Letter to the Editor

Ultrasound-guided microwave ablation for a rectal stromal tumor: a rare-case description

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Introduction

A rectal stromal tumor is a rare type of gastrointestinal stromal tumor (GIST) (1). Surgery was thought to be main treatment method, but, even after surgery, rectal stromal tumors have a high local recurrence rate. For unresectable GISTs, tyrosine kinase inhibitors and interventional radiology techniques are alternative methods that can be applied for treatment (2). However, there are almost no reports about GISTs treated with microwave ablation (MWA). Hence, we present a case report to describe the use of ultrasound-guided MWA in the treatment of a rectal stromal tumor.

Case presentation

Four years ago, a 63-year-old woman was admitted to hospital for a pelvic tumor, which was confirmed to be a rectal stromal tumor by biopsy. After diagnosis, she had surgery for complete resection of the tumor, but the tumor recurred 1 year after the surgery despite her taking imatinib (IM) regularly. The tumor continued to grow even when the dose of IM was adjusted to 600 g/day. Two months before she was admitted to Sichuan Cancer Hospital, the patient went to the outpatient service of Sichuan Cancer Hospital for dysuria. A magnetic resonance imaging (MRI) scan of her abdomen showed a 10.0 cm × 10.1 cm × 9.0 cm mass on the posterior rectal wall, which obstructed the urethra. The doctor advised the patient that the tumor was too big to resect and that she should undergo a curative resection after neoadjuvant chemotherapy with TKIs. So, the doctor changed the type of TKI to regorafenib (160 g/day) and placed a catheter for the patient to urinate. However, the patient stopped taking regorafenib on her own because the side effects were intolerable, and she was admitted to Sichuan Cancer Hospital for dysuria. The subsequent MRI scan showed a 11.0 cm × 10.0 cm × 9.3 cm mass on the posterior rectal wall (*Figure 1A*) and mild hydronephrosis of both kidneys. Fortunately, there was no metastasis in other parts of the body. We performed another biopsy of the tumor. The pathology results verified the lesion as a rectal stromal tumor. After assessment with contrast-enhanced computed tomography (CECT) and contrast-enhanced ultrasound (CEUS), the physicians and radiologists proposed to perform a palliative ablation of the mass to improve the patient's quality of life. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). This study was approved by the Ethics Committee of Sichuan Cancer Hospital (No. SCCHEC-03-2017-008). With adequate communication, written informed consent was obtained from the patient and her family for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Before the ablation, routine blood tests, routine coagulation tests, and an electrocardiogram (ECG) were completed to evaluate the basic condition of the patient. Polyethylene glycol-electrolyte powder was given to the patient for bowel preparation. During the procedure, the patient was placed in a recumbent position with her legs curled up, and routine monitoring including an ECG, blood pressure, and intravenous access was prepared. The ablation pathway was reconfirmed by conventional ultrasound and

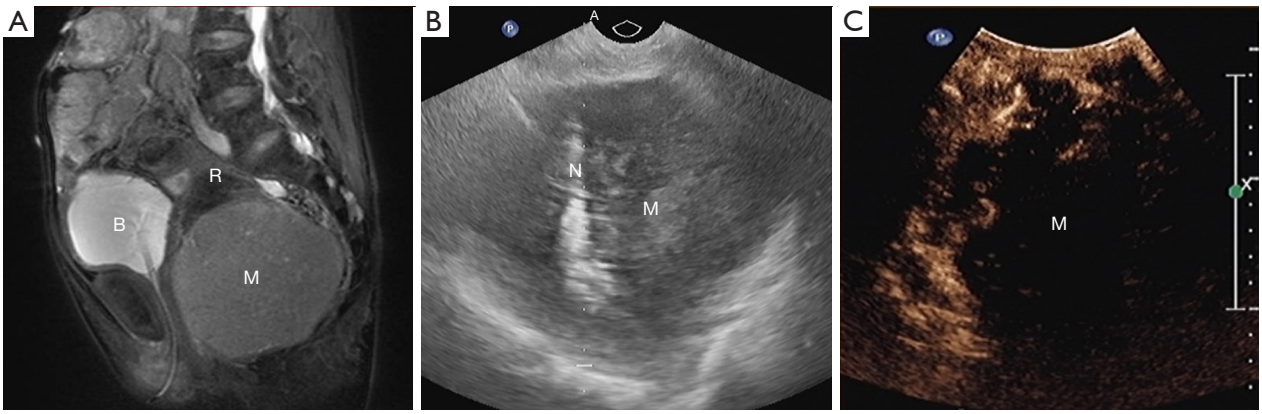

Figure 1 Images of the tumor before and during the procedure. (A) The MRI T2WI image shows the tumor on the posterior rectal wall, which caused the obstruction of the urethra. A catheter can be seen in the urethra. (B) The ablation process of the tumor. (C) A CEUS of the mass during the procedure. B, bladder; R, rectum; M, mass; N, microwave antenna; MRI, magnetic resonance imaging; T2WI, T2-weighted imaging; CEUS, contrast-enhanced ultrasound.

CEUS. After aseptic preparation, 5 mL of 1% lidocaine was administered for local anesthesia. Then, under the guidance of a real-time ultrasound, a 22-gauge needle was advanced to the puncture point on the previously confirmed perineum. Through the needle, we injected a solution including saline and lidocaine to separate the tumor from other normal tissues. At the same time, a double-cavity irrigation-drainage cannula was inserted into the rectum cavity to protect the rectal wall by saline irrigation. When the injection of protective saline was satisfactory, the microwave antenna was placed into the mass. Then, the moving-shot ablation technique was performed along the border of the tumor from superior to inferior, posterior to anterior, and internally to externally (*Figure 1B*). The ablation process was paused if the mass was fully covered by the vaporized area. Then, CEUS was used to evaluate the extent of the ablation area (*Figure 1C*). After considering the safety of the rectum wall and the patient's tolerance, we stopped the ablation process when no enhancement area appeared over about 80% of the whole tumor on CEUS.

During and after ablation, the patient's vital signs were stable, but she had a fever and chills on the second day. Through clinical manifestation and laboratory tests, she was diagnosed with bacterial peritonitis and sepsis. Fortunately, she recovered 20 days later after undergoing antiinfection therapy and symptomatic treatment. By then, she could urinate normally without a catheter and the hydronephrosis of both kidneys had disappeared, which greatly improved the quality of life of the patient. The tumor size in the 1-, 3-, and 6-month post-ablation ultrasound evaluation decreased from 10.0 cm × 10.1 cm × 9.0 cm (*Figure 2A,2B*) to 7.6 cm × 8.0 cm × 6.0 cm (reduction ratio, 64.3%; *Figure 2C,2D*), 5.1 cm × 4.1 cm × 4.2 cm (reduction ratio, 91.4%; *Figure 2E,2F*), and 5.5 cm × 3.1 cm × 4.5 cm (reduction ratio, 92.5%; *Figure 2G,2H*), respectively. The patient's quality of life was barely affected by the tumor, and she will undergo an operation in an attempt to resect the tumor.

Discussion

GISTs are the most common mesenchymal tumors of the gastrointestinal tract and can occur anywhere within it. They can mostly be observed in the stomach and in the small intestine. Rectal GISTs only account for 5% of all GISTs (1,2). For primary resectable rectal GISTs, surgery is the main treatment method. However, nearly 50% of patients still have recurrence or metastasis after complete tumor resection. TKIs, represented by IM, have heralded a new era of GIST-targeted therapy and brought new hope to patients with recurrence and metastasis. However, due to the common emergence of drug resistance, the therapeutic effect of IM can be limited, and about 15% of patients with GISTs do not respond to this drug. For patients with IM resistance, second- and third-generation TKIs can be used, but some patients remain resistant to them (3-5). For these patients, interventional radiology techniques, including hepatic artery embolization, hepatic artery chemoembolization, and radiofrequency are alternative methods (6,7).

MWA, one of the thermal ablative techniques, has the capacity to perform larger ablation volumes with shorter

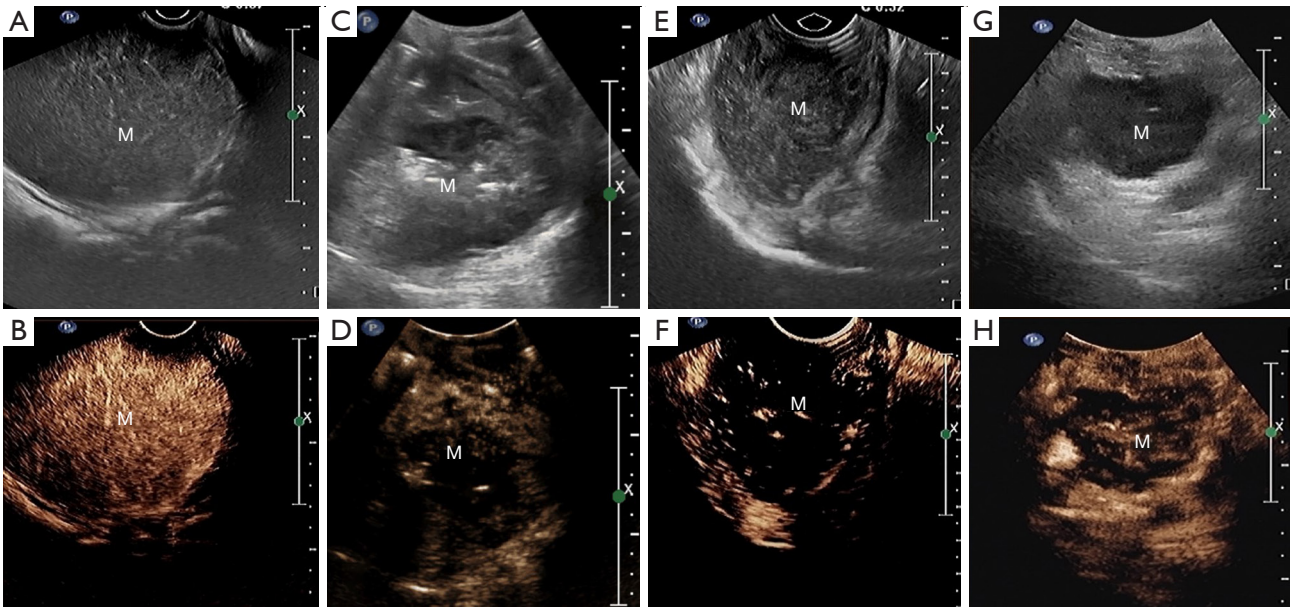

Figure 2 The size change of the tumor. (A) A 2D-ultrasound image of the tumor before ablation. (B) A CEUS image of the tumor before ablation. (C) A 2D-ultrasound image of the tumor at 1-month post ablation. (D) A CEUS image of the tumor at 1-month post ablation. (E) A 2D-ultrasound image of the tumor at 3-month post ablation. (F) A CEUS image of the tumor at 3-month post ablation. (G) A 2D-ultrasound image of the tumor at 6-month post ablation. (H) A CEUS image of the tumor at 6-month post ablation. M, mass; 2D, 2-dimensional; CEUS, contrast-enhanced ultrasound.

ablation durations and higher intratumoral temperatures than other existing thermoablative technologies. Flexible approaches, including percutaneous, laparoscopic, and open surgical access, are used by the technique for treatment. Percutaneous MWA is thought to be a minimally invasive approach that is nearly noninvasive and has therapeutic potential in the treatment of primary and metastatic tumor diseases, such as liver disease, lung malignancies, and renal tumors (8-10).

In our case, the patient's rectal GIST recurred after surgery and continued to grow despite the patient taking TKIs. Before our treatment, the tumor was too large, and compressed the patient's urethra. The patient suffered from dysuria and had to urinate through a drainage catheter. There were few viable options because she was resistant to TKIs. Therefore, we performed palliative MWA on the tumor. There were no previous reports of MWA being applied in rectal GISTs. During the MWA process, the ablation energy may adversely injure the rectum wall and other adjacent structures, such as the uterus and the vagina. Therefore, we injected saline around the tumor to isolate the surrounding tissues and continually used ice saline through a double-cavity irrigation-drainage cannula inserted into the rectum cavity to protect the rectal wall. The moving-shot ablation technique, together with ultrasound-guided stratified conformal ablation, was used in our case to assure maximum ablation of the tumor and minimum adverse injury to surrounding normal tissues. This patient had bacterial peritonitis and sepsis after the procedure but recovered 20 days later after receiving anti-infection therapy and symptomatic treatment. The infection might have arisen due to the short distance between the puncture point and the anus. Prophylactic antibiotics pre- or post-operation may be needed. Although the patient had a severe infection after ablation, she benefited greatly after her recovery. Twenty days after the ablation, the patient could urinate normally without a catheter and the hydronephrosis of both kidneys had disappeared, which greatly improved her quality of life. The tumor size has decreased, which may offer an opportunity for surgery.

In conclusion, ultrasound-guided percutaneous MWA can be a safe and effective treatment for rectal GISTs with effective preparation work to prevent complications, such as infection and injury of normal tissues. It may serve as a novel alternative approach for patients who are resistant to TKIs.

Conclusions

We present a case report to describe the use of ultrasound-guided MWA in the treatment of rectal stromal tumor. This may serve as a novel alternative approach for patients resistant to TKI inhibitor.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://qims.amegroups.com/article/view/10.21037/qims-22-434/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). This study was approved by the Ethics Committee of Sichuan Cancer Hospital (No. SCCHEC-03-2017-008). With adequate communication, written informed consent was obtained from the patient and her family for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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