



## A rare complication after radiofrequency ablation in the treatment of colorectal liver metastasis: A case report



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### ABSTRACT

Radiofrequency ablation (RFA) is one of the safe and effective treatments of colorectal cancer with liver metastasis, which has the advantages of minimally invasive, fewer complications, short hospitalization time and repeatable operation. A special case with advanced transverse colon carcinoma was treated by RFA in our center. All the procedures were performed, which were recommended by the guideline. An intestinal perforation occurred on the second day after the RFA, then surgeon performed emergency surgery, unfortunately, anastomotic leakage occurred on the 21st day after the operation, yet after conservative medical treatment, the patient achieved remission of symptoms and discharged from the hospital. Rare complications occurred after RFA in the treatment of colorectal cancer with liver metastasis are unpredictable, which could affect the efficacy of RFA and performance status of patients. Further investigation of the mechanism of these complications is warranted urgently, which might offer more effective methods against these rare complications.

### 1. Introduction

Up to 25%–50% of colorectal cancer patients may have liver metastasis,<sup>1</sup> which is the leading cause of death for these patients. Surgical resection was recommended standard method in the treatment of oligometastatic, which might provide a potential cure and promising outcomes. However, less than 20% of patients fit in the selection criteria of surgical resection.<sup>2,3</sup> For those who could not receive surgical therapy, radiofrequency ablation (RFA) is an alternative choice with fewer complications, high local control rate and repeatability.<sup>4</sup> The rates of complications after RFA was at most 3%,<sup>5</sup> including hepatic hemorrhage, hepatic injuries, skin burn, needle track seeding and adjacent organ invasion, such as colon, stomach, bile duct, lung, etc. To our knowledge, it is rare that intestinal perforation and intestinal anastomotic leakage occurred simultaneously after RFA.

### 2. Case presentation

A 64-year-old male patient, who was diagnosed of moderately differentiated adenocarcinoma of transverse colon cancer with liver metastasis and intestinal obstruction, received resection for colon tumor in October 2016, and undergone chemotherapy regularly after surgery for eight times, but liver metastases continue progressing (Fig. 1 A), which located in segment six, adjacent to intestine, with largest diameter less than 3cm. Based on the evidence of the patient's history and CT imagine, Multiple Disciplinary Team concluded that the liver metastases

was oligometastatic and can removable by surgery. However, due to heart disease and hypertension, the risk of anesthesia was high and the disadvantage of surgery was over weighted. Thus, RFA was chosen to treat liver metastasis. The RFA procedure was approved by the ethics committee of Yunnan Cancer Hospital. Written informed consent was obtained from patient for risks and benefits of RFA. The pre-RFA discussion was carried out routinely and all the procedure of the RFA were followed the guideline. Briefly, local anesthesia surgery under sonographic guidance was performed, because the lesion adjacent to intestine, we inserted electrode parallel with intestine and low power carried out avoiding intestine injury, multi-tined expandable electrode (Welfare, Beijing, China) was used melting 80 °C for 8 minutes to completely ablate lesions, ultrasound detected real-time during the procedure, the patient no severe complain just fell minor pain. On the next day, the patient got a fever, temperature was reach to 40 °C, and abdominal pain and sweating; physical examination showed that the abdominal muscle tension, the right lower quadrant pained while pressing and redounding, and an abdominal X-ray showed free gas under diaphragm (B), an enhanced CT indicated that there might been intestinal perforation(C). Surgical exploration found that the small intestine and colon adhered to the abdominal wall in many places, and ileum showed two holes about 3 × 2cm in size, intestinal perforation was considered, then intestinal segment resection and lateral anastomosis was performed, the patient was transferred to ICU for further treatment. 21 days after the surgical repair, there was a heavy leakage of yellow-green liquid at the abdominal incision (D,E); based on clinical and radiological findings, we considered

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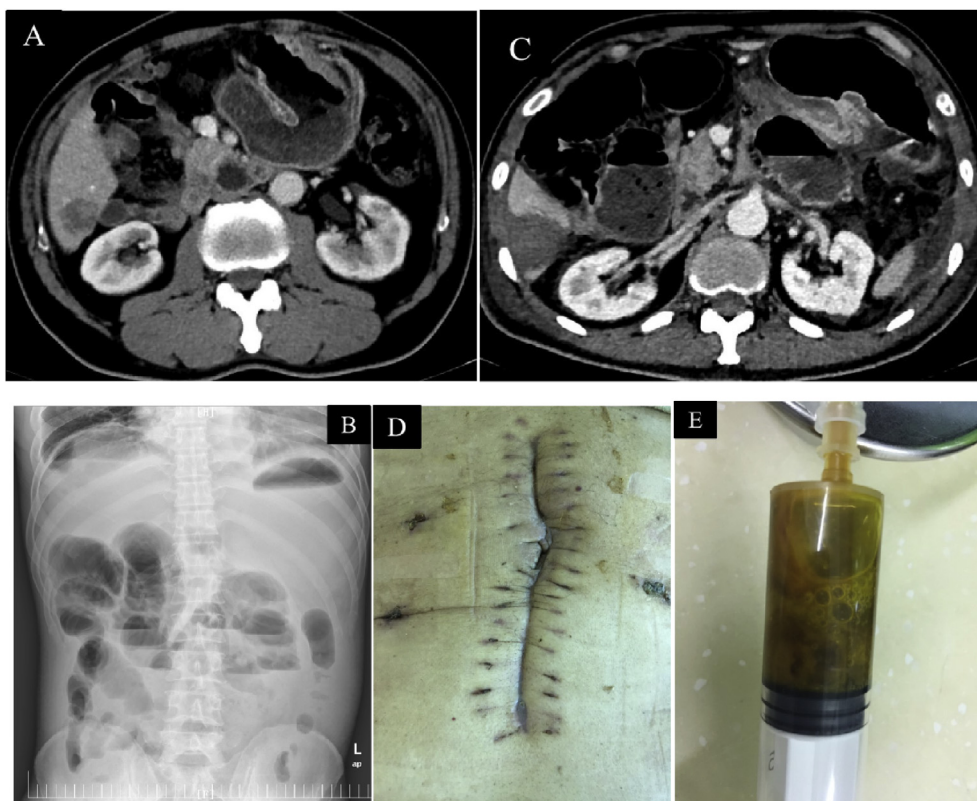
<https://doi.org/10.1016/j.jimed.2020.08.007>

Received 7 April 2020; Received in revised form 8 July 2020; Accepted 3 August 2020

Available online 6 September 2020

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**Fig. 1.** A, CT scan showed liver metastasis adjacent to the bowel, X-ray showed subphrenic free gas, CT scan showed the lesion complete ablation, but adjacent bowel may be perforated. D and E, A mass of intestinal fluid ooze through the surgical incision.

it might be delayed intestinal anastomotic leakage. Considering the patient couldn't tolerate impact of surgery, conservative medical treatment were performed, such as fasting, gastrointestinal decompression and inhibit intestinal juice secretion, the tube was inserted into incision at the same time, and negative pressure aspirator was used to drain continually. After 3 weeks, there was no intestinal juice derivation, the follow-up enhanced CT showed no sign of intestinal anastomotic leakage. Then, tube was removed and the patient was discharged. In July 2018, the patient died of multiple organ failure due to extensive tumor metastasis, and the overall survival time was 21 months.

### 3. Discussion

Intestinal perforation is a major complication of RFA on liver tumor. From 2015 through 2019, there was only one case in our center, which is in accordance with the reported result.<sup>6</sup> The main causes might be that the tumor was adjacent to the intestine, and the heat energy injured intestine during the operation, especially guidance by ultrasound alone because of gas interference. Also, it occurred more easily after operation or radiotherapy for colorectal cancer, this might be due to that the intestine adhered and relatively fixed after surgery or radiotherapy, which causing a poor peristalsis. However, it is rare to the secondary delayed anastomotic fistula after the repairment of intestinal perforation post-RFA.

We analyzed the causes of intestinal perforation in this case as follows: 1) The distance between lesion and intestinal canal is less than 1 cm, which may be main reason, although we try to avoid intestine injury and take some measures, such as inserted electrode parallel with intestine, and keep safe distance. 2) The only ultrasonic guidance could be easily affected by gas, so the distance between electrodes and adjacent important organs could not be accurately evaluated during the operation. Especially, it was difficult to accurately evaluate the distance between the

sub-needles and adjacent organs when the multi-polar radiofrequency ablation needle was used. As to this patient, the intestinal perforation may attribute to the location of lesion, US guidance alone and multi-polar electrode used. If combined US and CT together, we might detect abnormal changes.

Recently, some preventive measures were adopted: 1) Hydrodissection, a 21-gauge fine needle can be inserted into the gap between the liver and the bowel, and saline or glucose injection is used to separate the two, so as to ensure complete ablation and effectively avoid intestinal canal damage. 2) Compared with multi-polar ablation needles, unipolar ablation needles have a relatively small risk of accidental intestinal injury; 3) After ultrasound-guided puncture, CT scan can accurately determine the interval between the electrode and adjacent important organs, and real-time ultrasound monitoring can be conducted during the operating process, the combination guidance of the CT and ultrasound might decrease the occurrence of complications.

Anastomotic leakage is a common complication in colorectal tumor surgery, the incidence is 3%–19.8%.<sup>7–11</sup> The risk factors including male, older age, diabetes mellitus, malnutrition, anemia, tumor malignant degree, neoadjuvant radio-chemotherapy, blood transfusion and long-term hormone therapy.<sup>8,10,12</sup> The clinical symptoms usually occurs 5–8 days after surgery,<sup>8</sup> this case happened after 21 days post-surgery is uncommon. The treatment is usually surgical or conservative depending on the clinical symptom and patient's condition.<sup>8,11,12</sup> The occurrence of delayed anastomotic leakage in this case was considered to be related to the last tumor stage and poor nutritional status of the patient.

The literature showed some cases with intestinal perforation post-RFA,<sup>3,6</sup> but only one suffered from intestinal perforation and intestinal anastomotic leakage in the same time post-RFA, so the selection of patient and appropriate technique contribute to reducing post-operation complications.

All in above, RFA is a commonly used and effective method for the

treatment of colorectal cancer with hepatic metastasis. It will not only decrease the risk of these complications, but also improve the outcome of RFA that closely correlated with the patients' life qualities, after understanding the mechanism of RFA related complications.

#### Patient consent

Written informed consent was obtained from patient for publication of the case reports and any accompanying images.

#### Declaration of competing interest

The authors have no conflicts of interest to declare.

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