Case Report

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Oesophageal carcinoma with solitary patellar metastasis: a rare case report

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Abstract

The incidence of tumours found in the patella, including primary and metastatic tumours, is low. Solitary metastasis of oesophageal carcinoma (OC) in the patella is even rarer. A 50-year-old man presented to our clinic because of pain and limited range of motion in the right knee for 4 hours and after a fall. On the basis of the patient's medical history, he was diagnosed with OC 2 months previously and underwent two cycles of paclitaxel liposome combined with tiggio chemotherapy (oral tiggio, 40 mg, two times/day, with a treatment cycle of 3 weeks). A 99mTc-methylene diphosphonate bone scintigraphy scan showed increased radioactivity in the right patella. A right knee biopsy showed the presence of patellar metastasis from OC. Unfortunately, the patient denied additional treatment and was discharged for personal reasons. At the 1-month follow-up, which was conducted by a telephone survey, we learned that the patient had died of acute pulmonary embolism. X-rays and computed tomography are useful for diagnosing patellar metastases, but 99mTc-methylene diphosphonate bone scintigraphy can help physicians diagnose patellar metastasis of OC more rapidly. Biopsy with pathology is the gold standard for diagnosing patellar metastases. Additionally, timely surgical treatment prolongs the survival time of these patients.

Keywords

Oesophageal carcinoma, patella, 99mTc-methylene diphosphonate bone scintigraphy, fracture, tumour, metastasis

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Introduction

Oesophageal carcinoma (OC) is among the top six cancer-related causes of deaths worldwide because it metastasises rapidly and has a poor prognosis.[1] The 5-year survival rate of these patients is less than 16%, and even the median survival time of patients with advanced OC is less than 1 year.[2] The most common metastatic sites of OC are the lungs and liver.[3] However, OC metastases in bones, primarily long bones, have been reported occasionally.[4]

The patella, which is the largest sesamoid bone in the body, is an uncommon site for tumours to occur, regardless of whether they are primary tumours or metastatic tumours.[5] In the past few decades, to the best of our knowledge, few cases of patellar tumours have been reported and patellar metastases of oesophageal cancer are even rarer,[6] Only two cases of metastases of OC have been reported.[7,8] For the first time, we present an extremely rare case of a 50-year-old man who was diagnosed with OC and solitary patellar metastasis with no other bone metastases. The patient's condition rapidly deteriorated because he did not undergo additional treatment and he died of acute pulmonary embolism.

Case report

A 50-year-old man presented to our clinic because of pain and limited range of motion in the right knee for 4 hours and he had a history of falls. After a fall, the patient was unable to walk normally, and the pain became worse after movement. A physical examination showed a limited active range of motion, swelling, and palpable bony rubbing in his right knee. He was also not able to perform straight leg raising. The patient's lymph nodes were not enlarged on either side.

An X-ray examination showed a comminuted fracture of the right patella and a lytic lesion in the lateral aspect of the patella (Figure 1). This was not a major trauma. Because of the patient's age and history of trauma, we considered the fracture to be caused by osteoporosis. However, after careful inquiry of the patient's medical history, we found that he had no other existing conditions, except for OC, which he was

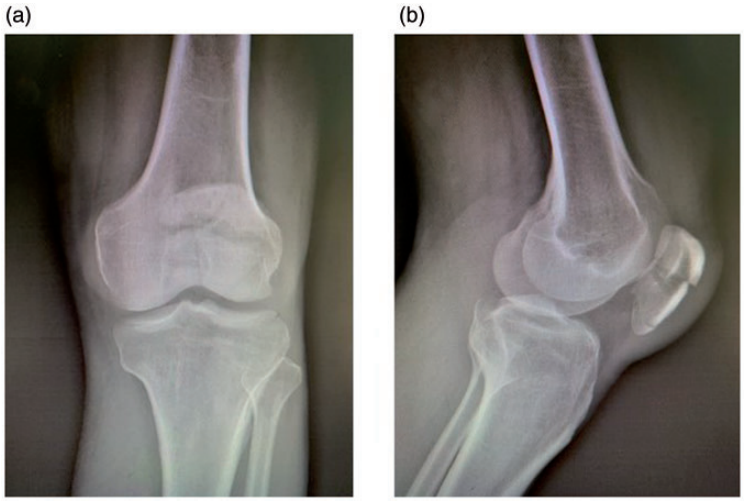

Figure 1. X-rays show a comminuted patellar fracture, defect, and bone resorption at the fracture end (a: anteroposterior; b: lateral).

diagnosed with 2 months previously. He had undergone two cycles of paclitaxel liposome combined with tiggio chemotherapy (oral tiggio, 40 mg/time, 2 times/day, with a treatment cycle of 3 weeks) for OC. Tiggio (fluorouracil derivative) is an oral anticancer agent, which is mostly used for treatment of advanced gastric cancer, bowel cancer, and oesophageal cancer. A computed tomography (CT) scan was then performed, which showed destruction of the lateral patellar cortex, low-density shadows, and irregular destruction of bone (Figure 2). However, the incidence of metastatic lesions to the patella is low.[9] A 99mTc-methylene diphosphonate (MDP) bone scintigraphy scan was performed to determine whether there were bone metastases. The images showed increased radioactivity in the right patella, which suggested OC with solitary patellar metastasis (Figure 3).

Under local anaesthesia, the patient underwent a needle biopsy. Postoperative pathology showed enlarged cell nuclei, an irregular morphology, and pathological mitosis, which could be diagnosed as cancer cells (Figure 4). The diagnosis of OC with solitary patellar metastasis was made on the basis of these findings. Cytology alone was not rigorous enough to diagnose secondary lesions, and therefore, the diagnosis of secondary OC was based on assumption. We immobilised the patient with a plaster and recommended hospitalisation for further treatment. Unfortunately, the patient denied additional treatment and was discharged for personal reasons. At a 1-month follow-up, which was conducted by a telephone survey, we learned that the patient died of acute pulmonary embolism.

Discussion

The patella is defined as the sesamoid bone originating from the quadriceps tendon. The patella develops from cartilage precursor cells in the third month of pregnancy and ossifies at approximately 3 years old.[9,10] The structure of the patella after ossification is similar to that of a long bone's epiphysis or apophysis. Therefore, the patella is a possible site for bone lesions. In clinical practice, painful and swollen knees are often associated with trauma, suppurative arthritis, rheumatoid arthritis, and degenerative osteoarthritis. Although

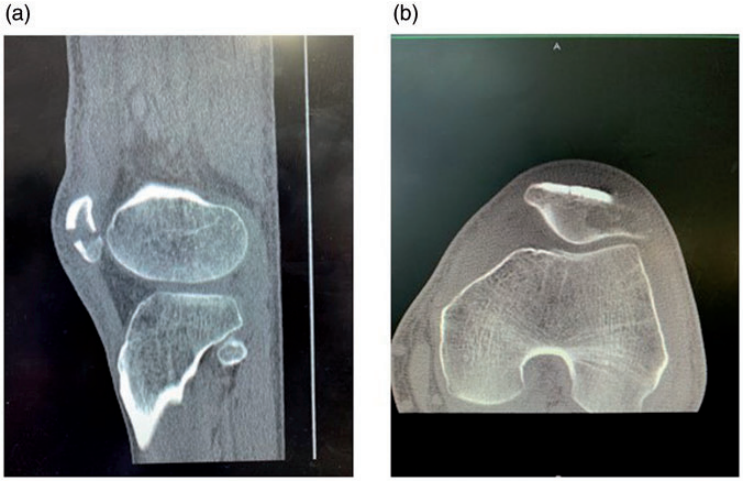

Figure 2. Computed tomography shows destruction of the lateral patellar cortex (a: sagittal; b: transverse).

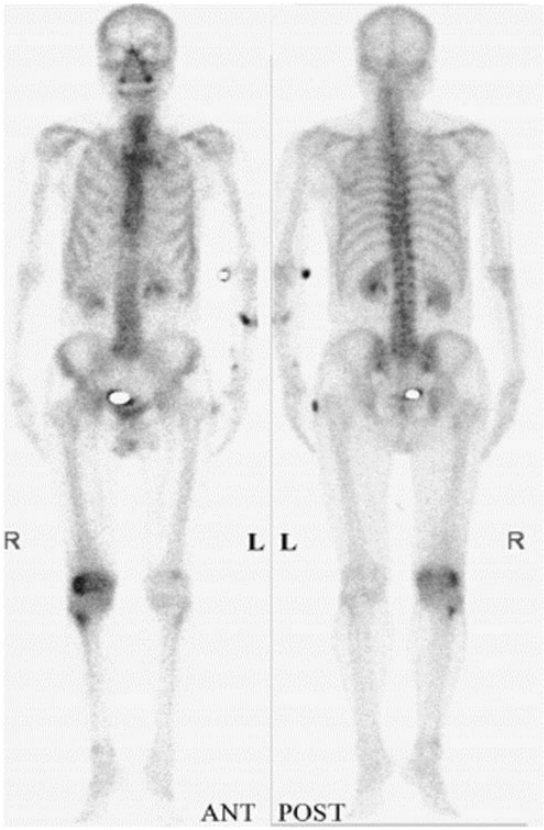

Figure 3. A 99mTc-methylene diphosphonate bone scintigraphy scan shows increased radioactivity in the right patella.

tumours are not a common cause, the possibility of patellar metastases should not be overlooked in patients with malignant tumours. However, the incidence of tumours found in the patella is low, and most of these tumours are giant cell tumours and chondroblastomas.[11] Reports of malignant tumour metastases to the patella are uncommon. Little is known about patellar tumours because of the low incidence of these tumours and the limited number of published studies on them. Solitary patellar metastasis from oesophageal cancer without other bone metastases is rare. Untimely diagnosis and treatment lead to worsening of this disease and make determining the prognosis difficult.[12] We report a case of OC with solitary patellar metastasis that deteriorated rapidly without treatment, and the patient died of acute pulmonary embolism.

The most common symptoms of patellar tumours are knee pain, swelling, and restricted mobility. A rapidly growing mass is another major symptom of a malignant tumour.[13] Because of spread and invasiveness of the tumour, it usually causes local redness, exudation, and other manifestations of inflammation, and can even lead to pathological fractures,[14,15] as in our case. When a patient with a malignant tumour has swelling and pain in the knee, we cannot ignore the possibility of patellar metastases. A MEDLINE database search

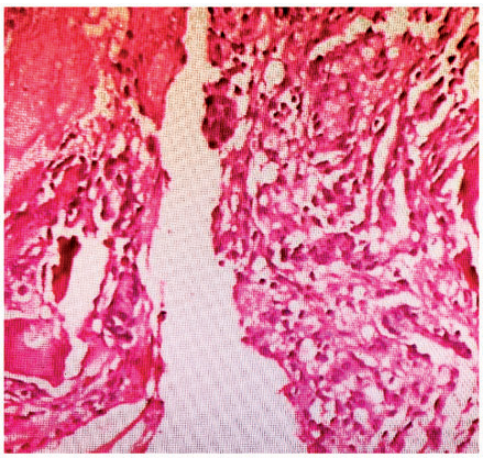

Figure 4. Pathology from a biopsy shows cancerous tissue. The nucleus is heterogeneous and the mitotic phase is obvious.
R, right; L, left; ANT, anterior; POST, posterior.

of studies published between 1952 and 2019 yielded only approximately 48 reported cases of patellar metastases.[6–9,16–25] There were more than 10 cases in which patellar symptoms were the first manifestation of the metastases.[18–21,25] Normally, patients with patellar metastasis of oesophageal cases initially have a history of progressive dysphagia, and immobilising pain and swelling in the affected knee gradually develop.[7,8] Notably, the current patient had isolated patellar metastasis 2 months after being diagnosed with OC, without lymph node metastasis or other types of metastasis. Because the OC was too large for complete resection, the patient underwent neoadjuvant chemotherapy before surgery. In such cases, an accurate initial examination is important for determining the appropriate therapy.

An X-ray examination is a common technique used to detect abnormal changes in the patella, which can lead to an earlier diagnosis of patellar tumours.[5] However, the accuracy of X-ray results varies by the size, shape, and location of the patellar tumour.[26] For malignant tumours, there is destruction of bone, unclear margins, and pathological fractures on plain radiographs.[27] However, these results need to be considered with CT or magnetic resonance imaging results to accurately identify the surrounding lesions and tumour sites for diagnosis.[28] An accurate initial examination is important for therapy. Although radiography and CT are commonly used, in such cases, bone scintigraphy is more useful for early diagnosis of bone metastases. Bone scintigraphy can accurately detect patellar tumours in scintigraphy scans because of their increased focal activity on the lesion of the affected patella.[29,30]

Surgery is the most effective treatment for patellar tumours.[31,32] According to the Enneking staging system, different surgical methods and resection ranges can be selected. In severe cases, amputation is required for treatment.[33] Unfortunately, our patient did not receive any treatment, which led to a rapid deterioration in his condition, and he eventually died of acute pulmonary embolism.

In conclusion, manifestations of malignant tumours can be misleading. Physicians need to be aware of this situation, even though OC occurring with isolated patellar metastasis is rare. X-ray and CT are useful for diagnosing patellar metastases, but bone scans can help physicians diagnose OC more rapidly. Biopsy with pathology is the gold standard for the diagnosis of patellar metastases. Additionally, timely surgical treatment prolongs the survival time of these patients.

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Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Ethics statement

This study complied with the Declaration of Helsinki. This study did not require approval from the Human Ethics and Research Ethics Committees of the Fourth Hospital of Hebei Medical University because it is a case report. Written informed consent was obtained from the patient for publication of this case report and its accompanying images.

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