

Application of PETCT in Radiotherapy of Patients with Peritoneal Lymph Node Metastasis from Cervical Cancer

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Abstract: Objective To observe the value of positron emission computed tomography (PET CT) in radiotherapy of patients with peritoneal lymph node metastasis from cervical cancer. Methods 72 patients with peritoneal lymph node metastasis of cervical cancer admitted to our hospital from March 2018 to March 2019 were selected as the study objects. They were randomly divided into the control group (CT guided radiotherapy) and the observation group (PETCT guided radiotherapy) according to the admission sequence, with 36 cases in each group. The relevant indicators, short-term efficacy and adverse reactions of the two groups were compared. Results GTVnd, CTV, PTV in the observation group were significantly larger than those in the control group ($P < 0.05$), and there was no significant difference between the two groups in PGTVnd ($P > 0.05$); The total effective rate of short-term chemotherapy in the observation group was significantly higher than that in the control group (86.11% vs 70.73%, $P < 0.05$), and there was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$). Conclusion PETCT has a clear advantage in radiotherapy for patients with peritoneal lymph node metastasis of cervical cancer, and it can accurately locate the metastatic lymph nodes to improve the efficacy of radiotherapy, with good safety.

Keywords: Cervical Cancer; Peritoneal Lymph Node Metastasis; PETCT; Radiotherapy

Introduction

Cervical cancer is a common gynecological malignancy, with a younger incidence rate. The literature reports that the metastasis rate of para aortic lymph nodes of cervical cancer above stage II is about 16.5%~33.0%. The patients with peritoneal lymph node metastasis of cervical cancer are more difficult to operate, and more difficult to clean up, with poor chemosensitivity. Radiotherapy has become an effective treatment plan for patients with peritoneal lymph node metastasis of cervical cancer. Precise localization during radiotherapy for patients with peritoneal lymph node metastasis of cervical cancer is the key to improve the therapeutic effect. With the continuous development of imaging technology, positron emission computed tomography (PETCT) is gradually applied to the diagnosis and treatment of benign and malignant tumors. Its examination scope has greater advantages than that of single traditional imaging technology. However, there is still no unified conclusion about the application value of PETCT in radiotherapy for patients with peritoneal lymph node metastasis of cervical cancer, In this paper, PETCT and CT were used to guide radiotherapy for cervical cancer patients with peritoneal lymph node metastasis, and the differences between the two clinical treatments were compared. The specific results are reported as follows.^[1]

1. Data and methods

1.1 General information

72 patients with cervical cancer admitted to our hospital from March 2018 to March 2019 were selected as subjects. (1) Inclusion criteria: ① Cervical squamous cell carcinoma confirmed by histopathology; ② Age>25; ③ CT or MRI scanning

revealed peritoneal lymph node metastasis; ④ No previous radiotherapy; ⑤ Cassegrain score > 70; (2) Exclusion criteria: ① Combined with other malignant tumors; ② Pregnant or lactating women; ③ No indication for radiotherapy. 72 patients with cervical cancer, aged 26-70 years, with an average age of (51.03 ± 3.48) years. The FIGO clinical staging of cervical cancer: 13 patients with stage II b, 26 patients with stage III a, 23 patients with stage III b, and 10 patients with stage IV a. According to the admission sequence, 36 patients were randomly divided into the control group and the observation group. There was no significant difference between the two groups in terms of age, stage and other baseline data (P>0.05).^[2]

1.2 Research methods

(1) Observation group: radiotherapy under the guidance of PETCT. In vitro radiotherapy, intensity modulated radiation therapy (IMRT) with simultaneous dosage of enlarged lymph nodes was used. Before treatment, PETCT (GEDIscoveyTMST-16) scanning examination showed that the patient had an empty stomach > 6h, and 4.44MBq/Kg fluorodeoxyglucose (FDG) was injected through a three-way venous tube. The patient rested peacefully for about 50min. PETCT examination showed that the patient remained in a supine position, the radiotherapy position was fixed with thermoplastic body membrane, and the laser lamp was positioned to place the mark, Make sure the patient breathes calmly and then perform CT scanning (body acquisition voltage: 120KV, current: 150Ma, pitch: 1.75:1, head acquisition voltage, current: 120KV, 150mA, pitch: 1.75:1). Then perform 3D PET image acquisition (body acquisition: 3min for each projection field, 5-6 projection fields, head acquisition: 5min for each projection field, 2 projection fields), perform attenuation correction with CT data, and transmit the PETCT fusion image to the planning system after iterative reconstruction. On the PET CT fusion image, more than two gynecological oncologists delineated the GTVnd PET and CTV PET determined by visual judgment and fitting formula method on the fusion image of PET CT soft tissue window and PET metabolic image, and delineated the OAR rectum, bladder, small intestine and other parts. PTV45Gy was divided into 25 times (1.8Gy/time), and the PGTVnd of metastatic lymph nodes was simultaneously added 55-65Gy.^[3]

(2) The control group: radiotherapy under the guidance of CT. The enrolled patients were delineated ROI on the same CT imaging machine to determine GTVnd PET, CTV PET, OAR, and treated according to the radiotherapy scheme used by the observation group.

Efficacy evaluation: WHO solid tumor efficacy evaluation criteria are divided into complete remission (CR) (all lesions disappear and last for at least four weeks), partial remission (PR) (tumor volume reduction > 50%, duration no less than four weeks), no change in disease (NC) (tumor lesions do not change significantly after at least two cycles of treatment), and disease progression (PD) (new lesions appear or lesions increase > 25%). The overall efficacy = CR + PR.

1.3 Statistical treatment

SPSS20.0 software was used to analyze the research data, and the measurement data were ($\bar{x} \pm s$), the counting data is expressed as rate (%), and independent sample t-value test and χ^2 . The difference was statistically significant (P < 0.05).^[4]

2. Results

2.1 Comparison of chemotherapy related indicators between the two groups

GTVnd, CTV and PTV in the observation group were significantly larger than those in the control group (P < 0.05), and there was no significant difference in PGTVnd between the two groups (P > 0.05).

2.2 Comparison of short-term efficacy between the two groups

The total effective rate of short-term chemotherapy in the observation group was significantly higher than that in the

control group ($P < 0.05$).

2.3 Occurrence of adverse reactions in the two groups

There was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$).

3. Discussion

Imaging technology is widely used in the diagnosis and treatment of cervical cancer. CT has become an effective means of diagnosis and treatment of cervical cancer due to its advantages of high image resolution and accurate positioning, but at the same time, it is difficult to make accurate qualitative diagnosis. In recent years, with the continuous development of imaging technology, PETCT came into being. In 2012, NCCN guidelines suggested that PETCT scanning can be carried out for cervical cancer patients with FIGO stage I b2 and above to assess the condition of cervical cancer, It has certain clinical significance to guide rational treatment plan. Radiotherapy has become the standard treatment mode for patients with advanced cervical cancer and formed a routine clinical guideline, but the efficacy of chemotherapy is not ideal, which is closely related to peritoneal lymph node metastasis; The study points out that the recurrence rate of pelvic and retroperitoneal lymph nodes in cervical cancer patients with peritoneal lymph node metastasis after concurrent radiotherapy and chemotherapy is about 33% - 40%, and the 3-year progression free survival rate is about 33%, or it may be related to the inaccurate location of the metastatic lymph node area during radiotherapy, leading to the low dose of chemotherapy drugs in the tumor focus. Therefore, accurate location of the tumor focus during radiotherapy for cervical cancer is of great clinical significance to improve the chemotherapy efficacy of patients.^[5]

It is reported in the literature that the sensitivity of CT in detecting retroperitoneal lymph node metastasis is about 44%. Compared with CT, PETCT has more obvious advantages in sensitivity of 97% and specificity of 94% for lymph node metastasis. Early studies confirmed that it is feasible to delineate cervical cancer target areas on PETCT images, and this method can reduce the impact of human factors. However, at present, there is no unified conclusion about the application value of PETCT in the evaluation of radiotherapy efficacy in patients with peritoneal lymph node metastasis of cervical cancer. The results of this study show that: GTVnd, CTV, PTV in the observation group are significantly larger than those in the control group, PGTVnd in the two groups has no statistical significance, the total effective rate of short-term chemotherapy in the observation group is significantly higher than that in the control group, and the incidence of adverse reactions in the two groups has no significant difference, It is preliminarily confirmed that PETCT guided radiotherapy for cervical cancer patients with peritoneal lymph node metastasis is beneficial to increase the drug dose in the tumor area, and the short-term efficacy is significantly better than CT guided radiotherapy, but it does not significantly increase the incidence of adverse reactions. In PETCT examination, 18F-FDG tracer is used to make a large number of them gather at the lesion, forming a significant difference from the boundary of surrounding normal tissues. At the same time, PETCT gathers anatomical and functional images, which can clearly show the extent of lesion invasion, help to define the boundary of the tumor, and can also automatically calculate the SUVmax value of the lesion location according to ROI technology, which is conducive to accurate judgment of benign and malignant lesions, In radiotherapy, it can better play the role of precise positioning ^[6]. Previous studies have pointed out that the radiotherapy positioning of PET images is more sensitive and specific to the location and judgment of tumor targets, especially peritoneal lymph nodes, than CT, which can effectively reduce the risk of missed treatment of tumor targets of the involved lymph nodes. Therefore, the clinical efficacy of radiotherapy under the guidance of PET in the treatment of cervical cancer patients with peritoneal lymph node metastasis is better. Based on the above analysis, PETCT has clear application value in radiotherapy of patients with peritoneal lymph node metastasis of cervical cancer, and has certain advantages in promotion and application.

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