

Ultrasound-Guided Percutaneous Microwave Ablation of Parathyroid Adenoma



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Editor:

Parathyroid adenoma is a major cause of primary hyperparathyroidism. The objective in the treatment of primary hyperparathyroidism is elimination of the pathologic parathyroid tissue. We describe our initial experience of ultrasound-guided percutaneous microwave ablation (MWA) of a parathyroid adenoma to report on the feasibility of the MWA technique for treatment of parathyroid disease. The patient provided informed consent for this report, which was approved by the ethics committee of Chinese PLA General Hospital.

An 80-year-old man who with a diagnosis of osteoporosis for 5 months and high serum calcium for 2 months without obvious bone pain was admitted to our hospital. The results of laboratory investigations revealed elevated parathyroid hormone (PTH) (212 pg/mL; normal range, 15–65 pg/mL), elevated serum calcium (3.15 mmol/L; normal range, 2.09–2.54 mmol/L), and low serum phosphate (0.65 mmol/L; normal, 0.89–1.60 mmol/L). Ultrasound detected a hypoechoic mass measuring 1.9 cm × 1.5 cm × 1.7 cm in the right parathyroid area (Fig 1), which was also detected by magnetic resonance imaging and contrast-enhanced ultrasound with high enhancement in arterial phase (Fig 2). Emission computed tomography showed that mass with an increased uptake of technetium-99m sestamibi. Ultrasound-guided biopsy was then performed, and pathologic findings confirmed the parathyroid nature of the lesion. The diagnosis of parathyroid adenoma was confirmed with laboratory, imaging, and pathologic findings.

The patient was placed in the supine position. A small incision was made after local anesthesia with 1% lidocaine was administered subcutaneously on the puncture site. The left margin of the parathyroid adenoma is close to

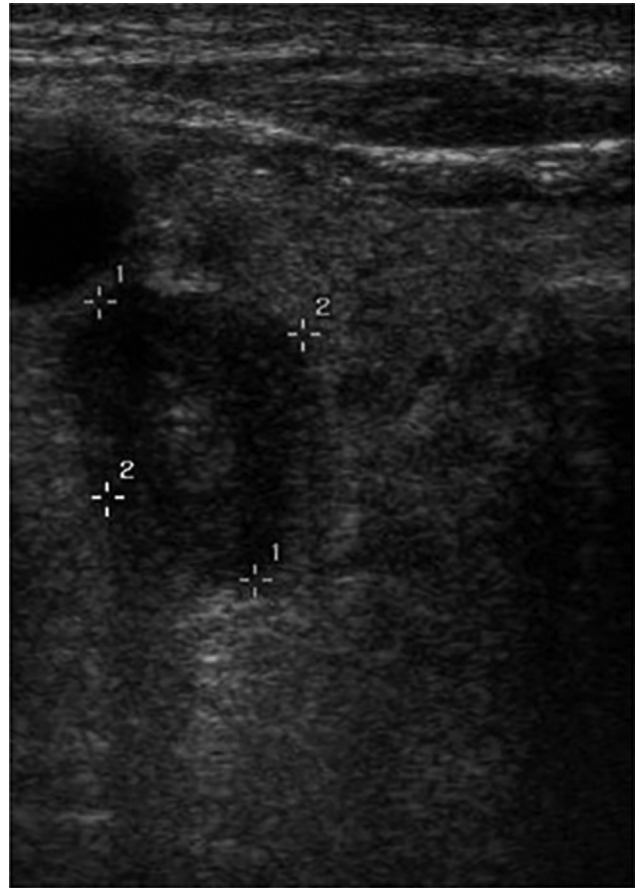


Figure 1. Ultrasound scan before microwave ablation shows 1.9 cm × 1.5 cm mass with hypoechogenicity in the right parathyroid area.

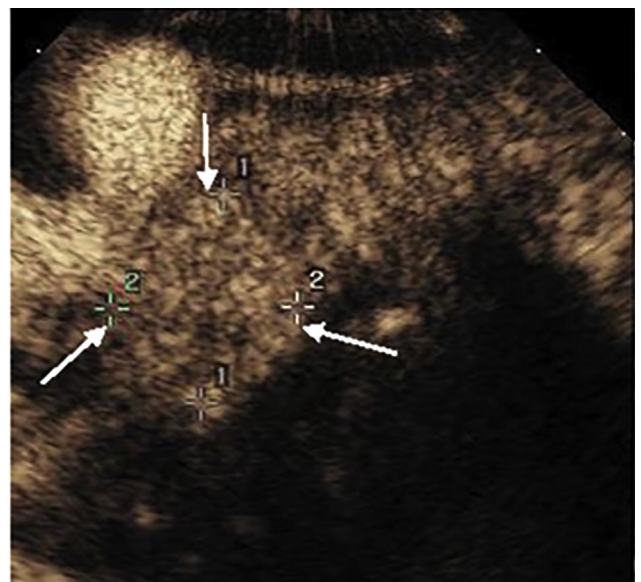


Figure 2. Contrast-enhanced ultrasound scan shows hyperenhancement of the mass (arrows) before microwave ablation.

None of the authors have identified a conflict of interest.

<http://dx.doi.org/10.1016/j.jvir.2016.08.021>

the tracheoesophageal groove in the expected course of the recurrent laryngeal nerve. Saline was injected into the surrounding parathyroid adenoma capsule with an 18-gauge percutaneous transhepatic cholangiography needle under real-time ultrasound guidance to protect the nerve from thermal injury. The KY-2000 MWA system (Kangyou Medical Instruments, Nanjing, China) with an internally cooled needle antenna (16-gauge) (1) was used to administer microwave energy. The internally cooled microwave antenna was placed into the parathyroid adenoma under ultrasound guidance. A power output of 20W at 2,450 MHz and discontinuous mode was used during MWA. The extent of the ablation area was based on the echogenic change around the antenna (Fig 3). Total ablation time was 180 seconds.

After MWA, the patient's vital signs were stable. The serum PTH and calcium levels decreased to 55.61 pg/mL and 2.68 mmol/L, respectively, and serum phosphate level increased to 0.67 mmol/L on the first day after MWA. Serum PTH, calcium, and phosphate levels were within the normal range 4 days after MWA (38.33 pg/mL, 2.28 mmol/L, and 1.07 mmol/L). Contrast-enhanced ultrasound showed no enhancement in the entire adenoma 3 days after MWA (Fig 4). Magnetic resonance imaging performed after the procedure showed the ablation area encompassed the whole adenoma. At 6 months and 12 months after

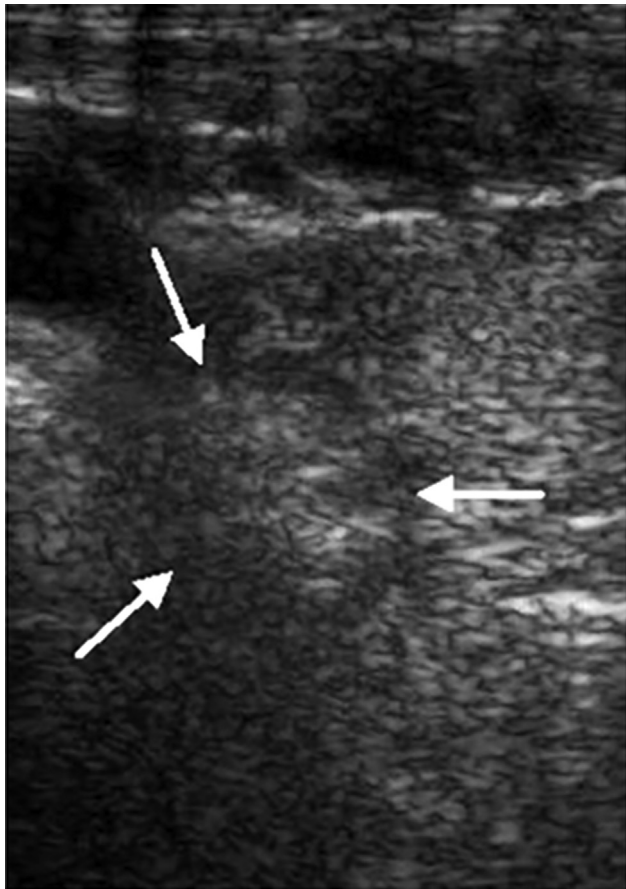


Figure 3. Ultrasound shows a gradual and diffuse increase in echogenicity of the mass from the irradiating segment to the whole mass during microwave ablation (arrows).

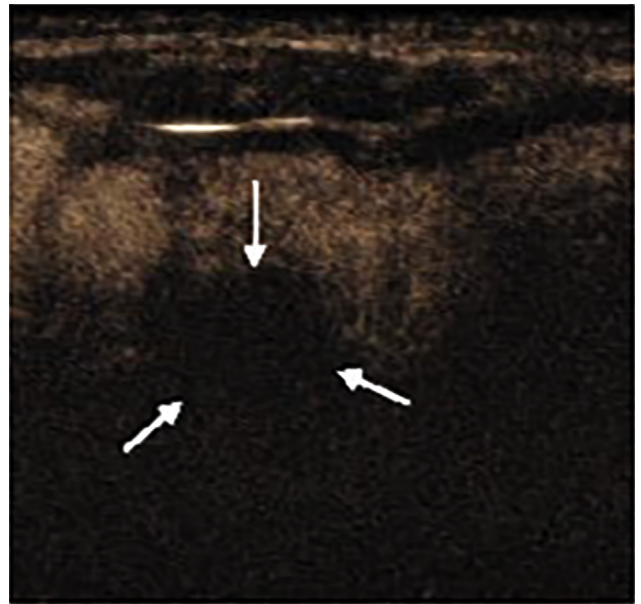


Figure 4. Contrast-enhanced ultrasound shows the whole mass with no enhancement continuously (arrows) 3 days after ablation.

MWA, the patient's PTH level was 99.21 pg/mL and 90.50 pg/mL, respectively, higher than normal range, but serum calcium (2.45 mmol/L and 2.42 mmol/L, respectively) and phosphate (0.93 mmol/L and 0.94 mmol/L, respectively) levels remained normal. There were no complications, such as esophageal perforation, tracheal injury, infection, hoarseness, cough, or skin burn.

Based on our previous experience in MWA of thyroid nodules (1), we performed percutaneous MWA of parathyroid adenoma with ultrasound guidance to explore the possibility of treatment. After MWA, complete necrosis was obtained, and the serum levels of calcium and phosphate normalized after ablation. The patient's PTH level increased 6 months after MWA, but it remained stable until the last follow-up evaluation (12 months after MWA). Although there could be additional sites of parathyroid adenomas responsible for this, long-term monitoring of serum calcium and PTH levels is important to establish the effectiveness of MWA as a therapeutic option for the management of parathyroid adenoma. MWA may be suitable for patients with parathyroid diseases in whom medical treatment is unsuccessful, patients who refuse parathyroid surgery, or patients with persistent or recurrent disease due to secondary hyperparathyroidism. In these patients, MWA could represent a nonsurgical alternative to parathyroidectomy by destroying the targeted parathyroid tissue. The limitations of this report are that it contains only 1 case and a 1-year follow-up period.

Thermal ablation techniques such as radiofrequency (RF) ablation have been used to treat parathyroid diseases, although the reported literature is limited. Follow-up for 4 cases in 3 reported studies ranged from 2 months to 1 year (2–4). One of 4 patients received further RF ablation because of a recurrence of the same gland 2 months after the first RF ablation.

In conclusion, the results suggest that ultrasound-guided percutaneous MWA is a promising technique for treating hyperparathyroidism and may become an alternative treatment modality in patients who refuse surgery. Further studies with large samples and long-term follow-up are needed.

ACKNOWLEDGMENTS

We sincerely thank Miss Meng-juan Mu and Miss Chao-nan Chen for their secretarial assistance.

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Hepatic Artery Embolization for Hepatic Rupture in HELLP Syndrome



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Editor:

The syndrome characterized by hemolysis, elevated liver enzyme levels, and low platelet count (ie, HELLP syndrome) is a severe form of preeclampsia that was first defined in 1982 (1). Patients with this syndrome are at an increased risk for hepatic rupture. The majority of patients with hepatic rupture in HELLP syndrome undergo surgical management (2).

Institutional review board approval was not required for the present report. A 41-year-old woman presented to the labor and delivery department at 38 weeks and 5 gestational days describing abdominal cramping, nausea and emesis, as well as fever and chills. Her blood pressure was 165/80 mm Hg and heart rate was 104 beats per minute. Her respirations were unlabored, and oxygen saturation was normal. On physical examination, her abdomen was tender to palpation in the epigastric region, without any rebound tenderness. The fetal heart rate ranged between 160 and 185 beats per minute with accelerations and decelerations. Laboratory results demonstrated a white

blood cell count of 13,000/L (normal range, 4,000–11,000/L) and a platelet count of 9,500/L (normal range, 15,000–45,000/L). Gestational hypertension, preeclampsia, and/or possible infection were considered possible etiologies. The patient was admitted by the obstetrics and gynecology service for observation. One hour after hospitalization, an emergent cesarean section was performed because of fetal heart tracing and persistent maternal hypertension. The surgery was completed without complication. Postoperative labile blood pressure, a follow-up white blood cell count of 19,600/L, platelet count of 7,500/L, and alanine aminotransferase (ALT) level of 332 U/L and aspartate aminotransferase (AST) level of 72 U/L (normal ranges, 0–45 U/L and 0–35 U/L, respectively) were consistent with HELLP syndrome. One dose of 4 g of magnesium sulfate was administered, which caused transient hypotension. Eight hours later, the patient exhibited severe hypotension and anemia requiring massive fluid resuscitation. She received 12 U of packed red blood cells, 12 U of fresh frozen plasma, 1 U of cryoprecipitate, and 2 U of packed platelets. An emergent computed tomography (CT) scan of the abdomen and pelvis was obtained and demonstrated hemoperitoneum and multiple areas of active extravasation from the right hepatic lobe (Fig 1).

Emergent visceral angiography revealed multiple foci of contrast medium extravasation in the peripheral branches of the right hepatic artery (Fig 2). The portal vein was widely patent. The proximal right hepatic artery was selectively catheterized with a 5-F RCI catheter (AngioDynamics, Latham, New York). Gelfoam pledgets (Pfizer, New York, New York) were emulsified with normal saline solution into a slurry and then injected. Postembolization arteriography demonstrated successful “pruning” of all peripheral right



Figure 1. Coronal reformatted contrast-enhanced CT scan of the abdomen and pelvis shows hemoperitoneum along the liver border, as well as areas of active extravasation underneath the liver dome (arrows).

Neither of the authors has identified a conflict of interest.

<http://dx.doi.org/10.1016/j.jvir.2016.08.003>