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ORIGINAL ARTICLE – PERITONEAL SURFACE MALIGNANCY

Characterizing the Patient Experience of CS/HIPEC Through In-Depth Interviews with Patients: Identification of Key Concepts in the Development of a Patient-Centered Program

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ABSTRACT

Introduction. The cytoreduction and hyperthermic intraperitoneal chemotherapy (CS/HIPEC) procedure is complex, involving lengthy preparation and recovery in a heterogeneous patient group. Understanding the patient experience is essential to improving interactions with health professionals that is critical to recovery.

Objective. This study sought to characterize the early recovery and return to quality of life (at 3 and 6–12 months post-surgery, respectively) in patients having undergone CS/HIPEC, through structured interviews.

Methods. Two sets of interviews were conducted among 20 CS/HIPEC patients. Interviews were uploaded into QSR NVivo 10 qualitative software (QSR International, Australia) and coded by two study personnel. Interview 1 focused on initial treatment decision making and postoperative hospitalization, while interview 2 focused on recovery, supports, and return to quality of life.

Results. Among the participants, 60% were female and the mean age was 57 years (range 31–71). Diagnoses included disseminated peritoneal adenomucinosis ($n = 6$), appendiceal adenocarcinoma ($n = 4$), colorectal adenocarcinoma ($n = 6$), goblet cell ($n = 2$), and mesothelioma ($n = 2$). The first interview identified common themes of perioperative psychosocial isolation, lack of direction, and the importance of an established support system. Patients requested printed and audiovisual materials focused on addressing expectations. The main findings from the second interview captured patient experiences with longer-term complications, as well as surveillance.

Conclusion. Focused interviews with patients recently having undergone CS/HIPEC identified key issues that may be addressed in programs to improve the patient experience. These issues were distinctly different in relation to phase of recovery, and patient-centered programs designed with these factors in mind have the potential to enhance the recovery process.

The Beryl Institute defines the patient experience as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care".[1] An understanding of the patient experience can assist in identifying gaps in care that may be addressed through various strategies initiated by the healthcare team, with an end goal of improving outcomes and the processes of healthcare delivery.

The cytoreduction and hyperthermic intraperitoneal chemotherapy (CS/HIPEC) procedure is a complex surgical procedure that involves extensive peritoneal stripping of tumor nodules from the surfaces of the abdominal cavity, followed by administration of heated chemotherapy through a circuit or coliseum to manage micrometastatic

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peritoneal metastases.[5] A randomized controlled trial and several cohort studies have indicated a survival benefit for patients treated with this procedure, for primary tumor sites including appendiceal mucinous neoplasms, appendiceal and colorectal adenocarcinoma, and primary peritoneal cancers.[6,7] The recovery and return to baseline or improved quality of life among this heterogeneous group of patients may be complex, and has been shown to occur by 6 months postoperatively.[8] Additionally, a diverse group of patients may seek consultation for this procedure, related to age, sex, prior surgery, prior chemotherapy, and functional status.[9]

A Swedish study of in-hospital patients having undergone CS/HIPEC (at 11 days postoperatively) was completed by Eriksson et al.,[10] and identified several discrete domains of the patient experience, including the process of recovery, body/mind connection, and supports and transitions in care. Swenne et al.[11] evaluated patients using in-depth interviews at 2–6 months postoperatively and identified several gaps in the recovery process, such as not addressing the mental stress of recovery and the effect of specific factors such as presence of an ostomy or needing additional systemic chemotherapy. Despite this well-studied recovery process, the patient experience of those choosing to undergo the CS/HIPEC procedure is lacking and has not been well-characterized. In particular, understanding the patient perspective as relevant to the various phases of preparation and recovery, including preoperative decision making and planning, in-hospital experience, and postoperative recovery, are significant areas to understand in relation to patient outcomes and with regard to the delivery of healthcare.

Our group previously studied the perioperative preparation offered to patients by high-volume surgeons around the world completing the CS/HIPEC procedure.[12] Two-thirds of centers stated they offered a formalized preoperative pathway, over 80% offered printed educational materials, 40% facilitated an opportunity to connect with patients having previously undergone the procedure, and 20% offered audiovisual/multimedia materials. Given these fairly diverse results, there was clearly no standardized educational method for communicating recovery information to patients, across all of the centers that perform the procedure, and no direct information from patients was elicited to assist with format, content, or knowledge needs.

The aim of the current study was to explore the early patient experience during the preoperative and early recovery period to determine themes important to decision making relevant to the in-hospital stay, and to evaluate the patient recovery experience following the hospital stay to determine factors important to the home recovery period and return to quality of life, from patients recently having undergone the CS/HIPEC procedure at our center. Understanding the patient experience of CS/HIPEC is an important opportunity to identify areas for improvement in patient care, including patient education, recovery, and gaining insight regarding the factors that have the potential to impede or facilitate preoperative planning to postoperative recovery of importance to the team and the patient, thereby yielding the most optimal outcome.

METHODS

Setting

Roswell Park Comprehensive Cancer Institute has been an established CS/HIPEC center since 2003. Three surgical oncologists offer the procedure to patients who are either self-referred or referred from surgeons or medical oncologists in the Western or Central New York area. On average, four to eight CS/HIPEC procedures are completed per month. Patients considered for the CS/HIPEC procedure undergo surgical consultation and multidisciplinary discussion. The general indications for the procedure include patients with peritoneal metastases from appendiceal or colorectal cancers or neoplasms, peritoneal mesothelioma, or primary peritoneal cancers.

This study was approved by the Roswell Park Institutional Review Board. All patients were informed that the study was confidential and that their decision to participate in the study would not be shared with anyone in their care team or affect the nature of their care. Each patient who chose to participate received a unique code that was randomly assigned.

Patient Population

A sample size of 20 patients was selected a priori to allow for capture and redundancy of adequate information. Consecutive patients having undergone the CS/HIPEC procedure at Roswell Park were recruited, starting in March 2016. All patients were recruited by June 2017. Overall, 96 patients underwent this procedure during the study period. Study personnel approached patients at the postoperative clinic visit to introduce the study and enroll interested patients, and a patient information sheet was provided to those who elected to participate. Inclusion criteria were as follows: having a CS/HIPEC procedure completed at Roswell Park in the last 3 months, and the ability to speak and understand English.

Interviews

Interviews were completed at two time points: 3 months and 6–12 months postoperatively. Interview questions

were designed by the research team and informed by the literature. The first interview (3 months) included questions related to initial treatment discussion, decision making, and the postoperative period in hospital. The second (6–12 months) included questions related to recovery postdischarge, supports, education, and return to quality of life. Interview questions can be found in "Appendix 1".

Study personnel prescheduled interviews with the patient and completed the interview, either in-person after a regularly scheduled clinic appointment or at a prearranged time by telephone. Patients who participated received a $50 gift card to a major retailer for each interview completed.

Interview Team and Data Collection

The interview team consisted of three research staff not involved in patient care but with extensive experience in recruiting study participants, qualitative methods, and conducting patient interviews. Patient interviews were completed by one of the research staff and were audio-recorded. Transcriptions of the interviews were completed by a central service.

Analysis

All of the completed interviews were organized into QSR NVivo 10 qualitative software (QSR International, Melbourne, VIC, Australia) for coding and further analysis. Transcripts were then prepared for analysis by determining a list of specific items of interest from the interview guide. An initial round of free coding of those independent items was completed by the study investigators and two study research staff members. The coding team met to review free coding results, resolve any inconsistencies, and discuss and determine a set of standard codes and categories for application to the rest of the patient interviews. The selected interview question guide topics were used as a framework to develop the coding structure. This approach to the analysis enhanced our ability to manage the data and improved our consistency in examining the interview guide topics of interest. A table format was used to create the coding summaries, which included the selected interview question guide topics and a summary of participant responses for each item. The coding team compared their individual analyses in order to verify agreement and detect any differences or inconsistencies between coders. Patterns were identified by examining the codes associated with interview guide topics. Examination of the response patterns across the data led to the emergence and ultimate identification of themes and majority responses among interview participants. Upon review of the findings, the major and most relevant themes were identified and agreed upon by the coauthors, and illustrative quotes were included to represent those themes.

RESULTS

Patient Demographics and Treatment Information

Of the 20 participants, 60% were female and the mean age was 57 years. Regarding tumor histology, eight patients had colorectal adenocarcinoma, six had disseminated peritoneal adenomucinosis, three had peritoneal mucinous carcinomatosis, two had goblet cell carcinoid, and one patient had peritoneal mesothelioma. Complete cytoreduction was achieved in 16 (80%) patients. Half of the patient cohort had private insurance (n = 11), four had Medicare, three had Medicaid, one had Veterans' insurance and one had other insurance (out of the country). Patients traveled for treatment to Roswell Park from distances ranging from 5 to 295 miles. Home-city populations varied from 163 to 256,902 people (Table 1).

A total of nine patients experienced 90-day postoperative morbidity. Surgical site infection occurred in three

TABLE 1 Descriptive characteristics of HIPEC study patients

Characteristics	n = 20
Age (mean years)	57
Gender	
Female	11
Male	9
Histology	
Colorectal adenocarcinoma	8
DPAM	6
PMCA	3
Goblet cell carcinoid	2
Mesothelioma	1
Complete cytoreduction	16
Morbidity (n=9)	
SSI/fat necrosis	3
Intra-abdominal abscess	2
C diff	2
Anastomotic leak, reoperation	1
Neutropenia	1
Oncologic outcome	
NED	10
AWD	8
DOD	2

DPAM disseminated peritoneal adenomucinosis, *PMCA* peritoneal mucinous carcinomatosis, *SSI* superficial surgical site infection, *NED* no evidence of disease, *AWD* alive with disease, *DOD* dead of disease

patients, intra-abdominal abscess requiring drain insertion occurred in two patients, and anastomotic leak requiring reoperation occurred in one patient (Table 1).

Oncologic outcomes at the time of analysis included 10 patients who were alive without evidence of disease; eight patients were alive with measurable disease (four were patients who did not have a complete cytoreduction), and two were patients who died of disease within the study period, after their second interviews were complete (Figs. 1 and 2).

Interview Information

All interviews were completed by one research team member for both interview time points. The average length for the first interview was 21 min, ranging from 10 to 50 min, while the second interview averaged close to 18 min, ranging from 12 to 32 min in length.

Interview 1 (3 Months Postoperatively) Themes

The identified themes at the first interview included factors that were of critical importance to the preparation and decision making that occurred prior to surgery. The majority of patients felt they were provided enough information to be confident with their decision to have surgery. The most common resource that helped in the decision to undergo CS/HIPEC was the initial consultation with the surgeon, followed by family, web-based searches, and personal faith.

Few patients cited decisional regret. In fact, the majority of patients stated they would have the surgery again, despite complications. Most patients also felt they had an understanding of other treatment options, enough so that they would still make the decision to choose CS/HIPEC. In terms of educational information provided in preparation for the procedure, 40% of patients preferred a short video, 30% preferred a website, 15% preferred written material/brochures, and 15% preferred a combination of all of the above.

Patients reported a wide range of experiences specific to their in-hospital experience following the CS/HIPEC procedure, ranging from 'not that bad' (9/20) to 'difficult' (9/20) to 'hell' (2/20). These findings did not correlate with extent of surgery or postoperative morbidity. The most prominent physical theme that was recurrent among participants was pain and pain management, including epidural function and adjustments. A highlight of the in-hospital experience was the rapid identification of the 'team' of care, including nursing and allied healthcare that were integral to the recovery process.

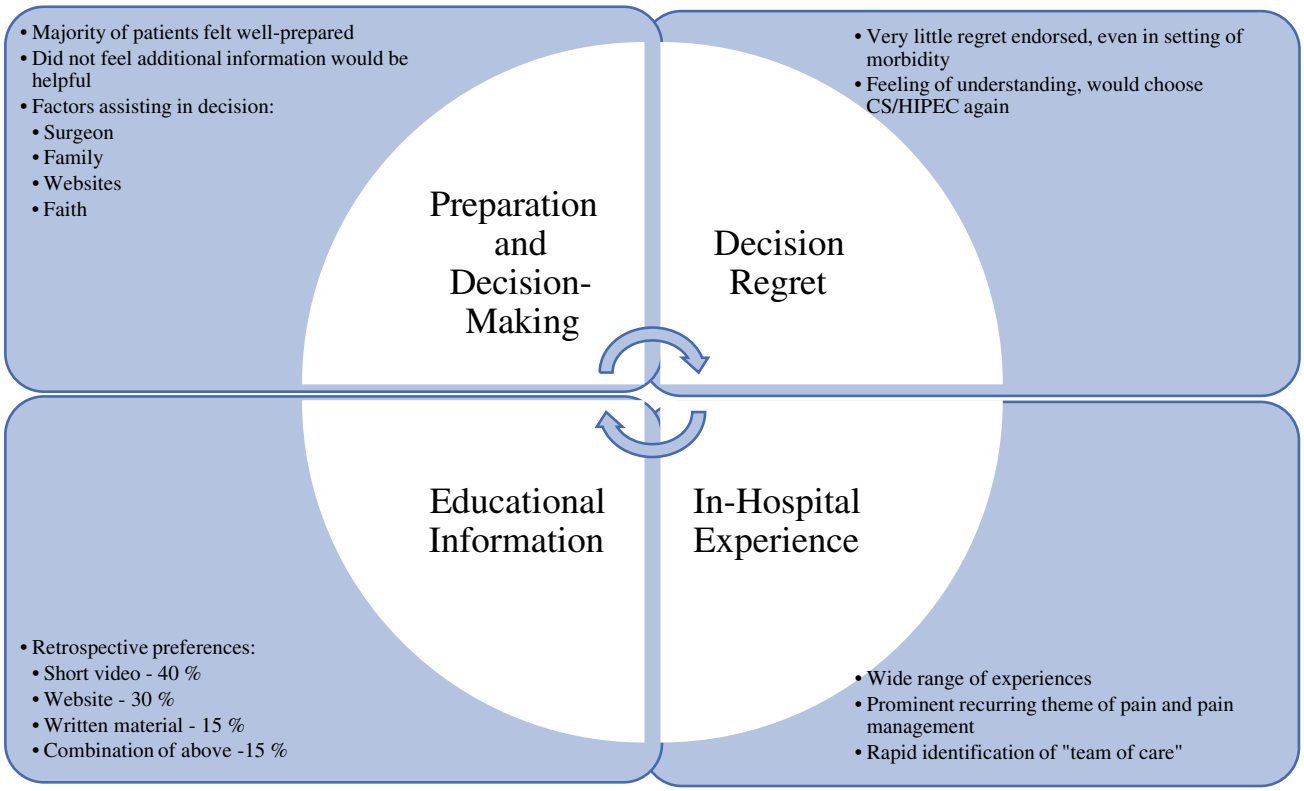

FIG. 1 Interview 1 (3 month post-operatively) themes

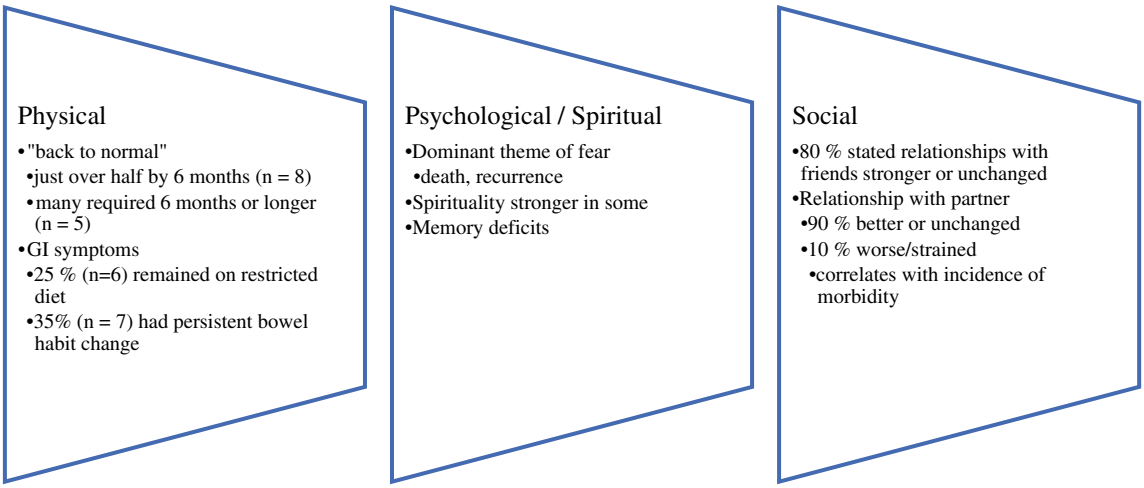

FIG. 2 Interview 2 (6-12 month post-operatively) themes

The majority of patients recalled the exact expected duration of time during their hospital stay, time in the critical care setting, incision type, and the probability of needing an ostomy. However, many patients did not understand or recall the likelihood of side effects or the severity anticipated (8/20, 40%). The most unexpected side effect identified among patients was depression; even with no personal history of this condition, symptoms were noted among patients, as best described in the following statement: "At first, that month, you get a little down cuz you can't do anything. My problem is I was always very active. So for me, doing nothing was just driving me crazy…". Patients expressed a genuine concern relevant to caregivers and for the 'loss of the team', as experienced during the hospital stay. One patient described the transition to home postdischarge from the hospital in the following manner: "… if my husband and I had realized the importance of his support, it maybe would have helped us prepare for—like—he was trying to work and at the same time take care of me. If we would have been more prepared, maybe we could have had a better plan in place for him …"

Interview 2 (6–12 Months Postoperatively) Themes

The second interviews centered on themes specific to the recovery process. The physical themes included the feeling of being 'back to normal'. A total of 14 patients chose to answer this question, with six patients feeling back to normal at 4 months postoperatively, three patients by 4–6 months, and five patients requiring 6 months or longer. Despite the recovery process and time from surgery, 6 of the 20 patients endorsed difficulty sleeping, and 7 endorsed chronic or ongoing pain issues. Regarding gastrointestinal symptoms, 6 of 20 patients remained on a restricted diet, and 7 endorsed ongoing bowel habit change.

Patients were asked about the psychological and social impact of the surgery and recovery process. The dominant theme from participant responses were about death and cancer recurrence, and is best represented by the following quote from one patient: "Well, I guess the fear I would have is that, of course, that this is not a cure. I know full well that I may need surgery again in the future. I guess if I thought about it seriously I would probably wonder what my life's future will be …". The patients who required postoperative adjuvant systemic chemotherapy also discussed experiencing memory deficits. Some patients stated they felt their personal spirituality was stronger compared with pre-procedure. From a social functioning perspective, the majority of patients (80%) stated relationships with friends or their social network was unchanged or stronger. Similarly, the majority (90%) of patients stated their relations with a partner or primary caregiver were better or unchanged; however, 10% described experiencing a worse or strained relationship, as represented by the following patient quote: "… it's been a lot of stress between us. It's just difficult because he has had to transition into a caregiver type of role … it's definitely been a change in the dynamic in our relationship". This 10% of patients who described experiencing worse or strained relationships was also correlated with those who experienced postoperative morbidity.

DISCUSSION

The interactions, perceptions, culture, and continuum of care, termed the 'patient experience', is becoming increasingly important to modern medicine, and should be taken into account for the development of programs in cancer care. The CS/HIPEC procedure is a complex surgical oncology procedure that is offered to a heterogeneous

group of patients, and requires a lengthy recovery process. Given the advanced nature of cancer in this patient group, and various phases in recovery, evaluation of the patient experience is invaluable to identifying gaps that may be improved upon. To date, the patient experience in the early postoperative period in CS/HIPEC has been evaluated by one group of researchers in Sweden.[10,11] However, the patient experience during the lengthy and complex recovery period, ending in return to preoperative quality of life past 6 months postoperatively, had not been comprehensively studied until the current study.

The patient cohort from this study included patients of varying ages, sexes, and tumor histologies, in keeping with most CS/HIPEC practices in North America. Additionally, postoperative morbidity was also well within the range of type and severity for such practices. Thus, results should be generalizable to the population of patients undergoing the procedure at our center and others. With respect to identified themes, although most patients felt they had enough information to make informed decisions about pursuing the procedure, almost half did not understand or recall the likelihood or severity of common side effects. In the setting of a lengthy recovery process, this poor understanding is a need that should be addressed to improve both patient comprehension of the process and as a component of informed consent. In addition, the identification of the patients 'team', which includes in-hospital staff as well as a primary caregiver who will be responsible for taking over many care tasks at home postdischarge, was a key factor to the recovery process. A better definition of the caregiver's roles and commitment to education, as well as the identification of an individual willing to fulfill even difficult recovery tasks, is warranted.

At the 6- to 12-month postoperative interviews, persistent physical symptoms occurred in at least half of the patients, most commonly related to gastrointestinal function, pain, and sleep. Although the CS/HIPEC procedure is completed on patients with advanced abdominal cancers, a survivorship care plan to manage and treat some of these symptoms may be warranted, specific to this procedure. Additionally, given the increased importance of the primary caregiver in the later postoperative period at home, in particular for patients experiencing morbidity from the procedure, the role, support, and preparation available to the caregiver was highlighted again.

Several interesting discussion points arise from analysis of the themes from this patient cohort. Patients appear to overwhelmingly request audiovisual or mixed-type educational information, related to preoperative decision making and the recovery process, although many sites offer mostly written materials.[12] This preference offers direction to facilities hoping to improve patient understanding and instruction. Additionally, although many physical symptoms of the procedure were prevalent, the most unexpected side effect was depression, even in patients who did not have this diagnosis preoperatively. The effect of depression on postoperative recovery has been well-demonstrated in the orthopedic joint replacement literature, indicating that patients with postoperative depression often have increased narcotic requirements and overall slower recovery.[13,14] Although the recovery period is different and the psychological status of the patient may be affected by a cancer diagnosis, the effect of depression on slowing the recovery process is relevant to CS/HIPEC, the potential for screening and active management in all patients should result in improved outcomes overall. Finally, the repeated mention of the caregiver throughout the recovery process indicates the importance of the roles and responsibilities in all phases of treatment. Shown in other disease sites, the caregiver for postoperative or post-treatment cancer patients has a unique role that can pose risk for burnout, which may in turn result in a negative impact for the recovering patient.[15,16]

The limitations of the current study include a patient cohort from a single center, with fairly heterogeneous demographic and tumor type characteristics. However, common themes can be identified and appeared to resonate in this cohort, despite these differences. The future plan to translate the current study data into a patient-centered program includes the following: a better description of possible side effects made available prior to surgical decision making, and a more comprehensive approach to the unexpected side effect of depression is warranted, probably from a similar type of qualitative study in the CS/HIPEC patient population. The inclusion of multimedia preparatory educational materials to the patient-centered program appears optimal for patients, and a program that includes caregivers as key members of the recovery process is necessary. This type of media may allow for patients to select or even be assigned modules of relevance by the surgeon and team to his or her particular case (for example, ostomy management). For the development of these multimedia type modules, the authors intend to partner with the patient group PMP Pals for the development, review, and possible dissemination of such modules. This study identifies several gaps that if addressed can directly improve the CS/HIPEC patient experience, and may indirectly act to improve on other conventional quality indicators such as length of stay and readmission rates.

DISCLOSURE None.

APPENDIX 1: INTERVIEW QUESTIONS

Appendix A: Structured Interview 1 (3 Months Post-surgery)

1. Tell me about your experience with your [colon/appendix/other] cancer.
2. Probe: what were the symptoms that made you seek medical help?
3. Who did you see (physicians or specialists)? What treatments were offered to you? How were treatment options presented to you?
4. What were you told about prognosis/how serious the cancer was? (Were you given specific length of life expectancy with/without treatment, or probability of survival?)
5. What treatments did you choose to have?
6. Probe: What treatment did you choose?
   (a) How did you choose the treatment?
7. Did you feel you were given enough information to be confident with the decision? What else may have helped you at that time?
8. What factors helped you make that choice? What people helped you make that choice? [How much did you use the Internet for information? Social media?]
9. Do you remember how long the recovery period in hospital was expected to be after surgery? What was the recovery period in hospital like for you?
10. Were you expecting to spend time in the intensive care unit?
11. Were you expecting to have an ostomy?
12. Were you prepared or aware of the types of incisions and tubes you would have after surgery?
13. Did you experience any expected side effects or complications?
    (a) Did you experience any unexpected side effects or complications?
    (b) How was the management or treatment of the complication explained to you?
14. Did you feel "back to normal"? When was that?
15. What was your recovery period like at home after discharge?
16. In retrospect, would you make the same choice today if you could replay that decision?
17. Probe: Would you tell me why? (Depending on tone of answer, change order of next probes:)
    (a) What were the benefits of the treatment for you?
    (b) What were the drawbacks? (Physical, social, economic?)
    (c) Did you feel you fully understood the benefits or drawbacks prior to the surgery? Can you elaborate on why or why not?
18. What one support (educational, psychosocial, social support, spiritual or economic) would have been most helpful to you prior to treatment? After treatment? When would they have been helpful?
19. Is there something you would have liked to understand better, or know more about, before deciding on surgery?
20. If you could advise someone who has to make the same decision as you did, what one thing would you tell him or her?

Appendix B: Structured Interview—(6–12 Months Post-surgery)

Did you feel you were given enough information to be confident with your decision to have HIPEC surgery?

Probe: What else may have helped you at that time?

What factors helped you make that choice?

Probes: What people helped you make that choice?

How much did you use the Internet for information? Social media? Do you remember how long the recovery period in hospital was expected to be after surgery?

Probe: What was the recovery period in the hospital like for you?

After surgery and to this point, did you experience any expected side effects or complications?

Probes: Did you experience any *unexpected* side effects or complications?

How was the management or treatment of the complication explained to you? At some point in your recovery, did you feel "back to normal"?

Probe: When was that?How has your recovery progressed since our last interview?

FOCUS 1: PHYSICAL

Did you have any type of "setbacks"?

Are you having pain or physical discomforts?

Are you exercising?

(a) How much/how often?

How are you eating? Do you enjoy food?

Have you had any problems or changes with your bowel habits?

Are you having trouble sleeping?

Are you having tiredness?

FOCUS 2: MENTAL/PSYCHOLOGICAL

What fears do you have?

Are you having mood swings?

Comparing to before your diagnosis and treatment: How has your memory been? Do you have any difficulty concentrating?

‘FOCUS 3: SOCIAL

Has this experience changed your relationships with your friends?
What about relationships with your family and partner?
Are you having any issues with everyday living?

(a) Issues with finances?
(b) Issues with travel plans?

FOCUS 4: SPIRITUAL/EXISTENTIAL

Has this experience with your cancer changed how you feel about yourself?
Probe: Can you tell me what ways you feel are different?
Has this experience with your cancer changed how you feel about your faith, or spirituality?
As time has passed, would you still make the same choice today if you could replay your decision?

Probes: Would you tell me why? (Depending on tone of answer, change order of next probes:) What were the benefits of the treatment for you? What were the drawbacks? (Physical, social, economic?) Did you feel you fully understood the benefits or drawbacks prior to the surgery?
Can you elaborate on why or why not?

Preparation and Education

What one support would have been most helpful to you before treatment?
After treatment?
Is there something you would have liked to understand better, or know more about, before deciding on surgery?
If you had a choice of how your patient information was presented to you, what would you prefer?

Probes:

(a) In the form of a: brochure (pamphlet), short video, or a website
(b) Are there any formats for educating patients on this procedure that you recommend that we have not already discussed?

If you could advise someone who has to make the same decision as you did, what one thing would you tell them?

REFERENCES

1. Improving the Patient Experience, The Beryl Institute website. Available at www.theberylinstitute.org. Accessed 30 April 2018.
2. Denkin N, Lincoln Y. Handbook on qualitative research. Thousand Oaks, CA: Sage Publishing Company; 1994.
3. Patton M. Qualitative research and evaluation methods. Thousand Oaks, CA: Sage Publishing Company; 2002.
4. Taylor G. Integrating quantitative and qualitative methods in research. New York: University Press of America; 2004.
5. Sugarbaker P. Peritonectomy procedures. *Ann Surg*. 1995;221(1): 29–42.
6. Verwaal VJ, van Ruth S, de Bree E, van Sloothen GW, van Tinteren H, Boot H, et al. Randomized trial of cytoreduction and hyperthermic intraperitoneal chemotherapy versus systemic chemotherapy and palliative surgery in patients with peritoneal carcinomatosis of colorectal cancer. *J Clin Oncol*. 2003;21(20): 3737–43.
7. Glehen O, Kwiatkowski F, Sugarbaker PH, Elias D, Levine EA, De Simone M, et al. Cytoreductive surgery combined with perioperative intraperitoneal chemotherapy for the management of peritoneal carcinomatosis from colorectal cancer: a multi-institutional study. *J Clin Oncol*. 2004;22(16):3284–92.
8. Dodson RM, McQuellon RP, Mogal HD, Duckworth KE, Russell GB, Votanopoulos KI, et al. Quality-of-life evaluation after cytoreductive surgery with hyperthermic intraperitoneal chemotherapy. *Ann Surg Oncol*. 2016;23 Suppl 5:772–783.
9. Haslinger M, Francescutti V, Attwood K, McCart JA, Fakih M, Kane JM 3rd, et al. A contemporary analysis of morbidity and outcomes in cytoreduction/hyperthermic intraperitoneal chemoperfusion. *Cancer Med*. 2013;2(3):334–42.
10. Eriksson H, Haglund K, Leo Swenne C, Arakelian E. Patients’ experiences of postoperative health related to cytoreductive surgery and hyperthermic intraoperative chemotherapy. *J Clin Nurs*. 2014;23(1–2):201–10.
11. Leo Swenne C, Cederholm K, Gustafsson M, Arakelian E. Postoperative health and patients’ experiences of efficiency and quality of care after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy, two to six months after surgery. *Eur J Oncol Nurs*. 2015;19:191–197.
12. Maciver AH, Al-Sukhni E, Esquivel J, Skitzki JJ, Kane JM 3rd, Francescutti VA. Current delivery of hyperthermic intraperitoneal chemotherapy with cytoreductive surgery (CS/HIPEC) and perioperative practices: an international survey of high-volume surgeons. *Ann Surg Oncol*. 2017;24(4):923–930.
13. Werner BC, Wong AC, Chang B, Craig EV, Dines DM, Warren RF, et al. Depression and patient-reported outcomes following total shoulder arthroplasty. *J Bone Joint Surg Am*. 2017;99(8): 688–695.
14. Koorevaar RC, van’t Riet E, Gerritsen MJ, Madden K, Bulstra SK. The influence of preoperative and postoperative psychological symptoms of clinical outcome after shoulder surgery: a prospective longitudinal cohort study. *PLoS ONE*. 2016;11(11): e0166555.
15. Stenberg U, Cvancarova M, Ekstedt M, Olsson M, Ruland C. Family caregiver of cancer patients: perceived burden and symptoms during the early phases of cancer treatment. *Soc Work Health Care*. 2014;53(3):289–309.
16. Hung HC, Tsai MC, Chen SC, Liao CT, Chen YR, Liu JF. Change and predictors of social support in caregivers or newly diagnosed oral cavity cancer patients during the first 3 months after discharge. *Cancer Nurs*. 2013;36(6): E17–24.