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Case Report

Metastatic Colon Cancer – An Effective Treatment Protocol of Integrative Therapies Including Electromagnetic Field Frequencies: A Case Report

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Abstract
Introduction: Colorectal cancer is the third most common cancer worldwide, with 25% of patients being diagnosed with metastatic disease, mostly in the liver, resulting in poor survival. Standard treatment of stage-IV colorectal cancer consists of primary tumour resection followed by chemotherapy. ***Case Presentation:*** Here, we report on the treatment effectiveness using integrative therapies in a 52-year-old male with metastatic colon cancer and liver lesions to achieve stable partial remission with an overall high level of wellbeing. After surgical removal of the primary tumour, the 8-month integrative treatment regime consisted of standard anti-angiogenesis treatment, as well as multiple non-standard but evidence-based therapies, including high-dose intravenous nutrients and herbal therapies, oral intake of repurposed medication and nutritional supplements, and a 4-month targeted electromagnetic field/Rife frequency therapy. ***Conclusion:*** The integrative therapies used in this case study were highly tolerable and effective in the treatment of metastatic colon cancer with liver lesions, achieving substantial tumour response and stable partial remission with a high level of wellbeing.

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Introduction

Colorectal cancer (CRC) or bowel cancer is the third most commonly diagnosed cancer, with an estimated 1.8 million new cases worldwide in 2018 and 15,700 cases in Australia in 2022 [1, 2]. Approximately 25% of CRCs are stage-IV at initial diagnosis, with metastasis found most frequently in the liver [1–4]. CRC is the second leading cause of cancer-related death worldwide [2]. The 5-year relative survival rate for metastatic stage-IV bowel cancer is low, between 10 and 15% [3, 4], and up to 30% in patients with resectable metastatic disease [2, 5].

The first-line treatment for stage-IV CRC after surgery of the primary tumour is chemotherapy with FOLFOX (folinic acid, fluorouracil, and oxaliplatin) or CAPOX (capecitabine and oxaliplatin) [2]. However, remission has been rare in stage-IV CRC patients [5].

Here, we describe a case of partial remission of metastatic CRC within 8 months using an integrative treatment approach with both standard drugs and non-standard therapies. After surgical removal of the primary tumour in the colon, integrative treatment included standard anti-angiogenesis therapy, high-dose herbal and nutrient intravenous (IV) therapies, a combination of repurposed medication and nutritional supplements, and electromagnetic field (EMF)/Rife frequency therapy. The patient remained in stable partial remission 6 months after completion of treatment, evident through follow-up magnetic resonance imaging (MRI).

Case Report

A 52-year-old male with severe abdominal pain was presented to emergency in November 2021 after several days of increasing abdominal bloating, distension, and intermittent diarrhoea. The patient had a history of similar episodes in the past year and a half; however, previous investigations, including a colonoscopy after a positive faecal occult blood test in December 2019, noted some polyps but did not find any malignancies. At the time of admission to the hospital in November 2021, the patient's blood test results revealed mild microcytic hypochromic anaemia with low mean cell haemoglobin (MCH = 24 pg, reference range 27–34 pg) and low mean cell volume (MCV = 75 fL, reference range 80–100 fL) and elevated C-reactive protein (CRP = 160 mg/L, reference range <1 mg/L), while the gastroscopy appeared normal.

A computed tomographic scan showed a thickened distant terminal ileum and small bowel obstruction (Fig. 1). Due to the patient's severe symptoms, a colonoscopy was performed shortly after and found a malignant-appearing lesion protruding from the terminal ileum extending into the cecum, consistent with cancer. Biopsies were taken and pathology confirmed colon cancer, specifically G1 low-grade adenocarcinoma arising from a tubulovilous adenoma with high-grade dysplasia. The patient underwent right hemicolectomy surgery by laparotomy, with the extraction of adjacent lymph nodes. Suspected malignant adhesions of the tumour to the abdominal wall and retroperitoneal soft tissue were noted. Involvement of two out of 20 lymph nodes led to the initial diagnosis of T4bN1M0 Stage-III colonic adenocarcinoma arising from the cecum (November 21) (Table 1).

Immunohistochemistry on the biopsied tumour revealed proficiency in mismatch repair proteins, including MLH1, PMS2, MSH2, and MSH6. Further investigations using transcriptomic DNA microarrays identified mutations in proto-oncogenes, including KRAS, HRAS, and NRAS. Blood cancer markers of carcinoembryonic antigen were in the normal range (<8.5 µg/L). Immunocytochemistry on cancer cells with monoclonal antibodies of a range of 18 chemotherapy agents identified bevacizumab as the most potent agent in this case (30% vs.

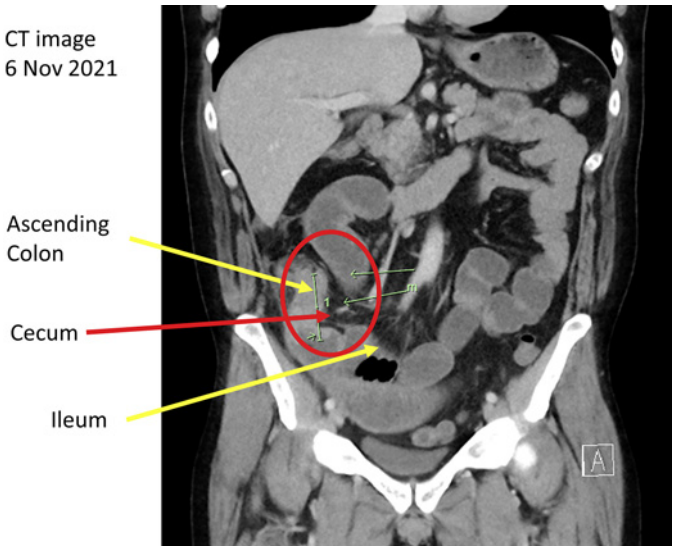

Fig. 1. Location of suspected primary tumour by computed tomography imaging. The patient's colorectal primary tumour, arising in the cecum (red arrow), a pouch connected to the junction of the small and large intestines, appeared as small bowel obstruction (black area in red circle) measuring 5.17 cm in length (green arrows). Pathology of the resected tissue confirmed a G1 low-grade adenocarcinoma with adhesion to the abdominal wall and soft tissue and involvement of two out of 20 lymph nodes. The T4bN1 tumour was removed by right hemicolectomy.

15% ramucirumab vs. 0% for all other agents tested; Onconomics Plus Test by RGCC, Switzerland; https://rgcc-international.com/tests/onconomics-plus-rgcc/) (Table 1).

The patient recovered well with a soft abdomen, was back to usual activities and diet, and had normal bowel motions 1 week after surgery. The patient was advised by his oncologist in December 2021 on follow-up chemotherapy and subsequent resection of liver metastases. Suggested chemotherapy would have involved FOLFOX for 6 months or 3 months of CAPOX, but the patient declined chemotherapy. Around the same time, the patient sought advice on other treatment options and discussed an integrative treatment approach (Table 1).

The integrative treatment approach included a package of (a) intravenous nutrients and herbs such as high-dose vitamin C, curcumin, quercetin, and artemisinin [6, 7], (b) anti-angiogenesis therapy with IV bevacizumab [8], (c) the Repurposing-Drugs-in-Oncology (ReDO) protocol combining daily oral intake of 16 repurposed prescription medications and nutrients and herbs [9], and (d) EMF, Rife frequency treatment [10, 11]. Tables 1, 2 and online supplementary Tables S1–S2 (for all online suppl. material, see https://doi.org/10.1159/000534628).

Table 2 outlines the treatment details, including dosages, frequency, duration, and total number of treatment sessions. Online supplementary Table S1 lists the EMF frequencies used in this case study. Online supplementary Table S2 provides mechanisms of action and references for the 17 medications and supplements used in the ReDO protocol.

The integrative therapies were provided in two stages, with the first 16-week long treatment stage (December 2021–May 2022), including IV therapies and the ReDO protocol, while EMF therapy was added to the treatment regime at a later stage (Table 1). During the first treatment period, 3 months after initial diagnosis, the patient underwent a restaging MRI scan, which revealed numerous (n = 5) metastases in the liver, mostly subcapsular and confined to the right lobe. The diagnosis was updated to metastatic colon cancer T4bN1 stage-IV (February 23, 2022) (Fig. 2 left, panel/before treatment).

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Table 1. Timeline of patient's cancer history

Timeline	Date	Patient's cancer history	Comments
Symptomatic pre-diagnosis	Dec 2019	Positive faecal blood test	Clear colonoscopy
	Jul 2020 – Oct 2021	Several episodes of intermittent abdominal pain, vomiting, diarrhoea	Hospitalised in Oct 21
Diagnosis and surgery	1 Nov 21	Abdominal bloating, distension, intermittent diarrhoea	Hospitalised, mild right iliac fossa discomfort on palpitation
	6 Nov 21	Bowel obstruction	By CT scan: thickened distant terminal ileum
		Abnormal blood tests	Mild microcytic hypochromic anaemia MCH = 24 pg (reference range 27–34 pg); MCV = 77 fL (reference range 80–100 fL)
			CRP mildly elevated 5 mg/L on 6 Nov 21 rising to 160 mg/L on 18 Nov 21
	11 Nov 21	Diagnosis: malignant lesion protruding from terminal ileum	Biopsy by colonoscopy and pathology
	16 Nov 21	Surgery	Right hemicolectomy by laparotomy
		Nov 21: T4bN1M0 Stage-III colonic adenocarcinoma; Feb 22: Metastatic Colon Cancer; T4bN1 Stage-IV and multiple liver lesions	Large caecal tumour described as G1 low grade adenocarcinoma, 2/20 positive lymph nodes; arising from a tubulovillous adenoma with high grade dysplasia; adhesion to right abdominal wall and retroperitoneum
			Immunohistochemistry on tumour tissue: proficient in MMR (mismatch repair) in MLH1, PMS2, MSH2, and MSH6
	21 Nov 21	Recovered well from surgery	Back to normal activities, eating, drinking, bowels working well, abdomen soft, non-tender
	Dec 21	Was advised on immediate chemotherapy, declined	Suggested chemotherapy: 6 months FOLFOX or 3 months CAPOX
		Oncogene testing; CTC-chemotherapy agent testing (Onconomics Plus by RGCC)	Mutations in RAS gene family including KRAS, HRAS, NRAS; favourable response to Bevacizumab
		Cancer marker CEA	3.6 μg/L (8/12/21); 1.6 (10/02/22); reference range <8.5 μg/L
Diagnosis updated 3 months later	23 Feb 22	Metastatic colon cancer; T4bN1 stage-IV and multiple liver lesions	Restating PET scan showed multiple liver lesions (L1–L5); mostly subcapsular confined to right lobe. L1: 12 mm junction of segment 7 and 8; L2: 6 mm peripheral segment 8; L3: 6 mm junction of segment 5 and 6; L4: 9 mm posteromedially segment 6; L5: 8 mm, segment 6; lung nodules stable
	Dec 21 – Sep 22	Discussed integrative treatment approach with Dr Eng	Treatment phase a: 10 weeks including IVC, IV curcumin, IV quercetin, artesunat, bevacizumab, ReDO protocol

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Table 1 (continued)

Timeline	Date	Patient's cancer history	Comments
Treatment phase a: 4 months	Dec 21	Vit B12 injection x 1	
	Dec 21 – Sep 22	IV vitamin C × 70	Twice weekly for 10 months
	Jan 22 – Sep 22	IV curcumin × 33	Once weekly for 8 months
	Jan 22 – Sep 22	IV quercetin × 33	Once weekly for 8 months
	Apr 22 – Jun 22	IV bevacizumab × 14	Once a week for 2 + 3 months
	Apr 22 – Sep 22	IV artesunate × 17	Once a week for 5 months
	Mar 22 – Jul 22	ReDO protocol	ReDO = Repurposing Drugs in Oncology = combination of 16 + drugs and nutrients (Table 2, Table S2)
Treatment phase b: additional EMF/Rife frequency 4 months	May 22 – Sep 22	EMF Rife frequency treatment × 40	Treatment stage 2: 2–3 × a week for 4 months, Rife frequency using Spooky-2, program cancer colon + liver + digestive system + BX + bacillus X filter carcinoma + XTRA (Table S1)
	May 22	Cancer screening test (CTC) test	To assess effectiveness of Rife frequency treatment; before Rife: 6.9 CTC/mL; After Rife: 2.0 CTC/mL
Check-up	13 Jul 22	Check-up: PET scan negative	No evidence of metabolically active disease, recurrence or metastasis
	22 Jul 22	MRI (liver): substantial tumour response, 1 visible lesion remaining -previously 5 liver lesions	Compared to previous examination (21/3/22), 1 visible lesion in superior portion of segment 7 remaining and reduced in diameter from L1: 12–9 mm; no other lesions visible
Treatment phase c	Aug – Sep 22	Helixor – Mistletoe injection × 4	Once a week for 5 weeks
	Aug – Sep 22	Oxygen therapy × 4	Once a week for 1 month
Follow-up	2 Mar 23	MRI (liver): stable disease	Stable disease, one small residual lesion with central cystic component very high in the right lobe in a subdiaphragmatic position, not enlarged in size. No evidence of new hepatic metastatic disease

CEA, carcinoembryonic antigen; CT, computed tomography; CTC, circulating tumour cell; CRP, C-reactive protein; EMF, electromagnetic frequency; MCH, mean cell haemoglobin; MCV, mean cell volume; MRI, magnetic resonance imaging; PET, positron emission tomography; RAS, oncogenes named after "Rat sarcoma"; RGCC, research genetic cancer centre (https://rgcc-international.com/tests/onconomics-plus-rgcc).

EMF, also known as "Rife frequency therapy" or "pulsed electromagnetic field therapy," was added to the treatment regime after 4 months of integrative therapies, to target the metastatic liver lesions. EMF therapy was provided as part of a research study (www.anzctr.org.au ACTRN12620000986976) using the Spooky-2 Frequency Generator with a plasma bulb. EMF uses low-energy waves in the radio frequency spectrum up to 5 MHz, and

frequencies were chosen from the Spooky-2 database to target colon cancer, liver cancer, and digestive system cancer (www.spooky2.com) (Fig. 3 and online supplementary Table S1).

To assess the treatment effect of EMF, we used the circulating tumour cell (CTC) blood test, also known as liquid biopsy, to compare CTC count before and after EMF/Rife frequency treatment. We specifically utilised the cytology-based internationally validated ISET (Isolation by SizE of Tumour)-CTC system developed by Rarecells Diagnostics (www.rarecells.com). CTCs are useful biomarkers to assess cancer risk and stage, with higher CTC counts indicating a greater risk of seeding further metastases distant from the primary tumour [12, 13].

In this case study, the CTC count in a sample of 10 mL of blood taken immediately before Rife treatment was compared to the CTC count 1 day after Rife treatment. CTC analysis revealed that the frequencies used for EMF treatment were effective in reducing the CTC count by 75% and therefore metastasising potential. Subsequently, EMF/Rife frequency therapy was included in the treatment regime, and the patient received 2–3 Rife frequency treatments weekly over the next 4 months to a total of 40 sessions.

Partial Remission

A check-up was performed in July 2022, after 8 months of integrative therapies and including four months of EMF/Rife frequency treatment following the updated diagnosis of metastatic colon cancer T4bN1 stage-IV (February 23, 2022), and revealed substantial tumour response to treatment. While five lesions of 6–12 mm in size in the liver were visible on the MRI on February 23, 2022, the follow-up MRI on July 22, 2022, showed only one remaining visible lesion of reduced size (12 mm–>9 mm) in segment 7 of the liver. Figure 2 illustrates comparative MRI scans of the liver at time of diagnosis before and after treatment. Furthermore, a positron emission tomography scan provided no evidence of metabolically active disease recurrence or metastasis.

Integrative therapies continued until September 2022, plus additional weekly injections with mistletoe (Helixor) and normobaric oxygen therapy for a month (5 L/min for 1 h) (Table 2). A follow-up low CTC count in October 2022, 11 months after initial diagnosis, supported the findings of a substantial tumour response to treatment. The patient tolerated the integrative therapies well, did not experience any adverse effects of the integrative treatment regime, and enjoyed an overall high level of wellbeing without restrictions in social or physical activities.

The partial remission of metastatic colon cancer with liver lesions achieved by primary tumour resection and an 8-month treatment regime of integrative therapies remained stable half a year later (March 2023), evident by a follow-up MRI scan of the liver, suggesting a long-term treatment effect. The CARE checklist was completed by the authors for this case report, attached as online supplementary material.

Discussion

In this case study of a 52-year-old male patient with metastatic CRC, we provide evidence for effective treatment of the metastatic liver lesions, using a combination of integrative therapies. After resection of the primary colorectal tumour, the patient was advised on chemotherapy and subsequent liver resection but refused. Current standard therapies for non-resectable metastatic CRC are not considered curable, in particular if arising from the cecum, and remission is rarely observed [5, 14].

In this case, the integrative therapy regime consisted of standard anti-angiogenesis treatment and multiple non-standard but evidence-based therapies, including high-dose IV

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Table 2. Treatment regime

Treatment	Mode	Dose	Frequency	Duration	Total number of treatments
IVC (sodium ascorbate)	IV	80 g	2× weekly	10 months	70
IV curcumin	IV	450 mg	1× weekly	8 months	33
IV quercetin	IV	500 mg	1× weekly	8 months	33
IV artesunate (artemisinin)	IV	250 mg	1× weekly	5 months	17
IV bevacizumab	IV	20 mg	1× weekly	20 weeks	14
Helixor (Mistletoe) – M series	Injection	1–30 mg	1× weekly	5 weeks	4
EMF/Rife frequency by Spooky-2	EMF/Rife frequency	Table S1 for frequencies	1–2× weekly	4 months	40
Normobaric oxygen by Oxymed	Nasal tube	1 ATA, 5 L/min for 1 h	1× weekly	1 month	4
REDO protocol includes (a) prescription medications					
Sodium phenylbutyrate	Oral	1–4 g/night	Daily	4 months	120
Dichloroacetate	Oral	500 mg × 2 in H_20	Daily	4 months	120
Metformin	Oral	500 mg × 1; 500 mg × 2	Daily	2 × 2 weeks (wk 1 + 2; wk 3 + 4)	28
Atorvastatin (+CoQ10 200 mg)	Oral	20 mg/night; 2 × 20 mg	Daily	2 × 2 weeks (wk 1 + 2; wk 3 + 4)	28
Dipyridamole	Oral	2 × 100 mg/day; 2 × 200 mg	Daily	4 months	120
Melatonin	Oral	4–6 × 60 mg	Daily	4 months	120
Doxycycline	Oral	2 × 50 mg	Daily	Month 1 + 3	30 + 30
Mebendazole	Oral	2 × 100 mg	Daily	Month 2 + 4	30 + 30
Fenbendazole	Oral	2 × 110 mg	Daily	4 months	120
Loratadine (anti-histamine)	Oral	2 × 20 mg	Daily	4 months	120
(b) Natural herbal supplements					
Berberine	Oral	2 × 500 mg	Daily	4 months	120
Black seed oil	Oral	2 × 5 mL	Daily	4 months	120
Epigallocatechin gallate (EGCG) = green tea extract	Oral	2 × 400 mg	Daily	4 months	120
d-Mannose	Oral	2 × 1,000 mg	Daily	4 months	120
Hydroxy citrate (*Garcinia cambogia*)	Oral	2 × 1,000 mg	Daily	4 months	120
Omega-3 oil	Oral	2 × 1,000 mg	Daily	4 months	120
Aspirin	Oral	100 mg	Daily	4 months	120

1 ATA, atmosphere pressure = 101.325 kPA; bevacizumab, monoclonal antibody = anti-angiogenesis therapy; CoQ10, co-enzyme Q10; EMF, electromagnetic field/Rife frequencies used in this case study in Table S1; L/min, liters/min; mg, milligramme; mL, millilitre, wk, week.

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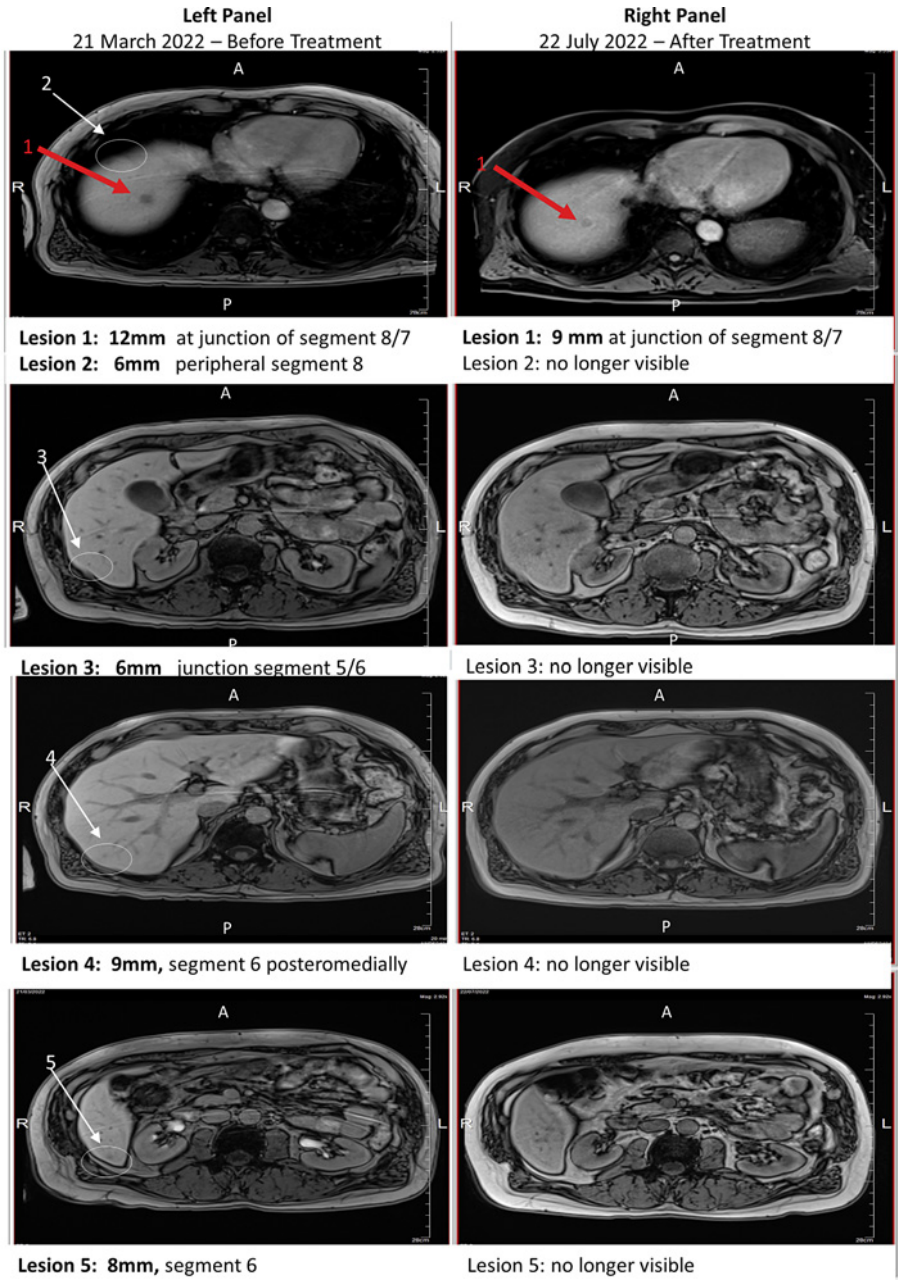

Fig. 2. MRI images of the liver before and after treatment. Left panel (before treatment): MRI images of the patient's liver on March 21, 2022. Five lesions were detected before treatment, including the main lesion 1, 12 mm in size (red arrow) and 4 smaller lesions 2–5 (white arrows). Right panel (after treatment): MRI images on July 22, 2022. Lesion 1 reduced in size 9 mm (red arrow) and previous 4 smaller lesions were no longer visible. A, anterior (front of patient); P, posterior (back of patient); R, right side of patient; L, left side of patient.

nutrient and herbal therapies, oral intake of repurposed medication and nutritional supplements, and targeted EMF therapy. The one standard treatment used in this case study was an anti-angiogenesis IV therapy, bevacizumab, which has shown promise, in particular, in the treatment of CRC, independently of mismatch repair protein status [8, 15].

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Fig. 3. EMF-Rife frequency device "Spooky-2" with plasma bulb held by the patient during treatment. Frequency range: 0–5 MHz (MHz = 10^6 Hz); device specifications at www.spooky2.com.

It is important to note that bevacizumab was one out of 26 therapies used in this study; therefore, it is impossible to determine the extent to which the anti-angiogenesis therapy contributed to the patient's outcome. Standard therapy for metastatic colon cancer usually combines bevacizumab with standard chemotherapy agents, resulting in favourable progression-free survival compared to observation only but no appreciable difference in the overall survival [8]. In this case study, we report on the integrative treatment approach combining bevacizumab with 25 non-standard but evidence-based therapies.

These non-standard but evidence-based therapies included high-dose IV vitamin C therapy, which has shown promise in the treatment of cancer [6]. High-dose vitamin C (30–100 g) yields high plasma concentrations of 13–15 mM (10^{-3} Mol) compared to only 220 µm (10^{-6} Mol) by tolerable oral intake of 3–4 g of vitamin C. The high plasma concentrations achieved by high-dose-IVC therapy generate cytotoxic hydrogen peroxide, which can be metabolised in normal cells by the enzyme catalase, but not by catalase-lacking malignant cells, leading to cell death of cancer cells [6].

Further therapies included IV-artemisinin and mistletoe injections, which are considered alternative effective immunotherapies, as well as IV-curcumin and other plant extracts, which have shown promising anti-cancer effects, such as inhibiting cancer cell proliferation and invasion, as well as inducing cell apoptosis [7]. Furthermore, the treatment regime included the ReDO protocol, consisting of a combination of 16 repurposed medication and herbal supplements administered sequentially that have evidence of anti-cancer effects, such as inhibiting metabolic energy pathways and inducing cancer cell apoptosis [9].

Additionally, at the time of restaged diagnosis of metastatic liver lesions, tumour-specific radiofrequency EMF therapy was given twice weekly for four months. EMF treatment has provided promising results in a number of clinical and preclinical studies, whereby EMF

therapy applied daily for several months achieved full or partial remission and improved survival of cancer patients [10, 11]. Several proposed mechanisms of action regarding how EMF therapy could inhibit cancer growth include direct pathways through disrupting cell division, modulating gene expression and protein synthesis, suppressing tumour vascularization, and indirect pathways through immune-modulatory effects, e.g., increase in TNF-alpha-promoting cell apoptosis [10]. These mechanisms of action studied in pre-clinical in vitro studies are supported by clinical studies, which showed slower tumour growth rate in EMF-treated participants compared with untreated control groups [10]. In summary, the patient tolerated the combination of integrative treatments well while maintaining a high level of well-being, which included regular physical activity, such as tennis, with an overall remarkable result of partial stable remission.

Conclusion

An 8-month protocol of integrative therapies was highly tolerable and effective in the treatment of a 52-year-old male with metastatic colon cancer and liver lesions, achieving a substantial tumour response and partial remission. Importantly, the response was durable, with stable disease maintained as confirmed on imaging 6 months after treatment completion, allowing a high level of wellbeing. The integrative treatment regime combined standard anti-angiogenesis treatment and non-standard but evidence-based therapies, including high-dose IV nutrient and herbal therapies, oral intake of repurposed medication and nutritional supplements, and 4 months of targeted EMF/Rife frequency therapy.

We recognise that it was outside the scope of this case study to determine the impact of the individual therapies or any synergistic effects on the overall outcome. Furthermore, generalisability of findings is limited, as this report is based on a single case. However, high tolerability of treatments and success in achieving stable partial remission in this case warrant further research.

Acknowledgments

We note Dr. Peter Eng (author P.E.) as the consulting and treating integrative physician of the patient in this case study. We are grateful to Dr. Nicholas Gelber, Deputy Director of Medical Imaging and Radiology at Cabrini Hospital Melbourne, for reviewing the MRI and CT images before and after treatment. We are indebted to Joy Chu who assisted with the collation of the MRI and CT images.

Statement of Ethics

Electromagnetic field (EMF)/Rife frequency therapy was applied as part of a research study, which assessed treatment effectiveness of EMF therapy for cancer by the circulating tumour cell (CTC) blood test analysis. This study protocol was reviewed and approved by the National Institute of Integrative Medicine (NIIM) Human Research Ethics Committee, approval number 0040N_2017. The research trial is registered with the Australian and New Zealand Clinical Trial Registry (http://anzctr.org.au; trial number ACTRN12620000986976). Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

P.E. was the treating physician of the case described in this report. T.B. advised on EMF treatment and the ReDo protocol. K.R. prepared the manuscript with contributions from P.E. and T.B. All authors approved the final version.

Data Availability Statement

All data generated or analysed during this study are included in this article and its online supplementary material. Further enquiries can be directed to the corresponding author.

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