Choriocarcinoma syndrome of primary pulmonary choriocarcinoma after lung lobe resection: A case report and review of the literature

Chen Chen
Sichuan University

Pei Zhao
Sichuan University

Zhenjun Liu
West China Hospital of Medicine: Sichuan University West China Hospital

Song Lu
West China Hospital, Sichuan University

Juan Ji
West China Hospital of Sichuan University

Xiuli Li
West China School of Medicine: Sichuan University West China Hospital

Qian Zhao
West China Hospital of Medicine: Sichuan University West China Hospital

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Case report

Keywords: primary pulmonary choriocarcinoma, male, choriocarcinoma syndrome

Abstract

Introduction: Primary pulmonary choriocarcinoma (PPC) is extremely rare, especially in males. It is characterized by a poor response to therapy and shortened survival times. Here, we report a PPC case which was complicated by choriocarcinoma syndrome (CS) and a review of the literature.

Case presentation: A 59-year-old man with 30-pack-year smoking history was referred to our hospital because of hemoptysis and chest pain. Positron emission tomography-computed tomography (PET-CT) showed multiple bilateral pulmonary nodules and multiple metastases throughout the body. The patient underwent single-port thoracoscopic wedge resection of the right lung upper lobe. Histological examinations verified the diagnosis of choriocarcinoma. Three days after the operation, the patient developed massive hemoptysis. A bronchoscopic examination showed bleeding from the bilateral main bronchus. Despite management in the intensive care unit (ICU), the patient died two weeks after surgery.

Conclusions: A rapid and correct diagnosis of PPC is necessary. When the patient has massive hemoptysis, we should be alert to the occurrence of CS. Surgery and modified chemotherapy, based on the physical condition of the patient, may currently be the best therapy for PPC.

Introduction

Choriocarcinoma is a highly malignant tumor which originates from anaplastic tropho-blastic tissue. Most of the choriocarcinoma usually occur in the female reproductive tract after a gestational event[1]. Extragonadal choriocarcinoma, which accounts for only 2% to 5% of all germ cell tumors[2], generally occurs in the midline of the body, such as the retroperitoneum, mediastinum, pineal gland, and intracranially. Primary pulmonary choriocarcinoma (PPC) in males is easy to misdiagnose or delay the diagnosis; therefore, a potentially curative chemotherapy or surgery may also be delayed[3]. Furthermore, choriocarcinoma syndrome (CS) is a lethal hemorrhagic comolication, containing high-volume choriocarcinomatous elements and markedly elevated β-HCG [1, 4]. Herein, we reported a 59-year-old PPC case and described the clinicopathological features, treatment, and prognosis of PPC and CS with a short review of the literature.

Case Presentation

A 59 years old man complaining of hemoptysis and chest pain presented to our hospital. Four months prior to admission, Chest computed tomography (CT) revealed a 43×26 mm parenchymal nodule in the posterior right upper lung lobe accompanied by emphysema, while no treatment was performed. The patient had hemoptysis without obvious inducement, accompanied by progressive shortness of breath, chest pain, intermittent fever, drenching night sweats, diminished appetite and a 5-kg weight loss over 3 months. The patient a smoking history for 30 years with one pack per day and a drinking history for 40 years with 200g per day.

There were no abnormalities on physical examination, including genital examination. Chest x-ray was significant for bilateral pulmonary nodules. Doppler ultrasound of the testes and mammography of breasts were negative for malignancy. To determine whether the tumor occurred primarily within the lung systemic screenings were performed by positron emission tomography-computed tomography (PET-CT). The results showed that multiple high metabolic nodules throughout the body (Fig 1), multiple bilateral pulmonary nodules (Fig 2), especially large mass in the upper lobe of the right lung (Fig 3), a 22 mm metastatic lesion in the pancreas (Fig 4), and multiple bone metastases (Fig 5). The patient underwent single-port thoracoscopic wedge resection of the right lung upper lobe. Extensive metastases in the right lung were observed during the operation, with tumor diameters ranging from 2-6 cm. Histopathologic workup of excised tumor showed poorly differentiated carcinoma and hemorrhage, with the few viable islands demonstrating syncytiotrophoblastic and cytotrophoblastic like cells (Fig 6). Immunohistochemical phenotype of pathological sections was that CK7(+), TTF-1(-), CK(+), CD34(-), CD117(-), OCT3/4(-), SALL4(+), HCGα(+), Ki67(+90%), Vimentin(-). Thus, we performed the serum β-HCG levels examination and the result was >10000.00(mIU/ml). The abnormal increase of tumor markers were ferritin >320.00 μg/L, lung tumor antigen (LTA) 136.20 ng/L and tissue polypeptide specific antigen (TPS)>4500.00 U/L. The results of sex hormone were testosterone 0.83 ng/mL, estradiol 716.10 pg/mL, follicle stimulating hormone (FSH) 0.26 mIU/mL. The pathological and hormone levels evidence met the diagnostic criteria for PPC.

Three days after the operation, the patient suddenly appeared consciousness disorder, sweating profusely and pinpoint pupils. Subsequently, hemodynamic instability and acute respiratory failure appeared. The patient was admitted to the ICU with tracheal intubation for respiratory support. A large amount of bloody fluid was sucked out of the bilateral main bronchus using bronchoscopy. The chest radiograph showed that multiple cluster and nodular shadows scattered in both lungs. Laboratory data was significant for white blood cell 13.85 900/mm which prompt the pneumonia. Subsequently, the patient developed cardiac dysfunction, manifested by increased myocardial markers. Cardiac color doppler ultrasound revealed that ventricular wall motion is not coordinated; left ventricular diastolic function decreased; ejection fraction was 60%. Simultaneously, the patient suffered acute renal failure, the endogenous creatinine clearance rate continued to decrease, to a minimum of 10.01 (ml/min/1.73m^2), and urea and creatinine continued to rise. Despite supportive treatment, the patient's condition continued to deteriorate. Due to multiple organ failure, the patient has no indications for chemotherapy and eventually died. Diagnosis of death: 1. Pulmonary choriocarcinoma with metastasis to the lung, brain, bone, pancreas, and lymph nodes 2. Severe pneumonia and respiratory failure 3. Acute renal failure; 4. Acute coronary syndrome.

Discussion

Due to infrequency of PPC, diagnosis before surgery is difficult [5]. In our case, the patient's single parenchymal nodule rapidly progresses to multiple bilateral pulmonary nodules combined with multiple metastases throughout the body during three months. It was not until postoperative pathology and β-HCG

examination that we finally established the diagnosis of PPC. Therefore, a rapid and correct diagnosis of choriocarcinoma is necessary. The diagnostic criteria for PPC includes the lack of a previous urological malignancy, solitary or predominant lung lesion without a primary gonadal site, elevated serum β-HCG levels that normalize following surgery or chemotherapy, and pathologic confirmation of the disease[6]. In our case, genital exam and doppler ultrasound failed to find the lesions of the reproductive system. Nevertheless, PET-CT showed multiple bilateral pulmonary nodules and multiple metastases throughout the body, so the primary tumor is not definitely at lungs, the possibility of a metastasis from occult lesions in other locations could not be ruled out entirely.

The choriocarcinoma syndrome (CS) is a rare and serious complication of the choriocarcinoma tumor. CS occurs shortly after the administration of chemotherapy and is connected with a high risk of fatal bleeding from metastatic lesions and frequently with acute respiratory failure with a high mortality rate at an early phase of the treatment induction [7]. Mostly, the hemorrhage appears shortly after the introduction of the chemotherapy, but there are also cases with pretreatment onsets reported in literature[8]. The basic mechanism of choriocarcinoma syndrome is probably massive lung metastases, massive intra-alveolar tumor-lysis, early necrosis of tumor cells, and consecutive superinfection, which can lead to acute respiratory failure (ARDS)[9]. Releasing of the cytokines is probably raising to systemic inflammatory response directing to multiorgan failure[10]. However, the patient's CS was likely resulted by the surgical procedure. There also have been report of CS after surgery, but the CS in that case occurred one and a half months after surgery[1], while the CS in our case developed only three days after surgery. This prompts us, for such advanced case, minimally invasive or even non-invasive procedure such as aspiration biopsy is more suitable to avoid inducing CS. Especially when we found that the patient has massive hemoptysis, we should be alert to the occurrence of CS. The outcome of choriocarcinoma tumor relies on its early recognition and chemotherapy. Chemotherapy should be started as soon as the results of the pathological evaluation and biological markers were known. We can use chemotherapy including bleomycin, etoposide, cisplatin, surgery and postoperative radiotherapy, and the prognosis will be improved[11].

Conclusion

In conclusion, PCC is highly malignant, progresses rapidly, and often has blood metastases at the time of diagnosis, and the prognosis is poor. The comprehensive treatment method of surgery combined with chemotherapy is advocated, but the effect is not satisfactory. Through clinical combined imaging and pathological examination, early detection, early diagnosis and early treatment are the keys to improving the prognosis of this disease.

Declarations

Ethics approval and consent to participate

All the investigation got the approval by Medical Institutional Ethics Review Board of West China Hospital of Sichuan University.

Consent for publication

Written informed consent was obtained from the participant and his family members before the study began. All authors have approved the manuscript.

Availability of data and materials

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Competing interests

The authors in this article declare that they have no competing interests.

Funding

This work was supported by Dr. Qian Zhao and Song Lu, members of West China Hospital of Sichuan University, who provided funding to conduct the analysis and prepare the manuscript.

Author Contribution

Conceptualization: Chen Chen

Investigation: Chen Chen, Pei Zhao

Project Administration: Zhenjun Liu, Song Lu

Resources: Juan Ji, Xiuli Li

Supervision: Qian Zhao

Acknowledgements

My sincere appreciation goes to the participants from West China Hospital of Sichuan University, who participated this study with great cooperation.

References

1. Takahashi, T. and R. Kobayashi, Choriocarcinoma syndrome after resection of primary pulmonary choriocarcinoma: report of a case. Surg Case Rep, 2016. 2(1): p. 122.
2. Hadgu, A., A. Tindni, and M. Panda, Primary pulmonary choriocarcinoma in a male. BMJ Case Rep, 2010. 2010.

3. Zhu, R., et al., Primary pulmonary choriocarcinoma in a male that was successfully diagnosed and treated: A case report and review of the literature. Medicine (Baltimore), 2016. 95(52): p. e5693.

4. Zeitjian, V.S., et al., Choriocarcinoma Syndrome: A Potentially Fatal Complication of Testicular Cancer. Case Rep Oncol Med, 2019. 2019: p. 4092941.

5. Snoj, Z., I. Kocijancic, and E. Skof, Primary pulmonary choriocarcinoma. Radiol Oncol, 2017. 51(1): p. 1-7.

6. Kamata, S., et al., A case of primary pulmonary choriocarcinoma successfully treated by surgery. Gen Thorac Cardiovasc Surg, 2017. 65(6): p. 361-364.

7. Moran-Ribon, A., et al., Super-high-risk germ-cell tumors: a clinical entity. Report of eleven cases. Support Care Cancer, 1994. 2(4): p. 253-8.

8. McGowan, M.P., M.R. Pratter, and G. Nash, Primary testicular choriocarcinoma with pulmonary metastases presenting as ARDS. Chest, 1990. 97(5): p. 1258-9.

9. Kirch, C., et al., Acute respiratory distress syndrome after chemotherapy for lung metastases from non-seminomatous germ-cell tumors. Support Care Cancer, 2003. 11(9): p. 575-80.

10. Kobatake, K., M. Kato, and K. Mita, Advanced testicular cancer associated with life-threatening tumour lysis syndrome and choriocarcinoma syndrome. Can Urol Assoc J, 2015. 9(1-2): p. 62-4.

11. Parshin, V.D., et al., [Treatment of primary choriocarcinoma of lung]. Khirurgiia (Mosk), 2018(3. Vyp. 2): p. 43-45.

Figures
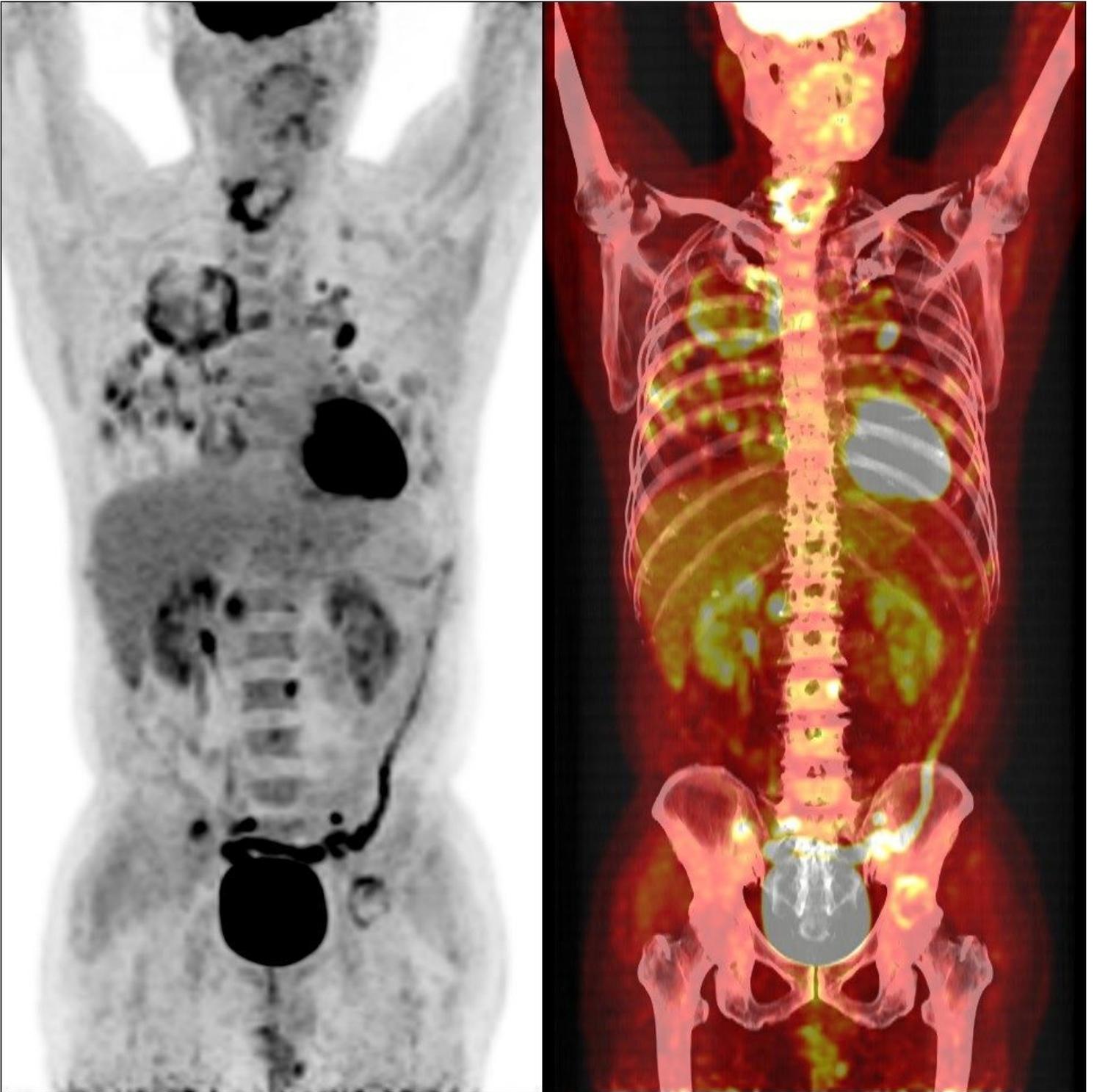
Figure 1

PET-CT revealed that multiple high metabolic nodules throughout the body.
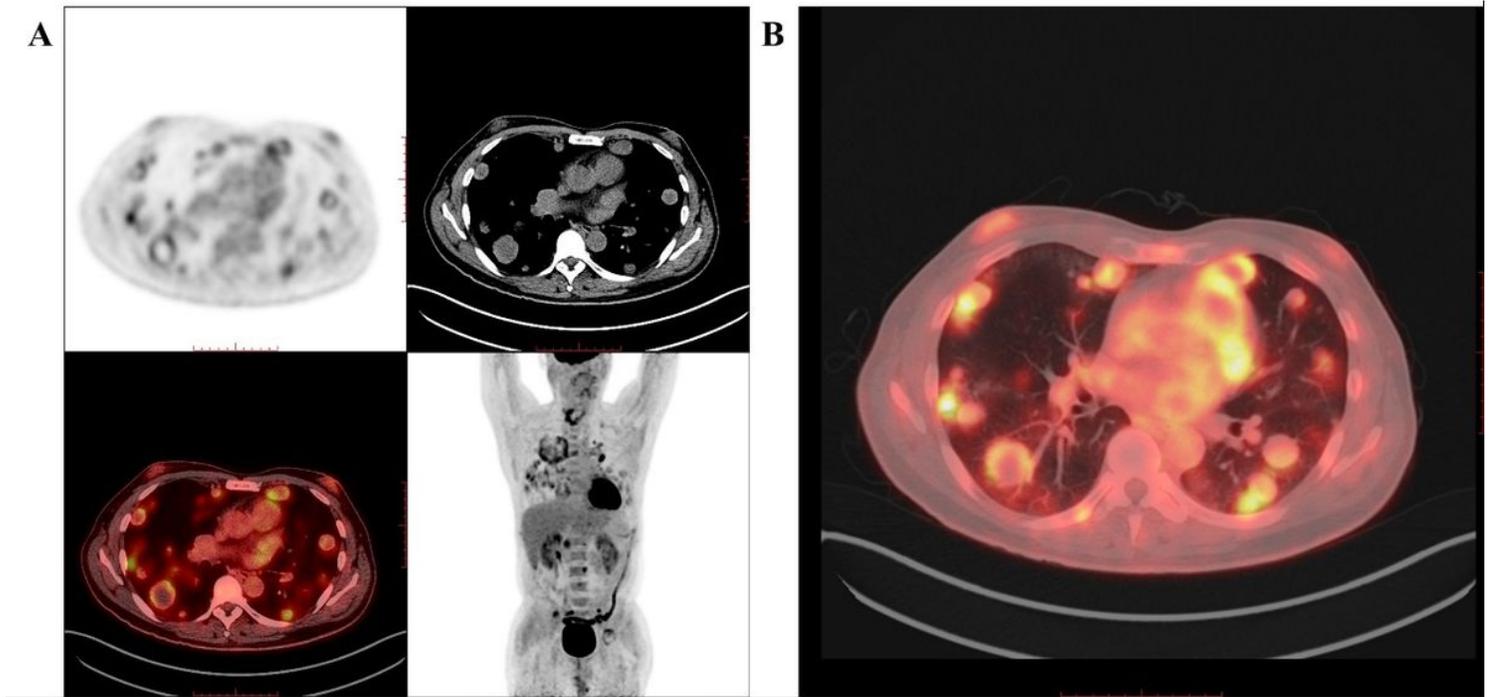
Figure 2

PET-CT revealed that multiple bilateral pulmonary nodules.
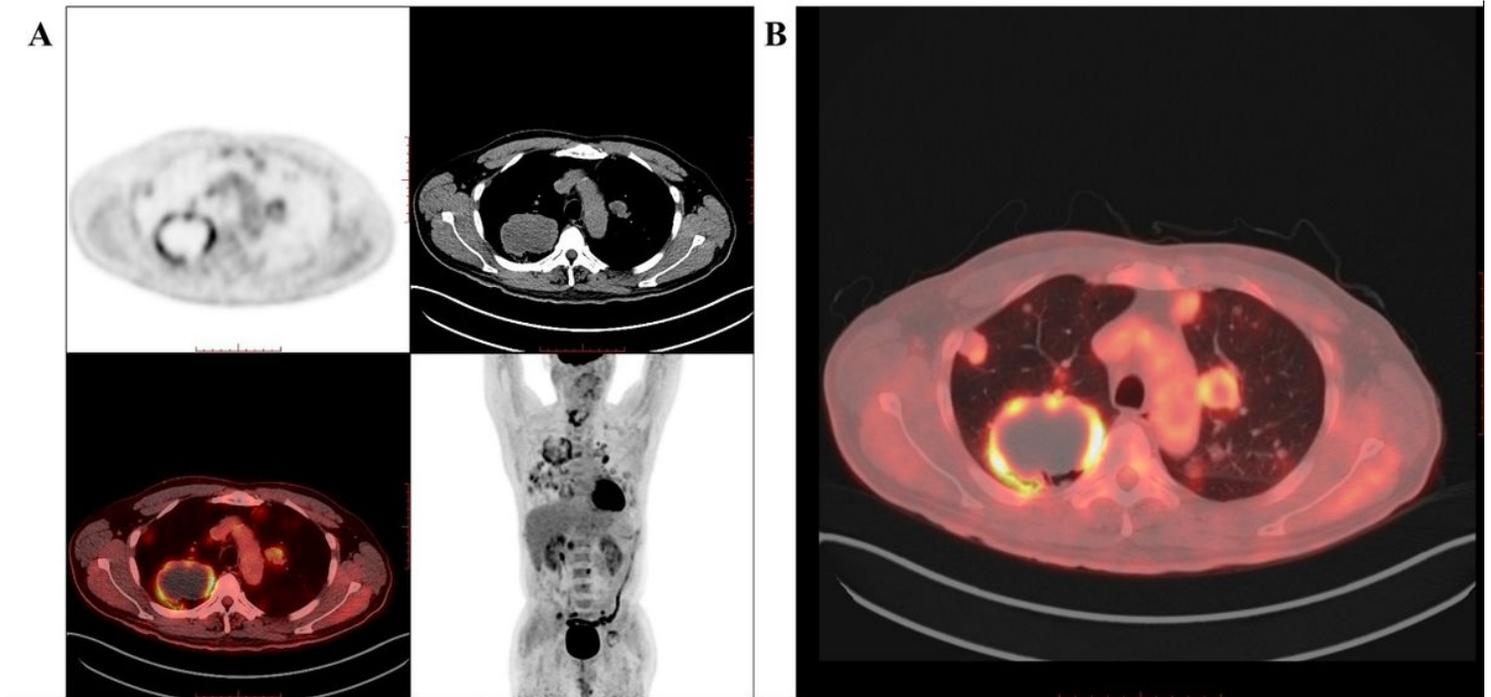
Figure 3

PET-CT revealed that large mass in the upper lobe of the right lung
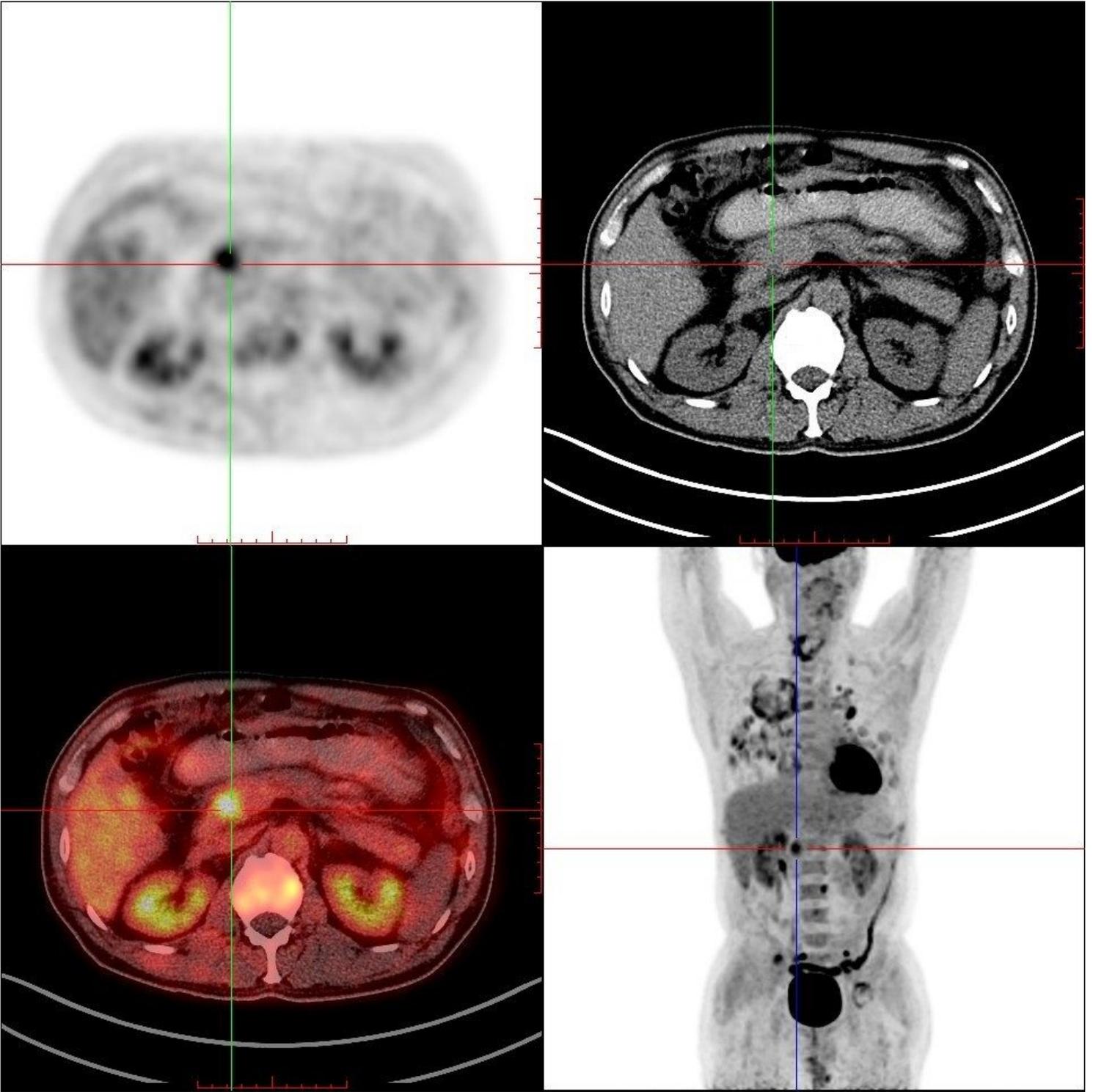
Figure 4

PET-CT revealed a 22 mm metastatic lesion in the pancreas
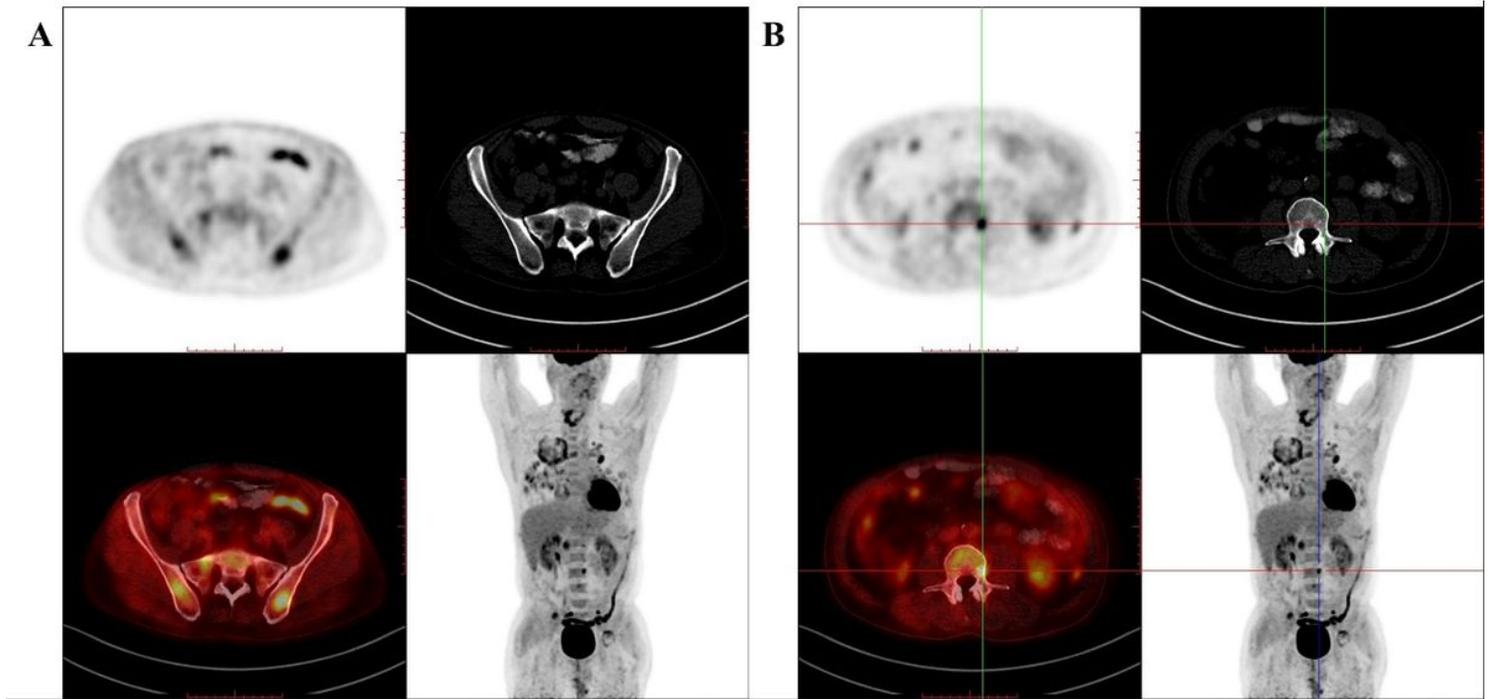
Figure 5

PET-CT revealed bone metastases in pelvis (A) and vertebra (B).
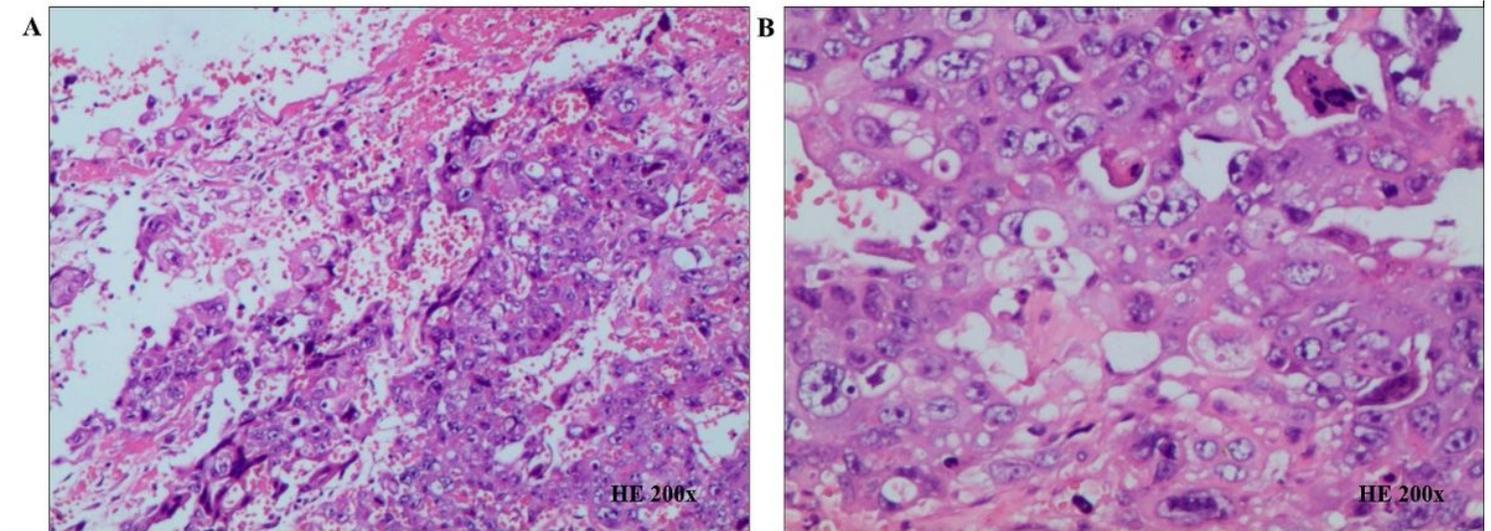
Figure 6

Histologic findings showing that the tumor was consisted of the poorly diffenrentiated adenocarcinoma, hemorrhage and islands demonstrating syncytiotrophoblastic and cytotrophoblastic like cells (hematoxylin and eosin stain; original magnification, ×200 and ×400).