

## Colorectal cancer and synchronous liver metastases

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## ***EJSO Submission***

# **Colorectal Cancer and Synchronous Liver Metastases: An Individual Case-based Qualitative Study (CoSMIC-Q).**

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## **ABSTRACT**

### **Background**

Contemporary management of colorectal cancer with synchronous liver metastases is complex. Although there is a large body of cohort data, there is no research exploring patient and clinician perspectives. This study explores the experiences and views of patients following treatment for colorectal cancer with synchronous liver metastases and the clinicians involved in their care.

### **Methods**

This is a qualitative study based on interviews with patients who had completed treatment for colorectal cancer with synchronous liver metastases and their treating clinicians. The interviews were recorded, transcribed and analysed using thematic analysis methods. Codes were developed both horizontally regarding each interview as a standalone hermeneutic unit and vertically by scanning across interviews for specific terms.

### **Results**

Four overarching themes emerged: patients' experience of initial diagnosis, involvement in treatment, views on the order of staged resections and views about research. For patients, the first consultation is critically important. Patients generally perceived sufficient autonomy in decision-making. In treatment options there is a preference for synchronous surgery balanced by an understanding of the greater risk. Patients did not want liver-first surgery due to the perceived risk of continued seeding from an *in situ* primary tumour. Clinicians accepted limited evidence for decision making but felt that trials of treatment sequencing were not feasible.

### **Conclusions**

This first qualitative study explores patients' perceptions in colorectal cancer with synchronous liver metastases that are not possible to obtain from quantitative data. CoSMIC-Q demonstrates the importance of incorporating patients' views into treatment planning particularly where equipoise exists in surgical sequence.

(Word count 250).

### **CRedit (Contributor roles taxonomy) statement**

Anthony KC Chan: Conceptualization (shared role), methodology, interviews and analysis, writing and reviewing final draft. Agnieszka M Ignatowicz: Conceptualization (shared role), methodology, interviews and analysis, writing and reviewing final draft. James M Mason: Conceptualization (shared role), methodology, writing and reviewing final draft. Ajith K Siriwardena: Conceptualization (shared role), analysis, writing and reviewing final draft.

## Introduction

Contemporary management of patients with colorectal cancer and synchronous liver metastases is complex.<sup>1,2</sup> North American and European guidelines recommend multi-modality treatment comprising systemic chemotherapy, radiotherapy for locally advanced rectal tumours and surgical resection of both primary tumour and liver metastases for those with good performance status and resectable disease.<sup>3,4</sup> In terms of sequence of surgery, the CoSMIC study reported equivalent outcomes after synchronous, liver-first or bowel-first approaches in a prospective cohort.<sup>5</sup> In practice, patients typically have a bespoke treatment plan which is based on the pattern of disease at first presentation and which may later be modified according to subsequent disease course.<sup>6</sup> Although patients' preferences and patient-reported outcomes of treatment are increasingly recognised as important, there is a dearth of information on the perspectives and preferences of individuals facing these cancer treatment pathways. For those with colorectal cancer and synchronous liver metastases who have an acute presentation with peritonitis or obstruction, it is understandable that the illness dictates clinician-led decision making. With elective presentations, involvement of the patient in this decision making is important as the balance of risk and benefit varies between management plans. For example, synchronous surgery avoids the need for two operations and in the only randomized comparison to staged surgery was associated with better long-term survival but this may possibly be at the risk of greater peri-operative morbidity.<sup>7</sup> Neoadjuvant chemotherapy treats occult micrometastatic disease but may allow disease progression at either the primary tumour site, liver metastases or elsewhere.<sup>8</sup> The liver-first approach has the unique advantage of allowing non-operative "watch and wait" management of a rectal tumour if there is a complete response but this is at the risk of local progression in non- or partial responders.<sup>9,10</sup> All these represent situations where patient preference could and should be incorporated into treatment planning. Yet, despite the large body of clinical cohort evidence on the management of patients with colorectal cancer and synchronous liver metastases, there are very little data on the important issue of

the patient's perspective. This study explores patients' and clinicians' views and preferences with regards to the treatment of colorectal cancer with synchronous liver metastases.

## **Methods**

### *Design*

This was a qualitative, interview-based study of patients with colorectal cancer and synchronous liver metastases who were already participating in an inception cohort study (CoSMIC main study) and clinicians involved in the care of this group.<sup>5</sup> Patients were selected from all three treatment pathways (synchronous surgery, liver-first surgery, bowel-first surgery). Consultant-level (attending) clinicians involved in the management of this group of patients were interviewed, being drawn from the specialties of hepatobiliary surgery, colorectal surgery, radiology, anaesthesia/critical care and oncology.

### *Setting*

The study was set in the regional specialist hepatobiliary cancer service of the Manchester Royal Infirmary.

### *Participants*

#### *i) Patients*

All patients in this study were recruited after completion of their allocated treatment pathway. Patients had already enrolled in the main CoSMIC study, for which the inclusion/exclusion criteria have been reported elsewhere.<sup>11</sup> In brief, patients were over 18 years of age and able to give informed consent. For patients whose first language was not English, translator services were utilised. A purposeful sampling strategy using knowledge of the cohort was used to ensure a relatively equal number of



patients in each treatment group. Nine patients and their relatives were interviewed in this study. The demographic details of patient interviewees and their relatives are shown in table 1.

### *ii) Clinicians*

Nine clinicians who were involved in the care of patients with colorectal cancer and synchronous liver metastases were interviewed. The clinician cohort comprised three hepatobiliary surgeons, three colorectal surgeons, an oncologist, a radiologist and an intensive care physician. The clinician interviewees had no knowledge of the identity of the patient interviewees.

### *Data collection*

#### *i) Patient interviews*

An interview guide was developed after reviewing the literature and was based on previous work in the area of patient experience in cancer services (Table 2).<sup>12</sup> The interview explored with patients: the experience and perceptions of the disease; the impact of the diagnosis; the process of the patient's decision making and understanding of their treatment and subsequent management. Interviews also sought information on patients' perceptions of research in this area and the acceptability of entering into any future randomised trial of the management pathways for patients with colorectal cancer and synchronous liver metastases. Standard starter questions were used as touchstones to initiate discussion, but patients were also able to freely express other views.

All interview questions were open-ended, except where a specific answer was sought (such as 'would you choose to take part in a future trial?') when a closed question would be asked. Interviewees (and relatives where present) were given as much time as needed for the interview. Individual interviews were stopped if there was any sign of emotional distress on the part of either the patient or their relatives. For any issues raised, the relevant clinical team were contacted with the patient's consent.

## *ii) Clinician interviews*

As with the patient interview guide, the clinician interview guide was developed after reviewing the relevant literature. Interview questions explored: the experience of providing care and in particular the clinicians' perspectives and views of treatment pathways; difficulties and challenges around treatment allocation; the decision-making processes; and the clinicians' relationship with patients. Clinicians' views on the acceptability of, and barriers to, entering patients into any future randomized trial of treatment sequencing were sought. The clinician interview guide is seen in Table 3.

## *Data analysis*

Interviews were audio recorded, transcribed verbatim and anonymised. NVivo (QSR International Ltd. Melbourne, Australia) software was used to manage these data. Interviews were analysed thematically, using constant comparison within a modified framework approach.<sup>13,14</sup> Data analysis was undertaken by two authors of this manuscript. Codes were developed both horizontally by coding each interview as a discrete hermeneutic unit and vertically by scanning across the interviews for specific terms.<sup>15</sup> Data from patients and clinicians were analysed separately but followed the same process. First, a sample of interview transcripts was read to identify the initial set of codes. This generated a coding framework that was discussed between authors and then used to code all remaining interview transcripts. Codes were gradually built into broader categories and themes through comparison across transcripts. Recognizing the complexity and diversity of the information gathered through the interviews, a matrix of main themes was developed from patients and clinicians.

## *Quality Control Measures*

All interviews were recorded and transcribed verbatim by a single transcriptionist. Data analyses and extraction of theme-significant statements were independently performed by two authors (AKCC, AMI).

Participants were given the option to receive their transcription by post, so that they could provide feedback although none took up this offer.

#### *Consolidated criteria for reporting qualitative research checklist*

The consolidated criteria for reporting qualitative research (COREQ) were used as a framework for the CoSMIC-Q study.<sup>16</sup> The completed checklist is shown in the Appendix.

#### *Ethics Approval*

The study was approved by the NHS Research Ethics Committee (South Central – Oxford C Research Ethics Committee) on the 2<sup>nd</sup> November 2016 (REC reference 16/SC/0610). Site-specific approval was obtained from the host institution.

## Results

Nineteen categories were extracted from transcripts of the patient interviews and twenty from the clinician interviews. These categories can be seen in Tables 4 and 5 respectively. Four integrated major themes were identified and can be seen in Figure 1. These are: i) Patients' experience of initial diagnosis and perceptions of cancer; ii) Patients' involvement in decisions about treatment; iii) Patients' and clinicians' views on the order of staged resections; iv) Patients' and clinicians' views on research in synchronous disease. Each theme is described in detail below.

### *i) Patients' experience of initial diagnosis and perceptions of cancer*

In relation to the first consultations, patients recalled the initial diagnosis in detail with delays perceived negatively. They talked about the initial symptoms (or lack of symptoms) that led to their eventual diagnosis and had mixed reactions to being given a diagnosis of metastatic colorectal cancer. For some, it was a surprise given that their health was otherwise very good, but for others, the diagnosis was expected. Patients mentioned that upon hearing the word "cancer", they did not remember much else from that point onwards in the consultation and relied on relatives who were present to lead the discussions.

In relation to perceptions of cancer, being told that the cancer had already spread elicited feelings of hopelessness and futility. The information given was perceived as sufficient, and no patients said that they either were not provided with enough information or were unclear about the treatment plan.

Whether or not a stoma would be required was important to patients. Travelling to different hospitals for specialist care and follow-up appointments were not perceived to be barriers to treatment.

### *ii) Patients' involvement in decisions about treatment*

The majority of patients were satisfied with the autonomy given to them to decide the sequence of treatment. Some patients questioned whether they had a genuine choice in terms of selecting treatment pathway.

Patients tended to trust their specialist to advise them on the best treatment plan. For some, where there was a clear indication for a particular treatment pathway (for example, bowel- first strategy for patients with features of intestinal obstruction), there was no desire to deviate from that pathway.

Patients were also confident in the decisions made by their treating clinicians and no patient (or their families) felt that the wrong decision about their surgical strategy had been made, even when they had either suffered peri-operative complications or recurrence of disease at the time of the interview.

Clinicians usually reported that during the conversations about treatment, patients expressed a preference for the first surgery to remove the bowel primary. Thus, for bowel-first and synchronous surgical strategies, clinicians felt that it was an easier discussion to have with their patients regarding surgery than for a liver-first approach. There was a common perception amongst patients and clinicians that the liver-first surgery would not treat the problem at the earliest opportunity. Clinicians agreed that there was no definitive common treatment pathway for patients with colorectal cancer and synchronous liver metastatic disease, particularly for those who were asymptomatic or not requiring emergency colorectal surgical intervention. Therefore, clinicians felt that treatment should be discussed with patients and individualised given the complexities and the number of variables to consider.

### *iii) Patients' and clinicians' views on the order of staged resections*

Patients preferred a bowel-first strategy, perceiving the primary to continually seed the body with metastases. Neoadjuvant chemotherapy offered little reassurance for disease control. They also discussed their preference for a single synchronous resection rather than two separate operations.

Shorter recovery time and hospital stay were the most commonly cited reasons for choosing a single

operation. Age and poor general fitness, together with longer anaesthesia and operation times, were highlighted as reasons for not having a synchronous operation.

Clinicians considered the bowel primary tumour as the source of metastatic disease and expressed a view that leaving this *in situ* risked further seeding of tumour. They were also concerned that leaving the bowel primary *in situ* risked the subsequent development of either obstruction or perforation. The settings for a liver-first resection were limited with the sole indication being the 'therapeutic window' between long course chemoradiotherapy and bowel resection for patients with rectal cancer.

The general consensus from clinicians was that synchronous resections could be performed safely, providing patients were deemed fit enough and if both the liver metastatic disease and bowel primary were deemed 'minor' resections. Factors such as tumour bulk that would prolong resection time were seen as favouring a staged rather than a synchronous approach. Colorectal surgeons were more likely to consider a covering stoma during a synchronous resection than during a staged resection. The reasons stated were mainly the severity of compromise of the patient's physiologic status during a prolonged procedure together with the potential for greater intra-operative blood loss during synchronous surgery.

#### *iv) Patients' and clinicians' views about research in synchronous disease*

In general, patients and their relatives were of the view that taking part in medical research would be desirable knowing that it would directly benefit those with the same disease in the future. No patients expressed ethical concerns about potential studies requiring randomized allocation to different surgical strategies. However, patients expressed strong views about personally not wanting a liver-first strategy. With regard to a randomised trial comparing staged to synchronous surgery, some patients had reasoned that the primary tumour was 'seeding' the liver and so explicitly stated that they would not have wanted to participate.

Clinicians had mixed opinions about the ethical correctness of any future randomised trial that would involve changing the order of surgical sequence specifically for research purposes. However, they conceded that there was currently no strong evidence-base to support clinical decision making. Other areas of uncertainty identified by clinicians included quality of life and any long-term benefit between staged and synchronous surgery.

## Discussion

This is thought to be the first qualitative study exploring the perceptions of patients with colorectal cancer and synchronous liver metastases together with the views of their clinical team. There are several novel findings from this study that cannot be drawn from traditional quantitative studies. First, the patient experience and disease perceptions of metastatic colorectal cancer were similar to the two mind-sets of 'public image' of cancer as described by Robb and colleagues.<sup>17</sup> The first is the rapid sense of dread and imminent death which patients in this study have described. The second is a rational reaction whereby patients accept that their condition is manageable and associated with the hope of a cure. The importance of the first consultation outlining diagnosis and management is emphasised as a simple but important message.

The majority of patients interviewed in this study were satisfied with the level of autonomy during their treatment journey and trusted their clinicians to make the right decisions for them. Despite the lack of research evidence to support their treatment strategy, no patients considered this to be an issue. The beliefs patients held about metastatic colorectal cancer were that the bowel primary was continually seeding the body and that they would not have control until the primary was removed. Chemotherapy provided little reassurance to prevent seeding if the primary tumour remained *in situ*. This belief about the bowel primary and continual seeding was psychologically very strong to the point where if patients were invited to participate in a randomised controlled trial assessing synchronous and staged surgery including the liver-first route, some would not take part because they would favour a bowel-first strategy. Patients undergoing the liver-first approach questioned why they had undergone resection of metastatic disease first but trusted their clinician's decision-making.

Synchronous surgery has the advantage of removing the entire macroscopic tumour burden in one operation. As expected, patients would prefer this option if possible in order to avoid two separate operations. Patients and their relatives understood the greater burden of a synchronous resection in terms of operating time and perioperative risk. Patients who had a staged resection were happy with



their treatment plan and said that they would not have wanted a synchronous resection. These perceptions were also mirrored by the patients' relatives.

Interviews with clinicians revealed a juxtaposition of uncertainty about evidence for the sequence of surgery with an apparently firmly-held belief that they understood the best pathway for individual patients while accepting the apparent lack of equipoise. Established beliefs and consequent patterns of clinical management appeared empirically entrenched. Thus, there was an expressed reticence to participate in trials while at the same time acknowledging the lack of an evidence base for the sequence of care. Clinicians appeared unaware that patient beliefs affirming their views of surgical management may simply reflect the explanations provided to them or the lack of patient autonomy. Interestingly, the hepatobiliary surgeons interviewed in this study also favoured a bowel-first resection strategy to prevent the occurrence of colorectal emergencies such as obstruction or perforation and also to stop further 'seeding of tumour'. The implications from these views may also extend into the research setting where clinicians may show a bias towards a bowel-first resection strategy and a reluctance to recruit to sequence randomization studies.

The findings presented within this manuscript need to be interpreted taking into consideration the study's limitations. The participant recruitment was limited to one study site, included only patients who had completed their treatment pathway and it is possible that only patients who were more positive about their cancer care were recruited. Therefore, the results may not be applicable to other settings. However, the experience of participants was found to be consistent across the sample. A second limitation is the sample size of the study. Samples in qualitative research tend to be smaller to support the depth of case-orientated analysis that is fundamental to this mode of inquiry.

The study's strength lies in the fact that it explored not only the experiences of patients, but also included the views of their clinicians.

In conclusion, this first qualitative study of the treatment experience of patients with colorectal cancer and synchronous liver metastases, demonstrates the importance of honest, detailed communication

with patients, the need to incorporate patients' views into formulating individual treatment algorithms and the likely lack of patient support for any randomized study of staged versus synchronous surgery. The interviews with clinicians showed relatively firmly held views despite the lack of corroborative evidence. This study provides evidence that patient views and their reported outcomes must be incorporated into future studies of the management of colorectal cancer with synchronous liver metastases.

[word count 3,159].

## **Acknowledgements**

We dedicate this study to Lolita Chan.

**Table 1: Demographic details of patient interviewees.**

<b>Patient ID</b>	<b>Sex</b>	<b>Age (years)</b>	<b>Surgery Sequence</b>	<b>Relative present</b>	<b>Interview length (min:sec)</b>
1	Female	66	Liver First	Husband	52:17
2	Male	70	Synchronous	Wife	34:00
3	Male	49	Bowel First	None	32:59
4	Male	64	Liver First	Son	22:19
5	Female	58	Bowel First	None	35:07
6	Male	63	Synchronous	Wife	16:09
7	Male	54	Bowel First	None	81:51
8	Male	56	Synchronous	None	48:48
9	Female	69	Bowel First	Husband	68:27

**Table 2: Outline of patient interview.**

<b>Introduction</b>
<p>Introduction of researcher            Reminder of the study, and confirmation that the participant still wishes to proceed            Explanation of what happens to the data            - Interviews will be audio recorded, and all recordings will be stored securely            - For analysis, the recording will be transcribed and anonymised            Reminder that the interviewee can stop the interview at any time</p>
<b>Opening Question</b>
Tell me about your experience of illness?
<b>Focusing on the Diagnosis</b>
<p>Tell me about your diagnosis. How were you informed of your diagnosis?  <i>Probes:</i>  <i>Did you feel you were given enough information in a way you could understand?</i>  <i>What were your expectations for treatment after being told of your diagnosis?</i>  <i>Were you told which consultant has overall responsibility for your care?</i></p>
<b>Focusing on the Treatment</b>
<p>Tell me about your treatment.  <i>Probes:</i>  <i>What were the aspects that you found particularly good, and which were particularly worrisome?</i>  <i>At the outset, how much information did you receive about the treatment proposed?</i>  <i>Was it given in a way you could understand?</i>  <i>Did you feel you had a say in the treatment proposed to you?</i>  <i>Is there anything that could have been done to make your experience better?</i></p> <p><i>[For staged-surgery patients]</i>  <i>Did your surgeon explain to you why you had your bowel/liver operation first?</i>  <i>Did you feel you had a choice between bowel-first or liver-first surgery?</i>  <i>Would you have had a preference?</i></p> <p><i>[For synchronous resection]</i>  <i>Did your surgeon explain to you why you had a bowel/liver operation rather than a two-stage procedure?</i>  <i>Did you feel you had a choice between a synchronous resection or a two-stage procedure?</i>  <i>Would you have had a preference?</i></p>
<b>Focusing on Research</b>
<p>I would like to talk to you about a potential research idea. If we were to design a research study that would compare patients having bowel-first and liver-first surgery:            How do you feel about allocating patients to one of these groups?            What are the main issues that would concern you for this approach?            Hypothetically, would you choose to take part in such a trial?</p>
<b>Closing the Interview</b>
Any questions from interviewee, and reminder of study contact details

**Table 3: Outline of Clinician Interview.**

<b>Introduction</b>
Introduction of researcher Reminder of the study, and confirmation that the participant still wishes to proceed Explanation of what happens to the data - Interviews will be audio recorded, and all recordings will be stored securely - For analysis, the recording will be transcribed and anonymised Reminder that the interviewee can stop the interview at any time
<b>Opening Question</b>
Tell me about your experiences in managing patients with synchronous colorectal cancer and liver-limited metastases
<b>Focusing on the Current Treatment Pathways</b>
What are the main issues in treatment allocation and decision-making? <i>Probes:</i> <i>Do you feel there is consensus at the MDT?</i> <i>Are your patients happy with the current treatment pathways?</i> <i>What are your views on bowel-first and liver-first resections?</i> <i>What factors are important for selecting patients for synchronous resections?</i> <i>What do you feel are the current challenges to treating synchronous patients?</i>
<b>Focusing on Research</b>
I would like to talk to you about a potential research idea. If we were to design a research study that would compare patients having bowel-first and liver-first surgery: How do you feel about allocating one of your patients to one of these groups? What are the main issues (both ethical and clinical) that would concern you for this approach?
<b>Closing the Interview</b>
Any questions from interviewee, and reminder of study contact details

**Table 4. Categories identified from the interviews with patients.**

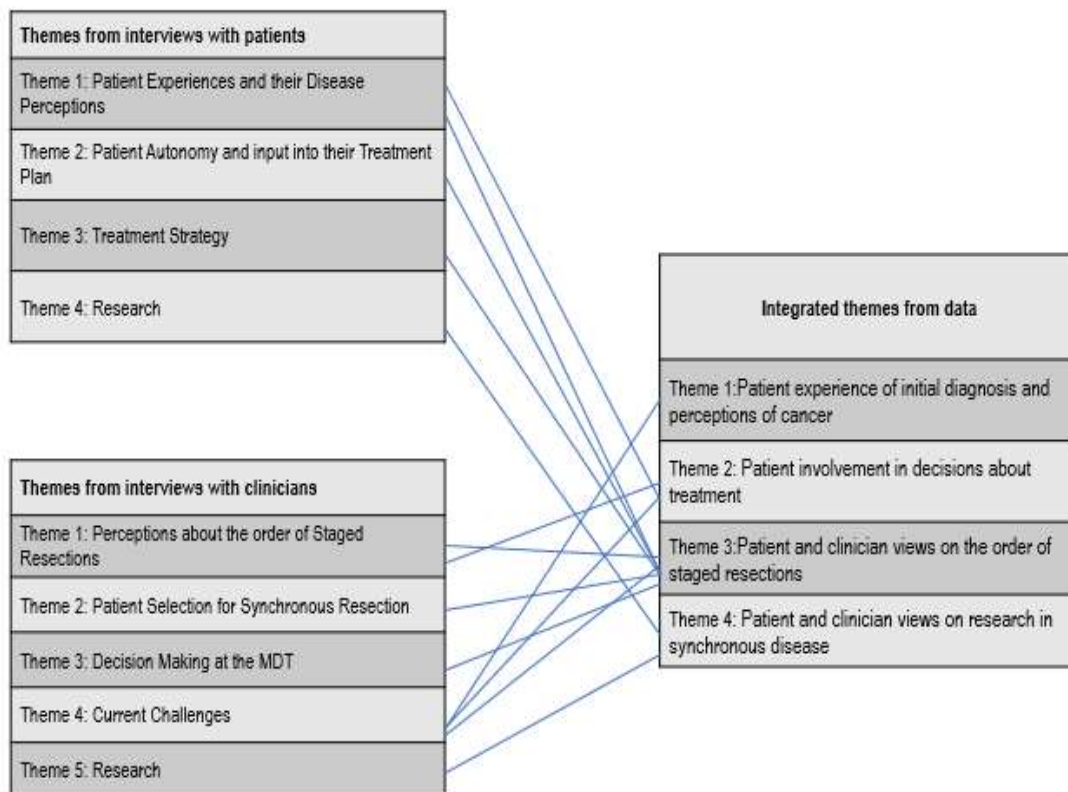
<b>Categories identified from the interviews with patients</b>
Personal experience/journey
Delayed or misdiagnosis
Patient's own perception of disease
Understanding of surgical sequence
Postoperative recovery period
Monitoring factors (such as CEA)
Alternative / complementary therapies
Problems during hospital stay
Preference for a particular surgical sequence
Involvement in the treatment decision making process
Future research in synchronous disease
Acceptability of RCTs in synchronous disease
Stomas
Support from healthcare services
Perceptions on synchronous surgical surgery
Travelling to different hospitals for treatment
Information about their illness (written/internet)
Laparoscopic / open surgery
Communication problems

**Table 5. Categories identified from the interviews with clinicians.**

<b>Categories identified from the interviews with clinicians</b>
MDT decision-making
Factors important when considering synchronous resection
When to consider neoadjuvant chemotherapy
Order of staged resections (bowel- or liver-first)
Current evidence/guidelines for deciding surgical strategy
Discussing treatment plans with patients
Patient perspectives as understood by a clinician
Feasibility of RCTs in synchronous disease
Quality of life and surgical strategy
Clinical rationale for liver-first surgery
Clinician's approach to synchronous disease
Clinical rationale for bowel-first surgery
Important factors when considering staged resection
Laparoscopic surgery and synchronous disease
Pre-habilitation / Preoperative optimisation
Pathway failure
Stoma formation
Personalised medicine
Bowel or liver first during synchronous resection
Problems in planning a synchronous resection



Figure 1. Map of integrated themes from clinician and patient interviews



## Table and Figure Legends

### **Table 1: Demographic details of patient interviewees.**

Detail on patients and their relatives together with information on duration of interview. Min = minutes.  
Sec = seconds.

### **Table 2: Outline of patient interview.**

Table provides a summary of introduction, opening question and probes on diagnosis, treatment and research together with closing statements.

### **Table 3: Outline of clinician interview.**

MDT, Multidisciplinary Team. Table provides a summary of introduction, opening question and probes on current treatment pathways, research and closing statement.

### **Table 4. Categories identified from patient interviews.**

List of the nineteen categories identified from interviews with patients.

### **Table 5. Categories identified from clinician interviews.**

List of twenty categories identified from interviews with clinicians.

### **Figure 1. Thematic map of integrated themes from clinician and patient interviews**

Grouping of themes from interviews from patients and clinicians to form integrated themes.

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## Appendix – COREQ Checklist

<b>DOMAIN 1: RESEARCH TEAM AND REFLEXIVITY</b>			
<b>Personal Characteristics</b>			
		<b>Interviewer AKCC</b>	<b>Interviewer AMI</b>
1	Interviewer / Facilitator	Both authors conducted the interviews	
2	Credentials	BSc, MBChB, MPhil, FRCS,	BSc, MA, PhD
3	Occupation	Surgical Trainee	Qualitative Researcher
4	Gender	Male	Female
5	Experience & Training	Doctoral training	Qualitative research methodology expert
<b>Relationship with Participants</b>			
6	Relationship established	AKCC involved with the clinical care of patients and previous involvement with CoSMIC	No prior relationship
7	Participant knowledge of the interviewer	All participants have met AKCC through either the CoSMIC study or in the clinical setting, prior to being approached about the current study.	No prior knowledge
8	Interviewer characteristics	AKCC has a clinical background and a subspecialty interest in HPB oncology.	AMI is a trained qualitative researcher with over seven ten years' experience of conducting qualitative health research with patients and clinicians
<b>DOMAIN 2: STUDY DESIGN</b>			
<b>Theoretical Framework</b>			
9	Methodological orientation and Theory	An interpretive qualitative approach was used.	
<b>Participant selection</b>			
10	Sampling	Purposive sampling was used.	

11	Method of approach	All participants were approached either during direct contact in the outpatient clinic or over the telephone.
12	Sample size	At least two patients in each group until data saturation. Each participant was offered the opportunity to have a close family member present to take part in the interview.
13	Non-participation	-
<b>Setting</b>		
14	Setting of data collection	All interviews took place in a private interview room.
15	Presence of non-participants	Spouses or family members were present during the interview in five out of nine patient interviews.
16	Description of sample	Patients diagnosed with synchronous colorectal cancer with liver-limited metastases and who have successfully completed their surgical treatment pathway (either bowel-first, liver-first or simultaneous bowel/liver surgery).
<b>Data collection</b>		
17	Interview guide	Guiding questions were produced prior to the interviews and used as prompts when necessary.
18	Repeat interviews	No.
19	Audio/Visual recording	Audio recording
20	Field Notes	Field notes were made immediately after each interview
21	Duration	30-45 minutes.
22	Data saturation	Data saturation was reached after seven interviews in both the patient and clinician arms of the study
23	Transcripts returned	Participants were given the option of receiving their transcript to allow feedback to the research team.
<b>DOMAIN 3: ANALYSIS AND FINDINGS</b>		
<b>Data Analysis</b>		
24	Number of data coders	Authors AKCC and AMI coded the data

25	Description of the coding tree	Thematically, using constant comparison method.
26	Derivation of themes	Authors AKCC and AMI derived common themes from the data
27	Software	NVivo
28	Participant checking	Participants were given the option of receiving their transcript to allow feedback to the research team.
<b>Reporting</b>		
29	Quotations presented	No.
30	Data and findings consistent	Yes
31	Clarity of major themes	Themes are presented clearly as subheadings in the results section and illustrated in the figure.
32	Clarity of minor themes	There is a description of minor themes within the major themes identified in the results section and illustrated in the figure.