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Anxiety, depression and fear of cancer recurrence in uveal melanoma survivors and ophthalmologist/oncologist communication during survivorship in France – protocol of a prospective observational mixed-method study

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Abstract

Background Quality of life (QoL) in patients undergoing surveillance for uveal melanoma (UM) can be affected by psychological sequelae. Fear of cancer recurrence (FCR) may be acute especially when prognostication indicates an increased risk of metastatic recurrence. Communication with an ophthalmologist or oncologist can then play a key role in impacting QoL.

Methods In this prospective study co-designed with patient's partners and using a mixed-method approach, 250 patients at high versus low risk of metastatic recurrence are recruited in a national UM reference centre in France. At T1, after the 6-months post-treatment surveillance visit, dyads of clinicians and eligible patients complete a questionnaire to assess their respective experience of the communication during that consultation. Patients also complete questionnaires assessing their health literacy, information preference, and satisfaction with the information received (EORTC QLQ-INFO25), genomic testing knowledge, genomic test result receipt, satisfaction with medical care (EORTC PATSAT-C33), perceived recurrence risk, anxiety and depression (HADS), fear of cancer recurrence (FCRI) and quality of life (EORTC QLQ-C30 and QLQ-OPT30). At 12-months post-treatment (T2), patients complete again the HADS, FCRI, EORTC QLQ-C30 and QLQ-OPT30. Multilevel analyses will assess the effect of satisfaction with the information received on FCR and QoL accounting for the clinicians' and patients' characteristics. In-depth interviews planned sequentially with ≈25 patients will deepen understanding of patients' care experience.

Discussion As information on prognosis based on medical parameters becomes widely integrated into oncology practice, this study will highlight UM survivors' information expectations and satisfaction with communication, and its

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effect on FCR and QoL. Culturally adapted recommendations for doctor-patient communication will be provided for contexts of oncology surveillance involving poor prognosis in cases of recurrence.

Trial registration NCT06073548 (October 4, 2023).

Keywords Uveal melanoma, Survivorship, Quality of life, Fear of recurrence, Anxiety, Depression, Genomic testing

Introduction

Uveal melanoma (UM) is the most common primary malignant intra-ocular tumour in adults. UM has an incidence of four to seven new cases per million per year in western countries [1]. At diagnosis, the disease is at a localised stage in 95% of cases. The local treatment is often conservative with mainly radiation therapy such as brachytherapy and/or external beam radiotherapy such as proton beam therapy, depending on size and location of the tumour in the eye; however, up to 30% of patients undergo enucleation [1].

In spite of these treatments, which provide more than 90% of local control [2, 3], up to 50% of patients will develop metastases within a median time range of two to five years [4, 5]. The liver is the most frequent site of metastatic spread (in > 80% of cases). Once the disease has spread to the liver, median survival is approximately 16 months [1, 6]. If metastases are diagnosed early, a complete surgical resection of liver metastases can be considered in approximately 25% of patients [7]. For the remaining 75%, liver-directed or systemic treatments can be proposed; in HLA A02:01 positive metastatic UM patients, tebentafusp showed a durable overall survival benefit in a randomised phase III trial versus investigator's choice [6].

Prognostication is defined as evidence-based prediction and communication of future health outcomes [8]. In UM, prognostication depends on the tumour's clinical features (mostly diameter and thickness, according to the AJCC 8th classification [9]), and the genomic risk which can be determined by gene expression profiling or copy number alterations (higher risk in monosomy 3 and/or 8q gain)) [10]. Prognostication enables the adaptation of the surveillance protocol to the individual risk of relapse [9–11].

Curie Institute is the head of Melachonat, the French network of expert cancer centres dedicated to UM and granted by the French NCI (INCa). In 2020, the Curie Institute initiated a prospective cohort, SALOME (*"Suivi des patients atteints d'un mélanome uveal adapté au risque de rechute" – "Surveillance of uveal melanoma patients adapted to their risk of recurrence"),* for a tailored surveillance of patients at high risk of metastasis (NCT04424719). In SALOME, besides the follow-up with ophthalmologists, a dedicated consultation with an oncologist takes place within two months of completion of tumour treatment and subsequently every six months. In parallel with the ophthalmological follow-up, high-risk patients defined by either a clinical and/or a genomic high risk of metastasis, undergo liver MRI (Magnetic Resonance Imaging) every six months for 10 years in line with the international recommendations [12]. Patients at low risk of recurrence are followed up every six months with a liver ultrasound (US) by an ophthalmologist at the treatment centre. So in contrast to these latter patients, those classified as high risk are referred to a medical oncologist, necessitating the development of a new patient-doctor relationship. During the initial surveillance consultation with the oncologist or the ophthalmologist, patients are informed of the (prognostication-based) surveillance modalities. Communication about the prognostication (i.e., clinical and genomic profiling results) is tailored to the patient information needs as perceived by the ophthalmologist or the medical oncologist.

The SALOME cohort provides a unique setting in order to systematically address the communication experience of ophthalmologists/medical oncologists and their patients in the context of UM oncological surveillance. Patients at high risk are recommended to undergo intensive surveillance, so they may understand that they present a higher risk of disease recurrence. However, there is no scientific data on French UM patients' beliefs and knowledge about UM prognostication.

Up to now, there is little knowledge about the relationship between information needs and QoL in UM patients [13]. Moreover, even less is known in the French culture, where the communication of objective and precise numeric estimations of recurrence risk may not be well accepted. Cultural factors affect patients' information preferences and expression of wishes, and influence clinicians' attitudes in communicating with them. Specifically, compared to Latin cultures, Anglo-Saxon cultures tend to value self-determination and autonomy, which impacts the amount, precision and timing of the medical information requested or provided [14]. As most studies on communication needs and QoL in UM patients are conducted in countries with an Anglo-Saxon culture [15–17], we lack such information in Latin cultures, such as in French patients.

Theoretical background

Research hypotheses are drawn from the theoretical background depicted in Fig. 1. The Wilson and Cleary Model [18] is a widely used theoretical framework for understanding health-related QoL. It proposes that QoL is influenced by multiple factors, including biological and physiological variables, symptom and functional status [18]. According to this model, these factors are interconnected and interact with environmental and psychological factors.

Leventhal's self-regulation model emphasises the importance of individuals' cognitive representations (i.e., beliefs, knowledge) of their illness. This can result from doctor-patient communication and interpersonal care continuity, the patient's preferences, satisfaction with care and coping strategies. Particularly, the patient's satisfaction with the medical information received can play a crucial role in a patient's emotions which could then influence FCR, psychological distress (including anxiety and depression) and QoL [19, 20].

Doctor-patient communication and care continuity

Cancer patients who are satisfied with the medical information received generally experience better mental well-being and QoL [21]. However, one study highlights significant unmet medical information needs after diagnosis and three months later in patients treated for UM [22]. In the UM context, doctor-patient communication can be challenging due to the severity of the disease when metastasised and the potential for emotional distress. Nonetheless, many patients want to be informed of their risk of metastatic recurrence [23, 24]. This information can help anticipate potential medical and/or personal consequences and in that way minimise distress caused by uncertainty. However, UM patients also experience regret after having received the genomic test result [15].

A positive relationship seems to exist between interpersonal continuity of care and patient satisfaction [25]; however, this has not been addressed in the context of UM surveillance where either patients at high risk are referred to an oncologist or patients at low risk continue to be followed by the specialist ophthalmologist alternating with the general ophthalmologist.

Quality of life

UM patients often face treatment side-effects and sequelae which may persist up to several years after treatment and which impact their QoL [16, 26, 27], including FCR [28].

Post-treatment symptoms and functioning

Empirical data show that following treatment, the QoL of UM patients appears to be significantly lower compared to matched healthy general population [29, 30]. The most

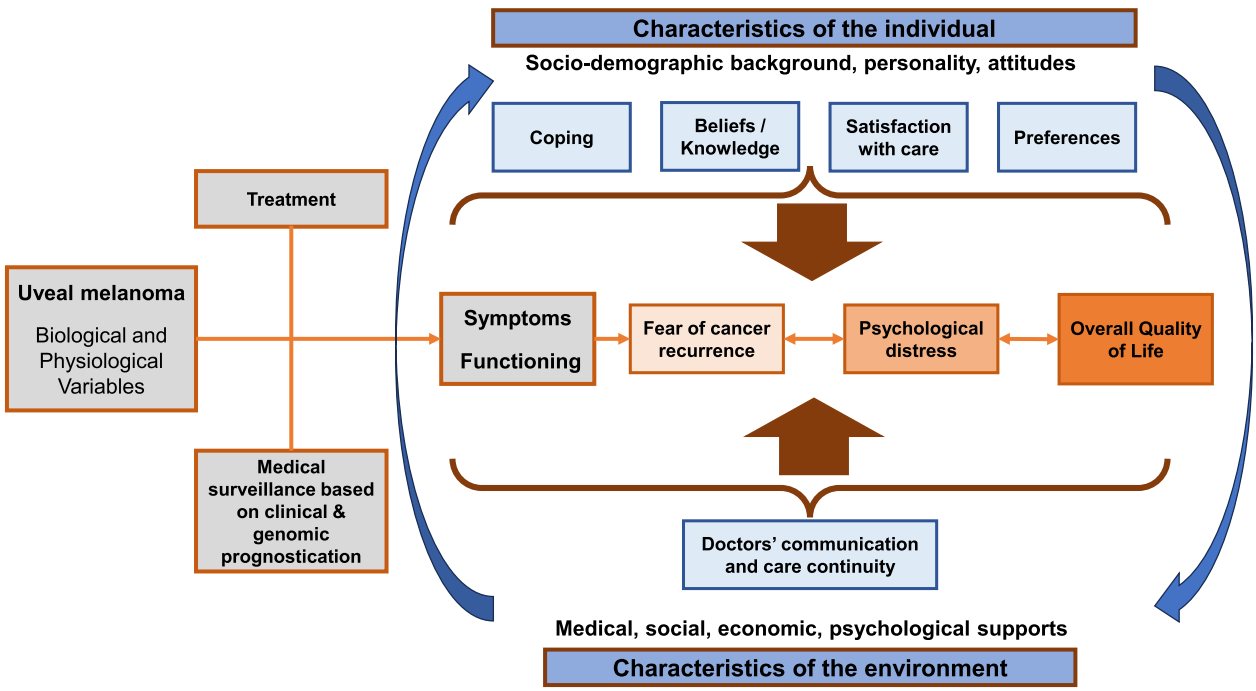

Fig. 1 Model underlying SALOMÉ – Quali Study. Model integrating environmental and individual characteristics as well as medical factors known to influence QoL

common symptoms experienced by UM patients undergoing radiation therapy are blurred vision, eye pain, and photophobia [3]. Patients who undergo enucleation may experience phantom eye syndrome, a condition characterised by the sensation of vision from the removed eye, which can affect their ability to adapt to their new visual status [31].

A large prospective study, conducted over a 20-year period, concluded that overall QoL was worse in enucleated patients than in patients treated with radiotherapy. However, this difference was not attributed to the treatment itself, but to factors predisposing to treatment choices such as a more severe disease (e.g., larger tumour) [16].

Within two years of treatment, overall QoL appears to be similar in patients treated by either enucleation or radiotherapy [32]. Furthermore, no difference was found at two years between these treatments regarding specific aspects of QoL such as the ability to drive, ocular irritation, headaches, or concerns regarding body image [33]. However, six months after treatment, functional difficulties were more important in enucleated patients, whereas difficulties in central and peripheral vision as well as in reading were higher in patients treated by radiotherapy [17]. QoL impairment tends to decrease over time [34].

Anxiety and depression

Before treatment, between 15 and 43% of UM patients experience moderate to high anxiety and 20% experience depression [30]. A longitudinal study revealed that around 20% of patients still had clinically significant levels of anxiety and 10% had high levels of depression throughout surveillance [27].

Persisting physical symptoms, phantom eye syndrome [31] and functional difficulties have been identified to be predictors of long-term anxiety [26] or depression [27]; 39% of patients report significant vision problems, which could lead to higher anxiety [27]. Furthermore, regarding breast cancer, research has established a potential relationship between persisting symptoms and traumatic memories of treatment and diagnosis [35, 36]. Individual status (being a woman [37] or a younger person [32]) and environmental factors (social support) seem to be correlated to better QoL [16].

Regarding genomic testing, findings are divergent. While some studies found that genomic testing, and thus objective estimation of metastatic recurrence risk, does not correlate significantly with QoL [13, 15, 38], other studies found that receiving a positive test result may be linked to higher worry or anxiety [26].

Depression levels seem to be worse at around three months post-treatment [39]. Anxiety, depression and decisional regret (after the receipt of the genomic test result) seem to decrease over time [27]. Interestingly, independent from the genomic test result, decision regret was more frequent in UM patients who chose not to undergo prognostic testing [40]. Higher anxiety and depression is also correlated to higher decisional regret [15].

Fear of cancer recurrence

FCR is defined as the "fear, worry, or concern relating to the possibility that cancer will come back or progress" [41]. It is characterised by intense worry, intrusive thoughts and difficulty planning the future [42]. These fears are related to uncertainty regarding future health. They result in anxious and depressive symptoms, which significantly affect overall QoL [31]. A study conducted in 2018, using the EORTC QLQ-OPT30, found that the frequency of worries about local recurrence or metastases was between 18 and 36% in UM patients [16]. In other studies including all types of cancer 60% of patients present at least mild FCR and 20% have moderate to high levels of FCR [43]. Persisting or newly occurring symptoms (e.g. late occurring vision loss) can be mistaken for disease recurrence and trigger FCR, especially in a context of a rare disease with insidious symptoms [44]. In all types of cancer, risk factors predisposing to distress and FCR are functional difficulties and time since the beginning of surveillance [28, 45], persistent or emerging post-treatment symptoms and functional limitations [27], younger age, female gender, previous psychiatric history, low social support, and higher levels of perceived stress [46]. Prognostication may affect FCR [47], in particular since metastatic recurrence does not manifest by any perceptible signs for patients.

In some studies, FCR has shown to be high and persistent over time [16, 48]. In others, FCR may decrease over time whatever the type of post-treatment surveillance [27, 49].

Study aims and hypothesis

Aim 1. To describe UM survivors' perceptions of the communication with their ophthalmologist or oncologist (i.e., communication experience of the surveillance consultation, knowledge about prognostication, receipt of genomic test result (yes/no) and its potential consequences, perceived cancer recurrence risk, satisfaction with ophthalmologist/oncologist communication, medical information received, care continuity) at the medical surveillance visit six months post-treatment; to explore these perceptions according to evidence-based high versus low recurrence risk, and potential determinants (i.e., demographic characteristics, health literacy, preferences for medical information, symptoms and functioning).

Aim 2. To assess ophthalmologists' and oncologists' perceptions of the communication they experienced with each of their patients and to compare them with their patients' communication perceptions.

Aim 3. To test the hypothesis that higher satisfaction with the information received about metastatic recurrence risk at the visit six months post-treatment is related to higher levels of QoL and lower frequency of clinical anxiety, depression and FCR at 12 months post-treatment, taking into account clinician and patient's characteristics [22, 50].

Aim 4. In a subsequent qualitative study, UM survivors' experience of the communication with their ophthalmologist or oncologist at the six-month surveillance visit will be further explored, in relation to QoL, anxiety, depression and FCR, and according to psychological characteristics (e.g. coping by seeking information), disease burden (e.g. eye symptoms) and environmental resources (e.g. social support).

Methods

Patient involvement

The present research protocol has been elaborated with the implication of patient's partners [51]. Patient's partners were influential in the research question choice and design of the study material.

Study design

This is a single-centre, prospective observational study (see Fig. 2). The study was approved by the institutional review board from Institut Curie on 01/09/23, in accordance with the Declaration of Helsinki. Participants (patients and clinicians) will receive an identification code.

The primary endpoint is QoL measured by the EORTC QLQ-C30 global health scale.

Main secondary endpoints include:

- Fear of Cancer Recurrence
- Anxiety and depression
- Patients' perception of the communication during the surveillance consultation
- Knowledge about clinical and genomic prognostication
- Receipt of genomic test result, regret over numeric result receipt
- Satisfaction with the medical information received
- Satisfaction with medical care
- Satisfaction with care continuity.

In a sequential qualitative study, a random sub-sample of UM patients will be invited for in-depth interviews taking place after questionnaire completion at the six-month post-treatment assessment within two months of questionnaire completion.

Participants

Patients entering surveillance for non-metastatic UM will be consecutively included either at the oncologist (for high-risk patients) or ophthalmologist (for low-risk patients) consultation at Curie Institute. Inclusion criteria are as follows (Table 1):

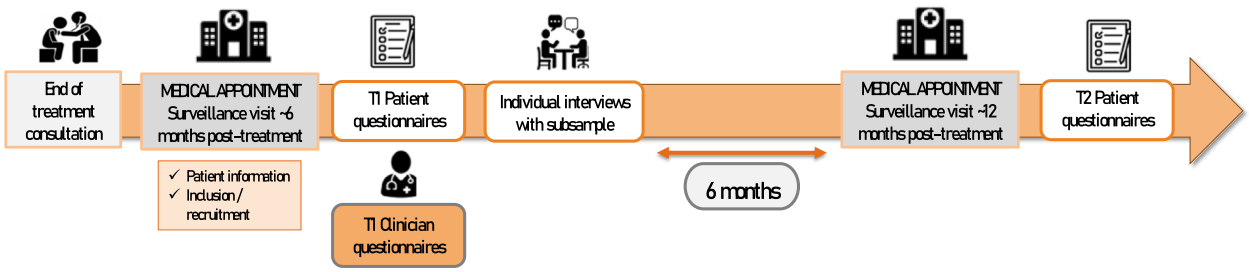

Fig. 2 Study design and assessment timeline. Main timepoints for SALOMÉ-Quali study, including medical visits and timepoints of questionnaires assessments and qualitative interviews

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• Patient aged 18 years or older • Diagnosed with a non-metastatic UM • Completion of primary tumour treatment at 6 months (± 2 months) • Able to keep to scheduled visits • Able to read and understand the language of the questionnaires	• Any social, medical or psychological condition that makes it impossible to complete the questionnaires • Persons deprived of liberty or under guardianship (including curatorship) • Patient with metastatic UM or any other tumour disease at the time of inclusion

Two groups will be identified within eligible patients:

1) Patients with non-metastatic UM at high risk for metastatic relapse defined as:

   – T2b/c/d or ≥ T3,
   – and / or anomaly on either chromosome 3 or chromosome 8, found by array CGH or sequencing.

2) Patients with non-metastatic UM at low risk of recurrence defined as:

   – ≤T2a,
   – and no alteration of chromosome 3 or chromosome 8 found.

Overall, the population and especially the count of high- versus low-risk patients taking part in this study will be representative of patients diagnosed with non-metastatic UM in France.

Patients who develop uveal metastatic recurrence or a new cancer diagnosis during the course of the study will not be considered in the analysis.

Data collection and procedures

Data collected and self-reported questionnaires (Table 2)

Baseline and follow-up clinical data (i.e., tumour size and localisation, treatment modality of the primary tumour, genomic test result (if applicable), visual acuity) will be collected from medical records. Patients will be asked for their demographic data (i.e., age, gender, marital, educational and professional status, travelling time between place of residence and cancer centre, sick leave (yes/no)), clinicians will also provide demographic data (i.e., age, gender) and professional background status (ophthalmologist or oncologist, years of experience, introduction to doctor-patient communication).

The EORTC QLQ-C30 (30 items) [52] assesses symptoms, functioning status and overall QoL. The complementary 30-item module EORTC QLQ-OPT30 [53] assesses specific symptoms and functioning in ocular cancers (e.g., ocular irritation or reading difficulty). For each validated scale, items with responses ranging from 1 (not at all) to 4 (very much) are summed and transformed into a standardised 0 to 100 measure. A high score for a functional scale or overall QoL denotes a high level of functioning and high QoL, while a high score on the

Table 2 Collected data, measures and assessment timing

	T1 6 months post treatment (± 2 months)	T2 12 months post treatment (± 2 months)
Predictor Variables		
Patients' demographic characteristics	X	
Baseline and follow-up clinical data	X	X
Health literacy	X	
Symptoms, functioning (EORTC QLQ-C30; EORTC QLQ-OPT30)	X	X
Preference for metastatic recurrence risk information	X	
Benefits/drawbacks of metastatic recurrence risk information	X	
Ophthalmologist/oncologist demographics and professional characteristics		
Ophthalmologists'/oncologists' perceptions of communication during the surveillance consultation (for each patient)	X	
Predictor and Outcome Variables		
Knowledge about clinical and genomic prognostication	X	
Receipt of genomic testing, regret over numeric result receipt	X	
Perceived cancer recurrence risk	X	
Perceived medical information received (EORTC QLQ-INFO25)	X	
Patients' perceptions of communication during the surveillance consultation	X	
Wish for psychological support during uveal melanoma surveillance	X	
Satisfaction with cancer care (EORTC PATSAT-C33 medical and care continuity scales)	X	
Outcome Variables		
Quality of Life (EORTC QLQ-C30 global health scale)	X	X
Fear of cancer recurrence (FCRI)	X	X
Anxiety and depression (HADS)	X	X

symptom scale denotes a high level of symptomatology/problem.

Fear of cancer recurrence is measured by the FCRI [54] (42 items) which addresses seven factors (i.e., triggers (8 items; 0–32 score range), severity (9 items; 0–36 score range), psychological distress (4 items; 0–16 score range), coping strategies (9 items; 0–36 score range), functioning impairments (6 items; 0–24 score range), insight (3 items; 0–12 score range), and reassurance (3 items; 0–12 score range)). Five-level item responses range from 0 (never / not at all) to 4 (always / very much). The total score ranges from 0 to 168 with higher scores indicating higher levels of FCR.

Clinical anxiety and depressive symptoms are assessed by the HADS (14 items) [55, 56]. Item responses are scored from 0 to 3 and the total score ranges from 0 to 42, with higher scores indicating higher levels of anxiety and/or depression. Cut-off scores used for each subscale are: ≤7 no anxiety or depression symptoms, >7 and ≤10 borderline anxiety and/or depression symptoms, >10 major anxiety and/or depression symptoms [56].

The EORTC QLQ-INFO25 questionnaire (25 items) [57] assesses patients' perception of medical information received. It is composed of four multi-item scales (information about disease, medical tests, treatment and other services) and eight single items including one addressing satisfaction with the amount of information received. For each validated scale, items with responses ranging from 1 (not at all) to 4 (very much) are summed and transformed into a standardised 0 to 100 measure.

The EORTC PATSAT-C33 contains doctors, care organisation and services scales, and overall satisfaction with cancer care (26 items) [58], and assesses patients' satisfaction with doctors' information and interactions, care continuity and overall quality of care. Item response scores range from 1 (poor) to 5 (excellent); these scores are summed and transformed into a standardised 0 to 100 measure.

For the EORTC QLQ-INFO25 and PATSAT-C33, a high score on a given subscale indicates a higher amount of perceived information received or higher levels of satisfaction.

Additional specific items adapted from the literature include patients' and ophthalmologists'/oncologists' communication experiences during the surveillance oncology visit [59], patients' health literacy [60], preferences for metastatic recurrence risk information [59], perceived benefits and drawbacks of information about metastatic recurrence risk [61–63], knowledge about genomic testing in UM [64], receipt of genomic testing, regret over numeric result receipt [23], perceived risk of metastatic recurrence [65] and wish for psychological support during UM surveillance [23].

For data collection the Computer-based Heath Evaluation System (CHES) is used [66]. Within CHES electronic case report forms (eCRFs) for the study are included as well as the patient interface for electronic collection of the questionnaires. If electronic data collection is not possible, it is done via paper–pencil and data is entered into the CHES platform by researchers.

If the paper form is chosen, questionnaires will be provided with a pre-stamped envelope and once completed will be returned via regular post within two weeks. At each assessment, if the questionnaires are not completed through CHES or returned by post after two weeks, a reminder (via phone or email) will be sent. Uncompleted questionnaires or not returned within one month will be considered missing.

In-depth individual interviews

Interviews will be performed by the first author (AM). An interview guide (supplementary material 1) is designed to explore patients' experiences of the communication with the UM treating ophthalmologist or oncologist during the first six-month follow-up, how this experience potentially relates to levels of FCR, symptoms of anxiety or depression and overall QoL, and how it is influenced by the patients' psychological characteristics (e.g. coping with information seeking) and environmental resources (e.g. social support).

The main topics of the interview are listed in Table 3. These concern the experience of the UM surveillance visits (e.g. "How did your life change since the initiation of surveillance visits?"), communication with the oncologist / ophthalmologist (e.g. "How did you experience communication with your doctor?"; "Can you tell me about the information you discussed?"), the information received about recurrence risk and surveillance modalities (e.g. "Which information did you receive regarding the characteristics of your disease or the modalities of your medical surveillance?"), the perception of recurrence risk (e.g. "How would you describe your overall health right now?"), expectations and experience of medical examination for UM surveillance (e.g. "What are your needs regarding medical surveillance consultations?"), the impact of surveillance modalities on emotions, feelings of uncertainty, daily life, FCR and QoL (e.g. "In what way did you feel uncertainty?"), and other concerns.

Interviews will be carried out in person, by phone, or by videoconferencing according to patients' preferences (e.g. due to living situation and/or familiarity with internet use). The duration of each interview is estimated to be between 45 and 60 min. Interviews will be audio-recorded, transcribed verbatim and pseudonymised using alphanumeric codes.

Table 3 Interview guide for individual interviews

1	Overall experience of the UM surveillance consultation with UM treating ophthalmologist or oncologist
2	Interpersonal aspects, attention to concerns, information needs and preferences, emotions, support provided, interpersonal care continuity
3	Communication, information received/not received according to wishes, shared understanding of disease, treatment, follow-up, checking/correcting patient's misunderstanding
4a	About UM risk of recurrence, UM characteristics (clinical & genomic prognostication), and surveillance modalities
4b	About MRI, CT scan, frequency, location of medical visits, care continuity
5	Understanding, perception of recurrence risk, experience of uncertainty
6	Expectations regarding UM surveillance modalities
7	Impact of UM medical surveillance
8	Emotions, daily life, FCR, QoL
9	Psychological and environmental resources
10	Other concerns

Full interview grid available in Supplementary material 1

Sample size

As the head of Melachonat, the French network of expert cancer centres dedicated to UM, roughly 350 new patients with UM are treated annually by ophthalmologists at the Curie Institute, of whom approximately 120 are patients at high risk of metastatic recurrence as defined above. Taking into account the feasibility of patient accrual over the study period, with two predictors included in a multivariate model (i.e., constant and communication satisfaction), a 2-sided α confidence interval (95%) for R2 = 10% (percent change in outcome explained by the predictors), the required sample size is 224 patients [67]. Taking an attrition rate of 10% into account, the required number of patients is 246 (224 + 22), of which one-third ($N = 82$) will be composed of consecutive patients at low risk for metastatic recurrence. This number can be rounded up to 250 patients. The inclusion period will be two years to include patients at high and low risk of metastatic recurrence (two-thirds of the sample or 120 + 44 patients) and the follow-up period will be six months.

For the qualitative subsequent study, a purposive sampling will target an equivalent number of patients per UM treatment (enucleation vs radiotherapy only) and surveillance modality (MRI for high risk vs US only for low risk). The overall number of subjects depends on data saturation, determined when three new interviews fail to bring new information; we expect a sample size of approximately 20 to 25 participants [68, 69].

Data analysis

Quantitative data analyses will be performed using R (https://www.r-project.org/), Python (https://www.python.org/), and Jamovi (https://www.jamovi.org/). Qualitative analyses will be aided using NVIVO (https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home) and iRaMuTeQ (http://www.iramuteq.org/).

Quantitative data

Participants' characteristics, clinical and self-reported data will be described in terms of frequency, percentage for categorical data, and mean, standard deviation, median, and range for continuous variables. Respondents (i.e., having provided at least one question in one of the self-reported questionnaires) and non-respondents at the first and second assessment time will be compared by age, gender, type of UM treatment or high versus low recurrence risk. UM patients at low versus high recurrence risk will be compared by age, gender, marital status, education, and travel distance to the cancer centre. Bivariate analyses will be carried out using the F-test (analysis of variance) for continuous data and the $\chi 2$ test for categorical data. For each self-reported questionnaire scale, missing data will be imputed using the subject's mean value per subscale if at least 50 percent of the responses per subscale were given, otherwise the patient's scale score will be considered missing [70, 71]. Internal consistencies (Cronbach's alpha coefficients) will be checked. Profile analysis [72, 73] will be carried out to describe patients by levels of satisfaction with information received and FRC based on age, gender, marital status, health literacy, and travel time from residence location to the UM surveillance centre. Multivariate mixed linear models [74] taking into account the ophthalmologist or oncologist who met the patient at the UM visit will be tested. We will estimate the relationship between the patient's satisfaction with the information received and FCR or QoL. Possible interactions between age, gender, marital status, health literacy, and satisfaction with information on FCR or QoL will be tested. For all tests, a significance level of $p < 0.05$ is predetermined. Change in patients' satisfaction

with information received, FCR and QoL will be assessed between assessment at T1 and T2.

Patients who develop a metastatic recurrence during the time of our study will be excluded from analyses.

Qualitative data

Qualitative data analyses will follow the SRQR recommendations [75]. Based on a constructivist grounded theory approach, interviews will be analysed thematically with the aim of better understanding UM survivors' experience of communication with the clinician, met or unmet information needs (e.g., additional information, support), and clarifying the communication relationship between the ophthalmologist/oncologist and patient and the patient's FCR and QoL potentially quantitatively substantiated [69, 76, 77].

The thematic analysis of the textual data will be carried out on the basis of a grid developed in two phases [78]: 1) from the interview guide and 2) from an independent analysis of 10 interviews by two researchers (AM and AB). Intra- and inter-coders reliability will be assessed in terms of agreement rate and Cohen's Kappa coefficient. Comparisons between patients in terms of UM surveillance modalities will be performed.

Throughout the interviews and analysis process, in order to emphasise a meta-reflexive position, notes will be taken by the first author (AM) and interviews and analyses will be discussed among the research team (AM, AB, SD, SPN, DM) [79].

Integration of quantitative and qualitative data

Quantitative and qualitative data will be described consecutively and then interpreted and commented on in relation to their respective contribution [80, 81]. Triangulation of data will be aimed at both by confronting patients' self-reported questionnaire and interview data, and patients' and clinicians' data [82]. We will describe and present in tables how quantitative and qualitative analyses provide results that converge, complement, diverge from or build on each other [83].

Discussion

This study aims to explore UM survivors' experience of the communication with their treating ophthalmologist or medical oncologist, their satisfaction with the information received about UM metastatic recurrence risk and surveillance modalities and its potential impact on FCR and QoL. This study investigates UM survivors' and clinicians' perceptions of the complex communication process about prognostication in UM. Moreover, it will also characterise patients' profiles (by age, gender, health literacy, marital status, etc.) in terms of information preferences, satisfaction and FCR.

Up to today, little guidance exists on how to communicate the results and consequences of a diagnosed high genomic risk of cancer recurrence [84] and on how to identify or respond to Latin, especially French in our study, patients' communication needs and support in this medical context.

Clinicians need very subtle and specific communication skills to inform patients about prognostication, including the nature, purpose and value of clinical examination and genomic testing. This study is expected to identify opportunities to improve the communication between ophthalmologists/oncologists and UM patients and to tailor information according to patients' profiles.

As genomic testing and prognostication become more common in daily clinical practice, the outcomes of this study may be relevant to similar clinical situations. Although Anglo-Saxon countries value self-determination and autonomy [14], little is known about the process of information request and provision, doctor-patient communication, FCR and overall QoL in UM patients during post-treatment surveillance in Latin cultures such as in the French culture. Gathering information and tailoring interventions are both crucial aspects in cancer survivors, as their QoL can deeply affect future health and survival [85].

Methodological strengths and limitations

Strengths

The study is co-designed with patients' partners. Sampling aims to recruit most UM patients treated in France, as the Curie Institute is one of the reference centres for this pathology. Data collected provide complementary insights from patients, ophthalmologists and oncologists. The prospective design allows the study to address the relationship between patients' information perception at T1 and subsequent FCR and QoL at T2. Data collected from a mixed, quantitative and qualitative approach, and from different perspectives, i.e., patients and clinicians, allow triangulation and integration [86–88].

Limitations

The study results may not be generalised to other cancer types for which cancer recurrence prognostication is performed (e.g., in breast cancer [89]). Furthermore, not all potentially relevant outcomes of patients' communication effects are assessed (e.g., short- or long-term surveillance adherence). Confounding variables such as other stressful life events are not assessed. UM survivors at low versus high risk of metastatic recurrence undergo different care pathways, involving either the treating ophthalmologist for low risk or the oncologist (and ophthalmologist) for high risk, and slightly different starting time of follow-up; this may confound the effect of clinicians'

communication and patients' perception. Moreover, UM genomic test results are not systematically communicated to patients in France. So not all patients will be aware of their UM metastatic recurrence risk; information about patients' satisfaction with the information provided in this respect will be limited to the content (what information was received or not) and not to the manner (how that information was provided).

Conclusion

This prospective mixed-method co-designed study employing UM-treating ophthalmologists, oncologists, UM survivors and patient partners investigates patients' communication experiences of UM metastatic risk prognostication and the relationship to FCR, anxiety or depression and QoL. While genomic testing in oncology practice concerns an increasing number of patients, there is still little information on patients' communication experience and information preferences in this respect. This study will identify opportunities to improve the communication experience in the early phase of UM medical surveillance based on the risk of UM metastatic recurrence [90].

Abbreviations

CGH	Comparative Genomic Hybridisation
CHES	Computer Health Evaluation System
CT	Computed Tomography
EORTC QLQ-C30	European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire
EORTC QLQ-INFO25	European Organization for Research and Treatment of Cancer Quality of Life Questionnaire– Information Module
EORTC QLQ-OPT30	European Organization for Research and Treatment of Cancer Quality of Life Questionnaire– Ophthalmic Cancer Module
EORTC PATSAT-C33	European Organization for Research and Treatment of Cancer Patient Satisfaction Questionnaire
FCR	Fear of Cancer Recurrence
FCRI	Fear of Cancer Recurrence Inventory
HADS	Hospital Anxiety and Depression Scale
MRI	Magnetic Resonance Imaging
PRO	Patient-Reported Outcomes
QoL	Quality of Life
UM	Uveal Melanoma

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

AM, AB and SD drafted the main manuscript. AM and AB designed figures 1 and 2. AB, AL, SD, SPN and SD developed the original concept of the study in collaboration with the other authors. AM, AB, SD and MC managed regulatory tasks. AM and BH worked on the CHES interface for data collection. AM will perform individual interviews. AM, AB, SD, SPN, DM and BH will be involved in qualitative analysis. AM, SPN, JP, NC, LLR, AMatet, MR, DM will be involved in data collection. All the authors contributed to the design of the study protocol, are involved throughout the project and have read and approved the final manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The project was validated on 01/09/2023 by the institutional review board (IRB) from Institut Curie, in accordance with the Declaration of Helsinki. Number DATA230157. Furthermore, it has been registered to clinicaltrial.gov, Nr. NCT06073548.

Consent to participate

Not applicable.

Consent for publication

N/A: this paper does not contain any patient or physician data.

Competing interests

Bernhard Holzner holds IPRs on the CHES software tool used in the study. The other authors declare no conflicts of interest.

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