 (64%) of the patients, and 24 (51%) of the partners estimated a probability of survival of more than 40%.

<table>
<thead>
<tr>
<th>Estimated survival (%)</th>
<th>doctors (%)</th>
<th>nurses (%)</th>
<th>patients (%)</th>
<th>partners (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- don’t know</td>
<td>(-)</td>
<td>2 (1)</td>
<td>8 (8)</td>
<td>8 (17)</td>
</tr>
<tr>
<td>- &lt; 10</td>
<td>38 (31)</td>
<td>31 (18)</td>
<td>4 (4)</td>
<td>4 (8)</td>
</tr>
<tr>
<td>- 10 - 20</td>
<td>45 (37)</td>
<td>34 (20)</td>
<td>10 (9)</td>
<td>5 (11)</td>
</tr>
<tr>
<td>- 21 - 40</td>
<td>24 (20)</td>
<td>44 (26)</td>
<td>16 (15)</td>
<td>6 (13)</td>
</tr>
<tr>
<td>- &gt; 40</td>
<td>15 (12)</td>
<td>62 (36)</td>
<td>68 (64)</td>
<td>24 (51)</td>
</tr>
</tbody>
</table>

(−) did not occur

**Chi square p < 0.01**

**Differences in preference for resuscitation**

The overall mean preference score (SD) did not significantly differ for the four study groups: 3.9 (1.9) for doctors, 4.0 (1.9) for nurses, 4.2 (1.9) for patients, and 3.8 (2) for their partners (ANOVA, p = 0.18). The mean preference score for individual respondents within the four groups varied. Eight doctors (7%), 17 nurses (10%), 17 patients (16%), and 3 partners (6%) had an individual mean score of 2 or less, indicating a strong general preference towards resuscitation. An individual mean preference score of 6 or more, which indicates a strong general feeling against resuscitation, was obtained from 8 doctors (7%), 17 nurses (10%), 19 patients (18%), and 6 partners (12%).

Preferences for resuscitation
Differences in preference for resuscitation associated with expected general survival probability

The mean preference score was significantly influenced by the expected general survival probabilities (ANOVA, p = 0.001). Higher preference scores (towards no resuscitation) were observed for lower estimates of the expected survival probability. Between the highest and the lowest estimates, the mean preference score differed 1.1 points: the mean score was 4.7 (1.9) for respondents who estimated the survival probability less than 10%, 4.0 (1.9) for those with probability estimates between 10 and 20%, 3.7 (2.2) for estimates between 21 and 40%, and 3.6 (2.2) for more than 40%.

Differences in preference for resuscitation associated with the prospects of the current condition without cardiac arrest (life expectancy and quality of life)

Figure 7.1. shows that doctors, nurses, patients and their partners favored resuscitation for 8 case descriptions, and generally did not favor resuscitation for the other 8. For two case descriptions the four study groups scored different. For case 11, patients and partners had a preference opposite to that of doctors and nurses. For case 16, the four study groups generally preferred no resuscitation, but the strength of that preference significantly differed between doctors and patients.

Figure 7.2. shows the independent impact of the prospects without cardiac arrest. Life expectancy and the aspects of quality of life are ranked in order of influence on the preference score. A life expectancy of less than three months was the strongest factor for all four study groups (highest β-coefficients). Significant differences in preference for resuscitation existed between the 4 study groups (F statistics p < 0.03) with regard to life expectancy, emotional condition, and social situation, but not for physical condition, age, and level of self care (F statistics p = 0.37, 0.08, and 0.87). Compared to patients and partners, doctors and nurses were more inclined to want no resuscitation in case of a life expectancy of less than 3 months. Contrary to doctors and nurses, the preference of patients and partners was more directed towards no resuscitation in case of a severely impaired emotional condition. Compared to the nurses, doctors were more inclined to want no resuscitation in case of old age (85 years). Contrary to doctors and nurses, the preference of patients leaned more to no resuscitation in case of social isolation (no family and friends).

Figure 7.1. [right page]. Case descriptions and strength of preference for resuscitation of doctors, nurses, patients and their partners.

Mean preference score for resuscitation of doctors, nurses, patients and their partners for each of the 16 case descriptions. Results are ranked in order of total mean preference score for each description.
case description
70 years,
no family or friends,
no pain or shortness
of breath,
not depressed,
dependent nursing
home,
1 - 5 years to live.

70 years,
no family or friends,
no pain or shortness
of breath,
not depressed,
dependent nursing
home,
1 - 5 years to live.

50 years,
family or friends,
no pain or shortness
of breath,
not depressed,
independent at home,
< 3 months to live.

85 years,
family or friends,
severe pain or
shortness of breath,
not depressed,
independent at home,
< 3 months to live.

mean preference and
95% confidence limits
- doctors
- nurses
- patients
- partners

Preferences for resuscitation
Preferences for resuscitation

- Life expectancy
  - (reference > 5 years)
  - < 3 months
  - 3-12 months
  - 12 months - 5 years

- Physical condition
  - (reference no pain/shortness of breath)
  - Severe pain or shortness of breath

- Emotional condition
  - (reference not depressed)
  - Very depressed

- Age
  - (reference age of 50 years)
  - 85 years
  - 70 years

- Self care
  - (reference independent at home)
  - Nursing home
  - Dependent at home

- Social situation
  - (reference family and friends)
  - No family or friends

β-coefficients and 95% confidence limits
- Doctors
- Nurses
- Patients
- Partners

Preference towards resuscitation
Preference towards NO resuscitation
DISCUSSION

We studied differences in preference for resuscitation between doctors, nurses, patients and their partners by their expectations of the general survival probability after resuscitation, and their value judgements about the prospects without a cardiac arrest. Only 37% of the doctors, 20% of the nurses, 9% of the patients and 11% of the partners had a reasonable notion of the general survival probability after in-hospital resuscitation (10 - 20%). In case of a very short life expectancy without cardiac arrest (< 3 months), doctors were less inclined to resuscitation than patients, whereas depression and social isolation were more important negative factors for patients and their partners. The data also suggest that nurses had a perspective quite close to the medical perspective, except in case of old age. Compared to doctors, nurses were more inclined to resuscitation in case of old age. Despite the differences in expectations and value judgements, the general preference for resuscitation did on an average not differ between the four groups.

It is almost impossible to assess the independent influence of considerations of the different participants in actual resuscitation decisions. Therefore, we approached the clinical reality in a carefully chosen design by creating paper patients and simulated decisions with relevant respondents. Nevertheless, results can be different when facing true patients. The medical culture in a hospital may also influence the decisions regarding resuscitation, and the results in other hospitals or countries may thus not be the same. Although we had a mix of relatively healthy and ill patients as measured by the COOP charts, we had to exclude those who were too ill or had serious impairments. Furthermore, 25% of the patients did not want to talk about the subject. It is difficult to estimate the effect of this selection on our results. We speculate that when patients are very ill, they will be less inclined to resuscitation. Patients who do not want to talk about the subject, may be those who are not willing to take their life into their own hands. Such patients are likely to accept every treatment offered, including resuscitation. A similar reasoning may apply to the partners who did not participate.

Life expectancy and the selected aspects of quality of life proved to be relevant for the decisions of our respondents, but other factors may also influence their preferences. For example, preferences can be influenced by the name of a disease despite a similar prognosis (e.g. AIDS and cancer), or by presenting cases of intravenous drug use, alcoholism or a criminal background or of a
personal relation with the medical staff.\textsuperscript{14,15} Also professional experience or religion of the decision maker can influence the preference for resuscitation.\textsuperscript{16,17}

When studying the prospects without cardiac arrest, physical condition and level of selfcare turned out to be of similar importance to the preferences of the 4 groups. A relatively large difference was found between doctors and patients with regard to a life expectancy of less than three months. It is possible that life expectancy has mainly a quantitative value for health care workers. In their professional judgement, a life time of less than 3 months may no longer be considered a worthwhile benefit to justify a resuscitation attempt. For patients and partners, life expectancy can have a more qualitative or social value, and 3 months can still be an important time to share with close relatives and friends. The importance of this social aspect is also suggested by the preference of patients towards no resuscitation in the absence of family or friends. In this case, doctors and nurses had no clear preference, apparently they avoided a moral judgement. As demonstrated by two of our case descriptions, the complex patterns of expectations and value judgements of the four groups can lead to disagreements in preferences for resuscitation in individual cases, despite the fact that their general preference for resuscitation did on an average not differ.

Most survivors after resuscitation have an acceptable or good quality of life,\textsuperscript{17} however survival occurs relatively infrequent and the probability of survival is regarded essential for resuscitation decision making.\textsuperscript{8,18,19} Our patients had high expectations about the survival after resuscitation. This misconception may be caused by television programs.\textsuperscript{8} In discussions with doctors, relatively high expectations of patients can be modified towards more realistic proportions, and this lowers their preference for resuscitation.\textsuperscript{20} However, if a discussion about resuscitation is only framed around the probability of survival, it can be expected that probabilities have a profound impact on the preference. If resuscitation is discussed in a broader context, our results suggest that even high expectations of survival have a modest influence on the preference for resuscitation. Nevertheless, adequate information on survival is essential and not only patients, but also health care workers and partners need to be better informed about the survival after resuscitation.

Although the preference for resuscitation between doctors, nurses, patients and their partners was on an average not different, we feel that patients have a perspective different from the others. Predictions on the choice of patients remains difficult because of the individual differences in preference. To determine the acceptability of a resuscitation attempt, we recommend discussions with patients in an early stage of the hospital admission. Physicians are expected to take an active role in this.\textsuperscript{21} Further research is needed whether such discussions induce anxiety in patients.\textsuperscript{22}
PREFERENCES
