Case Report

Conformal Radiotherapy for Squamous Cell Carcinoma of Gallbladder: A Case Report

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1. Background

Primary carcinoma of the gallbladder is the fifth most common malignancy of the digestive tract [1]. Squamous cell carcinoma, however, accounts for less than 3.93% of gallbladder cancers in China [2]. Symptoms generally develop late in the course of the disease, by which time the malignancy is aggressive and carries a poor prognosis. We report a case of advanced stage squamous cell carcinoma of the gallbladder that acquired complete tumor remission 2 months after the completion of conformal radiation therapy (CRT).

2. Case Report

A 58-year-old male was admitted to the local hospital with hypodynamia for 5 weeks. Physical examination was still unremarkable, the Karnofsky performance status (KPS) score was 90. A percutaneous biopsy was performed with ultrasound guidance, and the pathological diagnosis was squamous cell carcinoma. The pathologic differentiation was grade II (Figure 2). Laboratory tests showed the following: red blood cells $4.5 \times 10^9/L$, hemoglobin $153 \, g/L$, white blood cells $5.2 \times 10^9/L$, Neutrophils 58.2%, platelets $211 \times 10^9/L$, total bilirubin $10.4 \, mmol/L$, alanine aminotransferase $24 \, U/L$, aspartate aminotransferase $31 \, U/L$, alkaline phosphatase $71 \, U/L$, α-fetoprotein (AFP) 1.8 μg/L, carbohydrate antigen 19.9 (CA19.9) 8.5 U/L, and carcinoembryonic antigen (CEA) 4.56 U/mL. According to the CT, the surgeons figured that the tumor had lymph node metastases, which involved portal vein lymph node, inferior vena caval lymph node, and peripancreatic lymph node. They considered that the tumor was unresectable. The patient was recommended to receive conformal radiotherapy due to consideration of the advanced nature of the disease.

3. Radiotherapy

The patient provided written informed consent regarding treatment. No systemic chemotherapy was added during
radiotherapy. He underwent three-dimensional (3D) CRT with limited-field external beam radiation using a linear accelerator with 15 megavoltage photons at an outpatient clinic. For radiotherapy planning, the patient underwent a CT scan in the supine position with both arms raised above the head. The CT images were transferred to a 3D CRT planning system (Pinnacle 7.6C). The gross target volume included the gallbladder tumor, involved liver tissue, and abnormally enlarged portal lymph nodes. The clinical target volume included the gross target volume and the peripancreatic and celiac trunk lymph nodes, which were at risk for metastases. The planning treatment volume...
Figure 3: Postradiation CT scans corresponding to the sections in Figure 1. The region of low attenuation in the liver (arrows) corresponded to the treatment volume at 2 months after completion of 3D CRT. The tumor appears to have a complete response to 3D CRT.

included the clinical target volume and 0.7 cm margins for geometric uncertainties. The treatment portals encompassed the planning treatment volume plus 0.7 cm in each direction. Dose-volume histograms of the planning treatment volume, kidneys, liver, and spinal cord were necessary to select the optimal dose distribution plan. Coverage of 99.9% of the planning treatment volume by the 95% isodose line was required. The clinical target volume was subject to 40 Gy, with 14 Gy delivered to the gross tumor volume through reduced fields. The dose was in fractions of 2.0 Gy, once daily, five times per week for 5 weeks.

4. Result

During the entire period of radiation therapy, physical examination, routine blood tests, and serum biochemistry tests were performed once a week and remained normal. The patient's hypodynamia was relieved after completion of radiotherapy. The tumor marker levels were similar before and after treatment and considered normal (after treatment: AFP 2.1 ng/mL, CA19.9 7.9 U/mL, CEA 4.1 U/mL).

The patient was advised to return for follow-up 6 weeks after completion of the radiotherapy. Response to radiotherapy was evaluated at that time with an enhanced abdominal CT (Figure 3). CT showed that the tumor appeared to have a complete response to 3D CRT. A chest radiograph and whole body bone scan showed no evidence of metastasis. The patient was monitored every 3 months thereafter, and the abdominal CT remained unremarkable until 13 months after completion of radiotherapy. At that time, multiple metastatic lesions were found on CT. Two months later, the patient died of liver failure induced by intrahepatic lesions. The survival period was 15 months from initiation of radiation therapy to death.

5. Discussion and Conclusion

Gallbladder cancer is the most common malignant originating from biliary tract and represents approximately 8.4% of the estimated cases of hepatobiliary cancers diagnosed in the USA [3]. Squamous cell carcinoma of the gallbladder is a rare disease, accounting for 0.5%–12.7% of all malignant tumors of the gallbladder [4]. This malignancy is an aggressive and late symptomatic disease and most patients are treated at an advanced stage with a poor prognosis.

The only potentially curative therapy for gallbladder carcinoma is surgical resection. Unfortunately, most patients with this type of cancer have unresectable disease—only
10%–30% of patients are candidates for surgery at presentation. At present, no therapy is defined for unresectable cancer of the gallbladder, especially for squamous cell carcinoma. Reports on the efficacy of radiotherapy for gallbladder carcinoma are disappointing; most series have a small number of patients and results regarding survival are inconsistent. However, one study indicated that external beam radiotherapy, as an adjuvant to surgical treatment, has some beneficial effect on survival [5]. Radiotherapy may also be used in palliative management of advanced gallbladder carcinoma. We found no reports on radiotherapy for squamous cell carcinoma of gallbladder. In this case, the patient was treated with radiotherapy alone. CT scans showed complete tumor remission from 2 months to 13 months after treatment. This is encouraging evidence for the efficacy of radiotherapy for squamous cell carcinoma of the gallbladder, suggesting a possible role in treatment. However, the benefit in survival must be studied further. Ultimately, our patient died of liver failure due to intrahepatic metastases. Perhaps the addition of chemotherapy to radiotherapy may have influenced the outcome.

**Competing Interests**

We have no competing interests.

**Authors’ Contributions**

Jia-zhou Hou took charge of the treatment and drafted the manuscript. Zhao-chong Zeng participated in the design of the treatment and drafting of the manuscript. Jing Sun participated in the treatment. Yuan Ji participated in the pathological observation. All authors read and approved the final manuscript.

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**References**
