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What is This?

The 'surprise' question in advanced cancer patients: A prospective study among general practitioners

Matteo Moroni[1,2], Donato Zocchi[3], Deborah Bolognesi[4], Amy Abernethy[5], Roberto Rondelli[6], Giandomenico Savorani[3], Marcello Salera[3], Filippo G Dall'Olio[7], Giulia Galli[7] and Guido Biasco[2,7], on behalf of the SUQ-P group[3]

Abstract

Background: Using the 'surprise' question 'Would you be surprised if this patient died in the next year?' may improve physicians' prognostic accuracy and identify people appropriate for palliative care.
Aim: Determine the prognostic accuracy of general practitioners asking the 'surprise' question about their patients with advanced (stage IV) cancer.
Design: Prospective cohort study.
Setting/participants: Between December 2011 and February 2012, 42 of 50 randomly selected general practitioners (Bologna area, Italy) prospectively classified 231 patients diagnosed with advanced cancer according to the 'surprise' question and supplied the status of each patient 1 year later.
Results: Of the 231 patients, general practitioners responded 'No' to the 'surprise' question for 126 (54.5%) and 'Yes' for 105 (45.5%). After 12 months, 104 (45.0%) patients had died; 87 (83.7%) were in the 'No' group. The sensitivity of the 'surprise' question was 69.3%; the specificity was 83.6%. Positive predictive value was 83.8%; negative predictive value was 69.0%. The answer to the 'surprise' question was significantly correlated with survival at 1 year. Patients in the 'No' group had an odds ratio of 11.55 (95% confidence interval: 5.83–23.28) and a hazard ratio of 6.99 (95% confidence interval: 3.75–13.03) of being dead in the next year compared to patients in the 'Yes' group ($p = 0.000$ for both odds ratio and hazard ratio).
Conclusion: When general practitioners used the 'surprise' question for their patients with advanced cancer, the accuracy of survival prognosis was very high. This has clinical potential as a method to identify patients who might benefit from palliative care.

Keywords

Prognostic accuracy, palliative care, general practitioners, terminal illness, prognosis, surprise question

What is already known about the topic?

- When applied by specialists, the 'surprise' question ('Would you be surprised if this patient died in the next year?') has been shown to be a reliable and valid tool to identify patients who have a greatly increased risk of mortality in the coming year.

What this paper adds?

- When general practitioners, who have a strong voice in the continuing care of their patients with advanced diseases, asked the 'surprise' question of their patients with advanced cancer, the accuracy of survival prognosis was very high.

Implications for practice, theory or policy

- Use of the 'surprise' question by general practitioners should be considered as a tool to identify patients who might benefit from palliative care.

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Introduction

The decision whether or not to continue treatment for cancer is strongly influenced by the patient's prognosis as when, during the course of the advanced illness, is the right time to start palliative care (PC).[1–4] The appropriate timing of beginning PC is considered a crucial point to ameliorate the quality of life of cancer patients,[3,4] especially when specific treatment for the disease is uselessly aggressive or even harmful for the patient.[1,5] Investigations on this topic have reported unsatisfactory results because an expectation of longer time of remaining life delays the patients' referral to a PC programme.[6,7] This delay is a major reason that the goals of PC are not achieved. Some studies even show that earlier access to PC services results in better health, improved care and lower healthcare costs.[4]

Historically, researchers have used a question about whether the clinician would be surprised if the patient died in the following year (frequently called the 'surprise' question) as an indicator that a patient would be eligible for PC.[1,8] This has led to a fairly consistent identification of populations suffering from advanced life-limiting illness, especially in predictably progressive disorders such as cancer and chronic kidney disease. For instance, when the answer to the 1-year 'surprise' question is in the negative, the odds of dying within 1 year for patients with end stage chronic kidney failure were 3.5 times higher than for those in the 'Yes' group; this is a practical way to identify a population with shortened survival expectation.[9–13] Occasionally the 'surprise' question has also been used in clinical settings to identify people requiring PC.[14]

In many countries, including Italy, the general practitioner (GP) is the guarantor of the continuity of care for people with advanced illness, including cancer. The GP's opinion on therapeutic strategy is at the basis of the overall programme of management of patients and families.[15,16] In addition, GPs and other clinicians' provision of basic PC is becoming the foundation of a sustainable model of PC frequently referred to as 'primary plus specialist palliative care'.[17] The purpose of this study was to determine whether the 'surprise' question represented a feasible approach for GPs to identify patients potentially needing PC.

Methods

Setting and subjects

A total of 50 GPs out of the 120 members of the Bologna chapter of the Italian Society of General Practitioners (SIMG) participated in the study. They were selected using a simple random sampling without replacement from the database of the society's members. The society maintains a detailed member database and it was granted access in order to select a random sample of its members to be approached about taking part in the study. SIMG members constitute about 20% of the total number of GPs who work in the Bologna area. The selected physicians were contacted using email or telephone with an invitation to take part in the study. Specialisation and years of professional experience were recorded for each generalist.

All the doctors received instruction through a meeting that specifically addressed the clinical criteria for admission to the study. Interim reports and frequent telephone calls, in which doctors were asked about pathological and clinical findings of all cancer patients observed in the collection period, were done in order to minimise the patient selection bias.

Doctors were asked to answer the following question when faced with a patient with advanced (stage IV) cancer: 'Would you be surprised if this patient died in the next year?' The response was recorded on an anonymous number-coded case report form. Doctors also recorded the patient's gender, age and origin of the tumour. Recruitment took place over 3 months (from December 2011 through February 2012) for consecutive patients with stage IV (solid) cancer; haematological malignancies were excluded. Patients were those whom the doctor had in their care and who were recruited as they were been seen for scheduled or unscheduled visits by their GP. Doctors guaranteed anonymity of the patients.

At the end of the registration period, the coordinating centre collected the case report forms. One year after collection, each GP who had previously turned in a form was asked to provide the coordinating centre with each patient's status (alive or dead) and date of death, where applicable using an analogous number-coded case report form.

The study was approved by the Ethics Committee of the University of Bologna and by the Ethics Committee of the Local Health Unit of Bologna (Ethic Committee protocol no. 2084, 21 November 2011).

Statistical analysis

The data were divided into two independent groups according to the response to the 'surprise' question ('Yes'/'No'). Demographic and clinical characteristics of the two groups of patients were compared using the two-tailed Fisher's exact test for categorical variables (gender, site of cancer, doctor specialisation), as well as the *t*-test for continuous variables (age of the doctor, years of experience of the doctor).[18]

Univariate and multivariate Cox proportional hazard regression models were used to determine prognostic factors influencing the risk of death at 1 year. The following variables were taken into consideration: patient's gender, age and site of cancer, doctor's specialty, years of experience and answer to the 'surprise' question.[19]

Table 1. Demographics and cancer site of patients by physician response to the 'surprise' question.

Patients	All (N = 231)	Yes (n = 105)	No (n = 126)	p value
Mean age, years (±SE)	70.2 (0.9)	69.5 (1.3)	70.7 (1.2)	0.47
Men, n (%)	117 (50.6)	57 (54.3)	60 (47.6)	0.36
Cancer, n (%)[a]				
Lung	47 (20)	16 (15)	31 (25)	0.003
Breast	46 (20)	28 (27)	18 (14)	
Colon	33 (14)	17 (16)	16 (13)	
Prostate	18 (8)	13 (12)	5 (4)	
Pancreas	15 (6)	2 (2)	13 (10)	
Ovary–uterus	15 (6)	6 (6)	9 (7)	
Other sites	57 (25)	23 (22)	34 (27)	

SE: standard error.
Yes indicated patients in the 'Yes, I would be surprised' group; *No* indicated patients in the 'No, I would not be surprised' group.
[a]Percentages for people were rounded to whole.

In addition, univariate and multivariate Cox analyses were performed also stratifying patients by gender, in order to overcome bias due to exclusive site of cancer, such as breast and ovary–uterus for female and prostate cancer for males. Only variables with a univariate *p* value lower than 0.05 were included in the multivariate analysis.

The results of the univariate analyses showed the effect of each variable as a stand-alone predictor of risk of death at 1 year, whereas the results of the multivariate analyses showed which variables were the best predictors of risk of death at one year in the presence of other variables.

In order to measure the risk of death at 1 year only for the 'surprise' question's answer, the odds ratio (OR) was calculated as the ratio of the odds in the two groups.[20]

The Kaplan–Meier method was used to generate survival curves in mean days alive within a 1-year period for the 'Yes' and 'No' groups. The log-rank test was used to compare the survival in mean days alive between the two groups.[21,22]

Finally, in order to verify the correspondence of the 'surprise' question's answer and true status of the patient after 1 year, sensitivity and specificity were determined as were positive and negative predictive values (PPV and NPV). The Matthews correlation coefficient (MCC) was used as a final measure of agreement.[23] All statistical analyses were performed using the STATA® package.[24]

Results

A total of 42 (84.0%) of the 50 selected GPs participated in the study. GPs 'enrolled' 231 patients with advanced cancer (Table 1). According to their answer to the 'surprise' question, GPs assigned 105 (45.5%) of patients as 'Yes' (the GP would be surprised if the patient died within a year) and 126 (54.5%) as 'No'. There were no significant differences in age or gender between the two groups.

At the end of a 12-month period, 104 patients were deceased. Of them, 87 (83.6%) were in the 'No' group and

17 (16.4%) were in the 'Yes' group. There was a significant correlation between a 'No' response to the 'surprise' question and death within the year (*p* < 0.001). When considering the value of the 'surprise' question in predicting the survival within 12 months, the sensitivity of the test was 69.3% and specificity was 83.6%. The PPV was 83.8%, the NPV was 69.0% and the MCC was 0.53 (Table 2). The 'Yes' patients lived longer than 'No' patients (Figure 1).

Patients in the 'No' group had an OR of 11.55 (95% confidence interval (CI): 5.83–23.28) of being dead in the next year compared to patients in the 'Yes' group (*p* = 0.000).

In the univariate Cox analysis the hazard ratio (HR) was 6.99 (95% CI: 3.75–13.03). This analysis was also used to predict survival status at 1 year by grouping all other patients versus those patients with a specific referent cancer (Table 3). The risk of death from the other cancers was 35% of the risk of death from pancreatic cancer (HR = 0.354, *p* = 0.004). No other referent comparisons were significant. Experience of the doctors and specialisation were not significantly related with the accuracy of their prognostic prediction (*p* = NS).

In multivariate Cox analysis, only the 'surprise' question remained significantly correlated with an increased risk of death at 1 year with a HR of 6.98 (CI: 2.42–20.13, Table 4).

The proportion of answers to the 'surprise' question between GPs was investigated. No statistical differences in terms of the proportion of 'Yes' answer among participants or correlation between GPs and answers were found.

The clustering variable, GPs, was explored using Cox univariate and multivariate methods. No differences were found between clustering versus non-clustering data.

Discussion

The GPs' answers to the 'surprise' question were fairly accurate predictors of patients' outcome, although a trend to underestimate patients' survival was observed; 39 out of 126 patients in the 'No' group (30.9%) survived beyond

Table 2. Sensitivity, specificity, predictive value of the 'surprise' question (231 evaluable cases).

Group	Living	Deceased	Predictive value
'Yes'	88	17	Positive 83.8% CI: 75.3–90.3
'No'	39	87	Negative 69.0% CI: 60.2–77.0

CI: confidence interval.
Sensitivity = 69.3% (CI: 60.5–77.2); specificity = 83.6% (CI: 75.1–90.2); Matthews correlation coefficient (MCC) = 0.53.
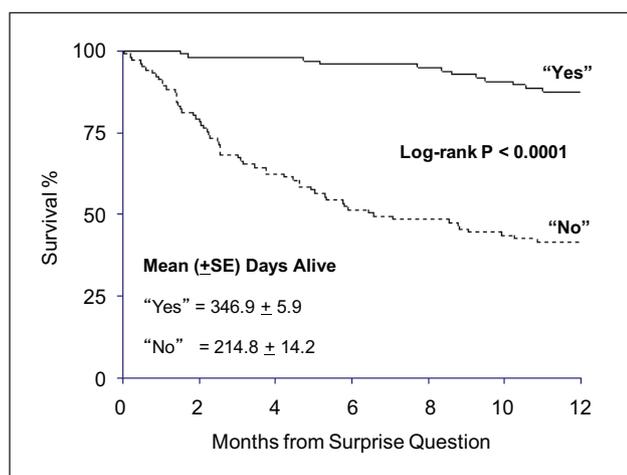
Figure 1. Days of survival in 1 year for 'Yes' and 'No' groups (Kaplan–Meier) and comparison of the survival between the two groups (Log-rank test).
SE: standard error.

the year. Thus the 'surprise' question is a good screening instrument because it induces physicians to accurately identify patients with poor prognosis and in imminent need of PC. This means that the 'surprise' question could be considered as an instrument in the determination of the right moment, not too late in the natural course of the illness, when the patient should be referred to PC. This is important because a referral that takes place later in the course of the disease leads to fewer of the patients' needs being met at the end of life.[4,5] The tendency to underestimate patients' survival that was observed is not necessary a limit of the method, because it could result in an earlier start of PC, such as was found beneficial in terms of patients' clinical condition, adequate care and reduced healthcare costs.[4]

The 'surprise' question has been validated as a clinical prediction tool for dialysis patients and has been studied on cancer patients.[9,10,11,13] In comparison with our results, a study by Moss et al. showed a lower probability of death within 12 months for the 'No' response than we found in

our research and a higher probability to live more than 12 months in the 'Yes' group.[11] A possible explanation of these differences may be found in the characteristics of the population observed. Moss' study included cancer patients regardless of the stage of the disease (only 15% were stage IV), while we considered only patients with advanced metastatic cancer, whose risk of having a shorter lifespan is higher than that of a population of cancer patients at any stage of illness.

This research is the first study concerning the use of the 'surprise' question by GPs as prognostic tool for advanced stage cancer patients. In Italy, GPs have a strong importance in the overall management of patients and their families and their judgement can be driven towards decision of care that patients often prefer to share with them rather than with specialists.[15] In such decisions, the generalist often has the last word. For this reason, while conducting research on the appropriate trigger for implementation of PC, the evaluation of their prognostic ability is of great importance.[25,26]

Most GPs working in the Bologna area care for a small number of patients with advanced tumours. Only 10 out of the 42 GPs who participated in the study reported more than 3 patients. Their experience in the management of advanced cancer patients is generally low despite the duration of their professional activity and may help explain why experience was not significantly related with the accuracy of their response.

There are some biases to this study. First, the group of doctors enrolled in the study constitutes only 10% of the generalists who work in the Bologna area. This figure might not be representative of the entire population of GPs. However, the average age of GPs of the Bologna area is 55.1 years and the average age of doctors involved in this study was 58.9 years. Also, the percentage of female GPs in Bologna is 28% and was 21% among the group in our study.

Second, the positive result of this research for the purpose of proper management of patients in advanced stage cancer may be dependent on factors related to the methodology of the 'surprise' question itself. The enrolment in the study may raise awareness of the problem of prognostication.[26] This bias is a limit of the method and cannot be eliminated; however, it suggests that extending the request to all doctors could be a way of generally raising the level of involvement in clinical practice.[1,11,27,28] Moreover, studies on GPs, not using the 'surprise' question and with different, shorter, observation time, may lead to unsatisfactory results.[25,26]

The 'surprise' question answer 'Yes' was a valuable method for GPs to identify advanced cancer patients living 12 months after the GP's visit. Positive predictive value was very high, and negative predictive value was low. The good value for MCC (0.53) supports the reliability of the test.

Table 3. Univariate Cox regression to predict status at 1 year.

Variable	Hazard ratio	95% CI	*p* value
Age (years)	1.015	0.994–1.036	0.169
Sex (reference = male)	0.775	0.484–1.241	0.288
Site of cancer			
Reference = lung	0.663	0.392–1.121	0.125
Reference = breast	1.983	0.986–3.993	0.055
Reference = colon	1.382	0.662–2.884	0.389
Reference = pancreas	0.354	0.176–0.714	0.004
Reference = prostate	3.517	0.862–14.347	0.080
Reference = ovary–uterus	1.955	0.615–6.216	0.256
Doctor experience (years)	1.002	0.963–1.042	0.925
Specialisation (reference = yes)	1.254	0.727–2.162	0.417
Surprise question (reference = yes)	6.987	3.747–13.029	0.000

CI: confidence interval.

Table 4. Multivariate Cox regression to predict status at 1 year.

Variable	Hazard ratio	95% CI	*p* value
Site of cancer (pancreas)	2.228	0.772–6.432	0.139
Surprise question (reference = yes)	6.978	2.418–20.134	0.000

CI: confidence interval.

In conclusion, this study shows that the 'surprise' question in the hand of the generalists could be a feasible and useful method to evaluate the prognosis of patients with advanced cancer at risk of 1-year mortality. The high sensitivity (69.3%) suggests that the 'surprise' question could be a useful screening test within the clinical practice. Other prognostic factors such as functional or nutritional status, encoded by precise measurements, may further improve its potential prognostic accuracy.[10,11,14,29] It is still to be clarified whether, by adding more prognostic indicators, the method becomes cumbersome and reduces compliance in its use.

In this study, we analysed the consistency between GPs' answers to the 'surprise' question regarding their patients with an incurable disease and the actual duration of the patients' survival in the following year. We did so in order to study the accuracy of the 'surprise' question in identifying patients with a shortened survival. The GPs' accuracy in predicting their patients' lifespan within the year by means of the 'surprise' question was so that it allowed them to select those patients who, due to their shortened life expectancy, may benefit from the activation or the implementation of a PC programme.

The results of this study may influence the identification of patients who are needing PC. As the Gold Standard Framework suggests, the use of the 'surprise' question should be encouraged and implemented in order to predict which patients affected by advanced cancer should be referred to a PC programme.[14]

Medicine (President). She has corporate leadership responsibility in AthenaHealth (health IT company), Advoset (an education company that has a contract with Novartis) and Orange Leaf Associates LLC (an IT development company). The remaining authors declare no conflicts of interest.

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