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Unusual presentation of metastatic adenocarcinoma of the lung



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ABSTRACT

On September 2013, a 62-year-old man with metastatic adenocarcinoma of the lung complained tenderness and pain of the first terminal phalange of his right hand. The biopsy confirmed metastatic adenocarcinoma of the lung to the finger. A single 8-Gy fraction of palliative radiotherapy was delivered to the patient's right hand. The patient received magnetic resonance-guided focused ultrasound surgery treatment to the phalange because he showed few improvement of clinical symptoms and persistence of moderate pain after radiotherapy. After magnetic resonance-guided focused ultrasound surgery, the clinical symptoms improved significantly. No serious adverse effects were reported and the patient compliance was very high. Our patient showed improvement of clinical symptoms after combined treatment. The patient remains in good health conditions.

1. Introduction

This case report shows an interesting presentation of metastatic adenocarcinoma of the lung with no history of tobacco. Metastases to the distal extremities are a rare presentation of adenocarcinoma of the lung. Starting treatment early is important to relief patients' pain and prevention of morbidity caused by bone metastases. Radiation therapy represents a successful and efficient method to palliate pain and prevent comorbidities caused by bone metastases.

The optimal dose and fraction of prescription for palliative radiation therapy has been the subject of controversy. In general radiation therapy practice, a higher radiation dose results in better tumor control. A single fraction of 8 Gy is as safe and effective as a multifraction regimen for bone metastases. Magnetic resonance-guided focused ultrasound surgery (MRgFUS) represents an effective alternative to palliate pain. The combination of

a single fraction of radiation therapy and MRgFUS appears to be more effective for pain relief and prevention of comorbidities.

2. Case report

On September 2013, a 62-year-old man with metastatic adenocarcinoma of the lung complained tenderness and severe pain [8–9 points to visual analogic scale (VAS)] of the first terminal phalange of his right hand.

The total body computed tomography (CT) scan performed on September 2013 showed progression in lung, right adrenal gland and bone metastases of the first terminal phalange of his right hand. The biopsy confirmed metastatic adenocarcinoma of the lung to the finger.

The patient was treated with a hypofractionated course of radiotherapy. The prescribed dose to the target lesion was 8 Gy delivered through 3D conformal external beam with anterior and posterior opposed fields with the use of high-energy photons (6 MV) to the right hand.

Before treatment (CT), planning scan in the supine position with personalized immobilization systems was performed. CT acquisitions were analyzed by treatment planning software (PINNACLE®) to perform target volume contouring and to evaluate the distribution of isodose. The planning target volume included the entire tumor mass with a isotropic margin of 2 cm [1].

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No serious adverse effects were reported. Our patient showed few improvements of clinical symptoms after radiotherapy with persistence of moderate pain (5–6 points to VAS score). The patient underwent treatment with MRgFUS after radiotherapy.

Prior to treatment of the bone lesion MRgFUS, our patient underwent unenhanced magnetic resonance (MR) imaging with contrast material enhancement.

On the day of the scheduled treatment, patients were positioned on the MRgFUS table with the metastatic lesion centered above the ultrasound transducer, with positioning and clear ultrasound pathway verified by MR imaging (standard T2-weighted fat-saturated images). The transducer was housed in a water bath in the MR table (multielement phased-array transducer, 120 mm diameter, frequency 1.0–1.5 MHz) and was coupled to the patient's skin by using a moistened gel pad to eliminate any air in the ultrasound beam path. A patient-specific treatment plan was generated covering the targeted lesion optimizing the number of sonications, location, and energy levels to avoid damage to non-targeted tissue. After verifying correct positioning using low-energy subtherapeutic sonications, treatment began at full energy, reaching ablation temperatures of 65 °C. During each sonication, real-time MR thermometry and anatomical images were acquired. At treatment completion, T1-weighted contrast-enhanced MR images were acquired [2,3].

MRgFUS was performed with conscious sedation (intravenous midazolam and fentanyl). The patient received the treatment in 1 day. Our patient showed improvement of clinical symptoms (1–2 points of VAS score).

The patient remains in good health conditions and experienced pain relief and regained the use of his hand.

3. Discussion

Lung cancer is the leading cause of cancer mortality worldwide, accounting for about 1.3 million deaths each year. Adenocarcinoma is the most common histological type of non-small-cell lung cancer (NSCLC) (approximately 40%). Metastasis from NSCLC is common in brain, bones, adrenal glands, contralateral and liver [4,5].

Bone pain is the most common source of cancer-related pain in patients suffering from metastatic cancer, especially those arising in the lung, breast, and prostate [6,7]. The common sites of bone metastases are the spine, pelvis, and extremities.

The incidence of bone metastases from NSCLC is approximately 15%–40%. Most occur predominantly in the spine, rib and pelvis [8]. Metastases to the distal extremities such as our case are relatively rare.

The consequences of bone metastases include pain, pathological fractures, spinal cord or nerve root compression or hypercalcemia [9]. These events are associated with compromised quality of life of the patients, performance status and independent functioning and as well may have a shorter overall survival [10].

Starting treatment early is important to relieve patients' pain and to prevent other comorbidities. The possible treatment include orthopedic or neurosurgical intervention, radiation therapy, systemic hormonal therapy or chemotherapy, opioid and localized nerve blocks.

Radiotherapy is the treatment of choice for localized painful bone metastases useful in preventing bone fractures [11]. The appropriate fractionation scheme for the most effective treatment schedule for bone metastases has been the subject of debate in the past two decades [12].

The various treatment schedule include: 30 Gy in 10 fractions, 20 Gy in 5 fractions, and single fractions of 8 Gy [13].

Based on the evidence from the existing literature there is no difference in complete or overall pain relief between single treatment and multifraction palliative radiotherapy for bone metastases [14]. A single 8 Gy fraction is recommended as the standard dose-fractionation schedule for the treatment of painful bone metastases [11].

Depending on the radiation therapy protocol, options for retreatment may be limited. Alternatively, patients can be treated with narcotic medications, but those medications may lead to malaise, mental status changes, nausea, and constipation. MRgFUS can be used when radiation fails. MR-guided focused ultrasound is a completely non-invasive procedure, meaning there is no surgery, no incision, and no blood loss [2].

The patient can return to normal activities within a few days. Most patients report a decrease in their pain within 1 or 2 days after MRgFUS. It has been shown that in addition to pain relief, patients also frequently experience an improved quality of life.

A single fraction of 8 Gy has been shown to be safe, effective and a low-cost treatment for the palliation of painful metastatic bone metastases [15]. The addition of MRgFUS to RT can improve patient symptoms and quality of life.

More studies are needed to evidence the differences in efficacy between different radiation therapy schedules and the combination of RT and MRgFUS in painful bone metastases [16].

Conflict of interest statement

We declare that we have no conflict of interest.

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