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CASE REPORT

Metastatic Brain Adenocarcinoma and Pelvic Squamous Carcinoma Originating From Cervical Adenosquamous Carcinoma: A Case Report and Literature Review

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Background: Cervical adenosquamous carcinoma (ASC) has a poor prognosis, and brain metastasis (BM) is extremely rare. Patients with BM have a poor prognosis. At present, there is no satisfactory treatment and no standard effective treatment. In recent years, immune checkpoint inhibitors (ICIs) and surgical treatment have emerged as a promising treatment for recurrent and metastatic cervical cancer (CC).

Case: We report a 39-year-old CC patient whose cervical biopsy pathology showed adenocarcinoma with stage IIIC1r, and so underwent radical radiotherapy and chemotherapy 7 years ago. She was under a palliative enterostomy 4 years ago after intestinal perforation due to multiple recurrence of pelvic tumor. To our surprise, postoperative histopathology was squamous cell carcinoma and adenocarcinoma, ASC was confirmed. The postoperative efficacy of intravenous chemotherapy combined with immunotherapy was partial response (PR), and the efficacy of immunomaintenance therapy was progressive disease (PD). While she had gone through the recurrence of intestinal leakage 3 years ago, Pelvic exenteration (PE) was performed (postoperative histopathology squamous cell carcinoma), the postoperative effect was complete response (CR), and the patient selected regular reexamination. Isolated BM focus was developed in August 2024, and radiotherapy, chemotherapy and immunotherapy were refused after surgical treatment (post-operative histopathology adenocarcinoma). The progression-free survival (PFS) after BM is nearly one year. At present, the patient's reexamination showed no obvious abnormality.

Conclusion: We report a case of ASC, whose at the initial treatment, the cervical lesions were mainly adenocarcinoma. However, pelvic metastatic lesion was mainly squamous carcinoma and underwent chemotherapy combined with immunotherapy combined with PE. The histopathology form of BM is adenocarcinoma. The surgical treatment has achieved remarkable curative effect and survival benefit.The choice of treatment is often based on the number of metastases in the patient's clinical state, tumor size, and metastases in other organs.

Keywords: brain metastases, cervical adenosquamous carcinoma, cervical cancer, immunotherapy, pelvic exenteration

Introduction

Cervical cancer (CC) is one of the most common female cancers worldwide.[1] Among the four cancers specific to women, CC ranks second in the global cancer burden, only after breast cancer. In 2021, the total incidence of cc reached 0.67 million cases, and the number of deaths is 211,484.[2,3] The number of CC cases is the highest in China, India and the United States.[2] About 70% to 80% of CC are cervical squamous cell carcinomas, 20% to 25% are adenocarcinomas, and

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the rest are ASC and rare histological types.[4] Due to the unique pelvic anatomy and its congenital pathological features, cervical squamous carcinomas cells mainly metastasized to the pelvic and paraaortic lymph nodes via lymphatic vessels.[5] The 5-year overall survival rate associated with lymph node metastasis is not satisfactory, and lymph node metastasis reduces 5-year survival from 95% to 33.3%.[6] For these patients with tumor recurrence, especially after radiotherapy, there is a lack of effective treatment options. In addition to chemotherapy, immunotherapy and other methods, surgical treatment is mainly Pelvic exenteration (PE). PE can prolong the disease-free survival and overall survival of patients by removing the recurrent tumor and the involved pelvic organ. However, there are some problems such as high surgical risk, high cost and changes in patients' living habits.[7,8] In recent years, another breakthrough in the treatment of CC is the application of immune checkpoint inhibitors (ICIs), which play a role in inhibiting the escape of the host immune system. Pembrolizumab was the first anti-PD-1 monoclonal antibody approved by the US Food and Drug Administration for the treatment of CC.[9] Pembrolizumab combined with chemotherapy ± bevacizumab can be used as a new first-line standard treatment for patients with recurrent or metastatic CC.[10] Side effects need to be closely monitored and managed, and screening for checkpoint positive patients is more conducive to treatment.

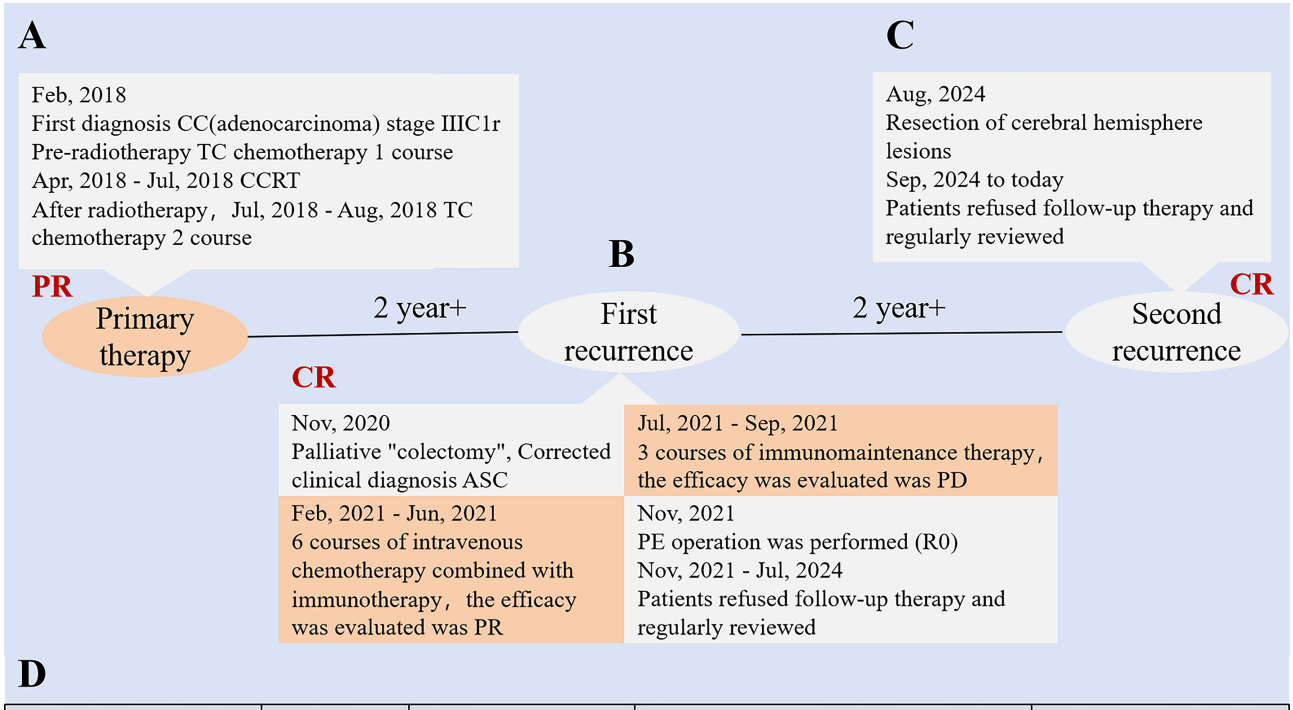
Patients with ASC treated primarily radiotherapy (RT) have a poorer prognosis compared to patients with squamous cell carcinoma. Incomplete regression of tumor after RT is the most important prognostic factor for local failure.[11] In the presence of distant lesions, the 5-year survival rate for CC is low, at 16.5%, and spread to the central nervous system is often associated with death within 6 months of BM diagnosis.[12] Therefore, BM is a marker of longevity restriction independent of tumor burden.[13] Although BM is rare in CC cases, its fatality rate is very high. Its occurrence is mainly a higher risk with histological types of previous lung metastases, adenocarcinoma, ASC, undifferentiated carcinoma, and neuroendocrine carcinoma.[14] At present, there is no unified treatment plan for BM of CC, which mainly includes surgery, radiotherapy, chemotherapy, and immunotherapy. The choice of treatment is often based on the number of metastases in the patient's clinical state, tumor size, and metastases in other organs.[13,15,16]

Clinical experience in the treatment of ASC with recurrence and metastasis after radiotherapy is insufficient. Here, we present a case of a patient initially diagnosed as cervical adenocarcinoma as FIGO2021 stage IIIC1r, who had poor response to initial chemoradiotherapy. At pelvic recurrence, palliative surgery (confirmation histologically was ASC), chemotherapy, immunotherapy, and PE were given to achieve R0. R0, that is, the tumor is completely resected, refers to the situation where no cancer cells can be found at the resection margin under the microscope, and no cancer cells remain either with the naked eye or under the microscope. The lesion has been completely resected. Isolated lesion BM was found, and good clinical benefit was obtained after surgical treatment.

Case Report

The patient has no family history of CC, was not on any medicines and has not undergone cervical screening. Therefore, she is not sure whether she has cervical preneoplastic lesions. Seven years ago, she was 32-year-old with postcoital bleeding and gynecological examination indicates cervical masses, human papillomaviruses (HPV) and cervical biopsy pathology. The results show that HPV is positive for the 18 high-risk subtype. Moreover, the biopsy pathological result was adenocarcinoma with pelvic MRI suggested enlargement of left pelvic lymph nodes, and metastasis was considered, so the stage for she was IIIC1r (Timeline illustrated in Figure 1). On Feb, 2018, she received 【paclitaxel + cisplatin】 chemotherapy for 1 course. Tumor regression was not obvious after chemotherapy. Concurrent chemoradiotherapy was performed from Apr, 2018 to Jul, 2018. The specific target dose of external irradiation was 50Gy/25f, and that of after-load radiotherapy was 40Gy/7f. During radiotherapy, 3 courses of concurrent chemotherapy 【Docetaxel + Lobaplatin】 were treated. After radiotherapy, the cervical area occupied significantly reduced and some remained. Then, 2 courses of chemotherapy 【Docetaxel + Lobaplatin】 were continued from Jul 2018 to Aug 2018, so the efficacy was PR. The patients were reviewed regularly (Figure 1A).

Four years ago (Nov, 2020), due to "abdominal pain", the patient's abdominal CT examination revealed perforation of the sigmoid colon. After palliative "colectomy" and colostomy, postoperative histopathology indicated that low-medium differentiated squamous cell carcinoma was seen in the whole layer of the colon wall, and mucinous adenocarcinoma nodules were found in the mesentery. Combined with the medical history and immunohistochemical results, it was more likely to come from the cervix. The patient was diagnosed with a first recurrence of CC (PFS: 28m) and had a corrected



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	Date	Diagnosis	Treatment	Outcome
Primary therapy	Feb, 2018	CC(adenocarcinoma) stage IIIC1r	TC chemotherapy 1 course	PR
	Apr, 2018 - Jul, 2018		CCRT	
	Jul, 2018 - Aug, 2018		TC chemotherapy 2 course	
First recurrence	Nov, 2020	Pelvic recurrence of ASC	Palliative "colectomy"	CR
	Feb, 2021 - Jun, 2021		6 courses of intravenous chemotherapy combined with immunotherapy	
	Jul, 2021 - Sep, 2021		3 courses of immunomaintenance therapy	
	Nov, 2021		PE operation was performed	
Second recurrence	Aug, 2024	BM of ASC	Resection of cerebral hemisphere lesions	CR

Figure 1 Timeline of diagnose and treatment of the patient. (**A**) Primary therapy; (**B**) First recurrence and therapy; (**C**) Second recurrence and therapy; (**D**) The patient's treatment schedule.

clinical diagnosis of ASC (Supplementary Figure 1). Six courses of intravenous chemotherapy combined with immunotherapy【Paclitaxel for Injection (Albumin Bound) + Cisplatin + Pembrolizumab】 were administered. We evaluated efficacy after course 2, 4 and 6 of treatment, the efficacy was PR after 4 courses of treatment. Jul 2021 the efficacy was evaluated as PD after 3 courses of immunomaintenance therapy 【Pembrolizumab. Oct 2021, the patient discharged feces and other intestinal contents through the vagina. We suspect that it is accompanied by enterovaginal leakage, abdominal Nuclear Magnetic Resonance Imaging scan (MRI) (Figure 2A and B) and 18F-FDG PET/CT (Figure 2C) revealed pelvic metastasis around the left iliac vessel, involving the left psoas major muscle, iliopsoas muscle, pelvic wall and adjacent intestinal duct, involving the left ureter, retroperitoneal and bilateral inguinal lymph node metastasis.

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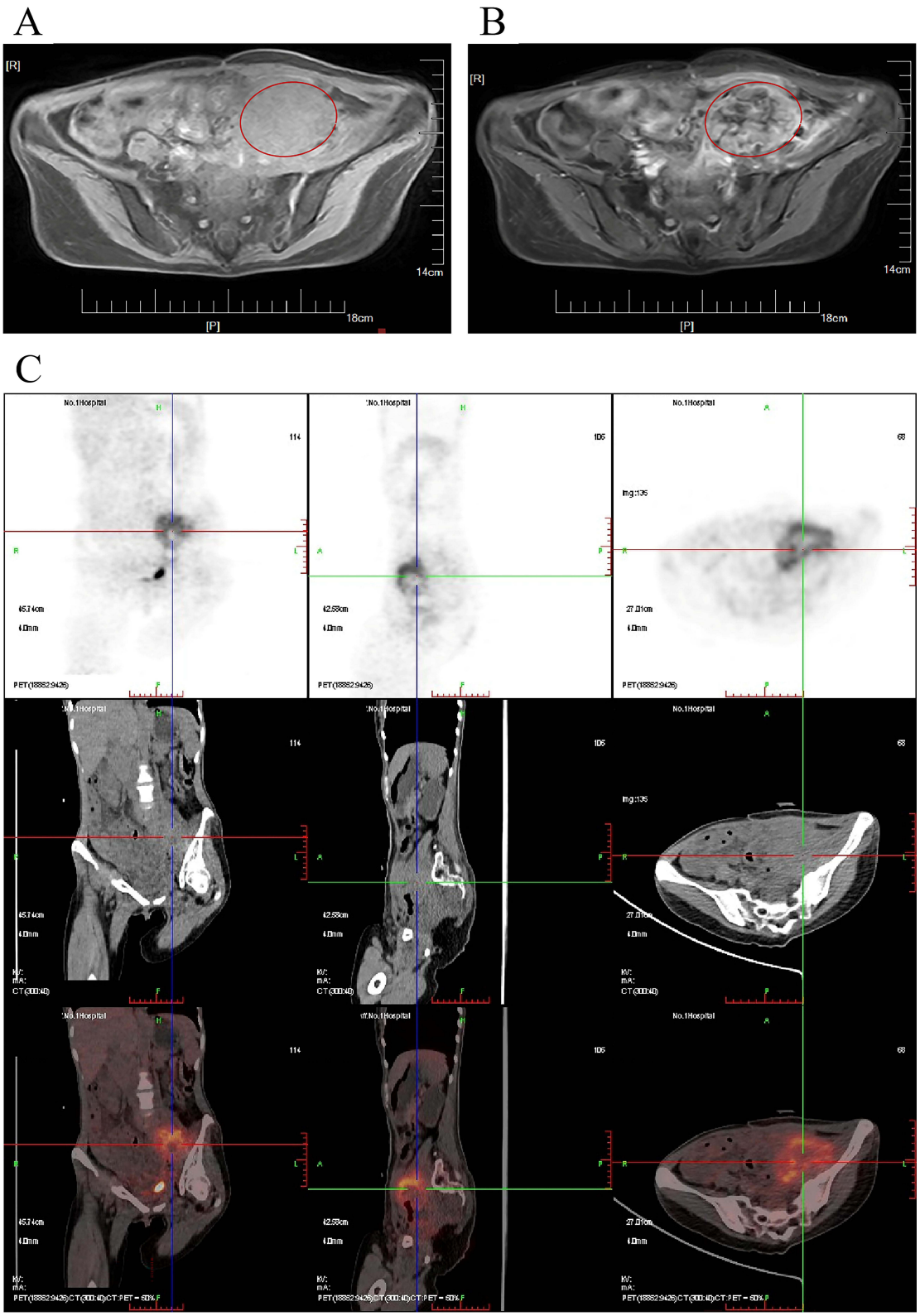

Figure 2 Imaging data of the patient before PE. (**A**) Pelvic MRI scan, in which the red circle shows the metastatic lesion; (**B**) Pelvic MRI contrast scan, in which the red circle shows the metastatic lesion, T1WI shows equal and low signal, T2WI shows equal and high signal, DWI shows high signal, ADC shows low signal, and the enhanced scan shows uneven enhancement. (**C**)18F-FDG PET/CT shows the recurrent tumor in the left pelvic cavity.

On Nov 10, 2021, PE operation was performed (transabdominal perineorectomy, total cystectomy, double adjunctive hysterectomy, partial enterocolectomy, entero-ascending colostomy, right ureteral cutaneous stomy, left iliac vessel resection, left iliac vessel artificial vascular replacement, pelvic lymph node dissection). Histopathology results showed that there was moderately differentiated squamous cell carcinoma infiltrating in the fibrous fat of pelvic cavity, and no carcinoma was found at the incisal margin (R0) (Supplementary Figure 2), so the efficacy was evaluated was CR (Figure 2C). Patients refused follow-up immune maintenance therapy, etc., and regularly reviewed the disease (Figure 1B).

In Jul 2024 the patient had intermittent convulsions without obvious causes, accompanied by dizziness and headache. In Aug 2024, the 18F-FDG PET/CT (Figure 3A) and MRI contrast scan of the brain (Figure 3B) indicated the possibility of metastatic tumor in the right frontal lobe nodule. At the same time, 18F-FDG PET/CT showed that the pelvic cavity was changed after PE, and no abnormal increase in metabolism was observed (Figure 3C). Next resection of cerebral hemisphere lesions was performed (Figure 1C). Postoperative histopathology findings: brain metastatic adenocarcinoma, except for a few carcinomas with squamous cell carcinoma differentiation. Although follow-up chemotherapy, radiotherapy, or immunotherapy were strongly recommended, the patient refused, at present (June 2025, 10 months after BM resection surgery), the patient's reexamination showed no obvious abnormality (Supplementary Figure 3).

The complicated medical history of the patient was not only reflected in the fact that she had undergone surgery for PE and BM metastases but also because the pathological results were different each time. The pathological is adenocarcinoma in the initial treatment and adenosquamous carcinoma in the first recurrence under palliative "colectomy" (Supplementary Figure 1); tissue of PE is squamous carcinoma (Supplementary Figure 2); tissue of BM is metastatic adenocarcinoma, except for a few cancerous tissues with squamous carcinoma differentiation (Supplementary Figure 3). However, microscopic images and immunohistochemical results of each metastasis indicated that the cervix was the primary lesion (Figure 4). Figure 4A–J are form palliative "colectomy" specimen tissue; Figure 4K and L are from PE postoperative metastatic tissue; Figure 4M–P are form are form BM metastatic tissue. Among them, palliative "colectomy", as a turning point in the diagnosis of this patient, is of great significance for the diagnosis of ASC. We performed extensive immunohistochemical tests to diagnose ASC while ruling out primary bowel cancer, and our results were supported ASC by immunohistochemical of p16 in tumor is positive yellow arrow, while intestinal mucosa is negative with the black arrow (Figure 4B), in periintestinal fat is positive (Figure 4I yellow arrow). Immunohistochemical of CK 5/6 of tumor is positive (Figure 4E) and p40 of tumor is partially positive (Figure 4F) which means that squamous cell differentiation, is a reliable marker of squamous cell carcinoma. And the signature immunohistochemical CK20 for primary bowel cancer in intestinal mucosa is positive with the black arrow, while colon metastatic tumor after colectomy specimen tissue is negative (Figure 4D yellow arrow) and periintestinal fat (Figure 4J) are negative. These help us rule out primary intestinal adenocarcinoma. Tissue specimens for BM resection (Figure 4M), left brain tissue (Figure 4M black arrow), right tumor solid growth (Figure 4M yellow arrow), immunohistochemical p16 is diffuse positive (Figure 4O), and p53 is mutant expression (Figure 4P), while ER (Supplementary Figure 4A) and PR (Supplementary Figure 4B) were negative. Therefore, it is not considered that this brain tumor is a meningioma.

Although the patient underwent two major surgeries in a short period of time, her Eastern Cooperative Oncology Group Performance Status (ECOG) physical status was 1–2 points when reviewed in January 2025, the patient could walk, and the head and abdominal CT scans showed no abnormalities.

Discussion

After lung, colon and breast cancer in women, CC has the fourth highest incidence globally,[1] and women's lives are seriously threatened. According to the WHO, there are more than 600,000 new cases and more than 300,000 deaths globally each year.[17] Chemoradiation (CRT) is the standard treatment for locally advanced CC.[18] To improve oncology outcomes, the role of chemotherapy in neoadjuvant and adjuvant therapy continues to be investigated. Despite advances in standard therapies, patients with recurrent metastatic CC face poor prognosis and limited treatment options. Therefore, recurrent and persistent CC is the difficulty in the treatment of gynecological malignant tumor, and is also the key point

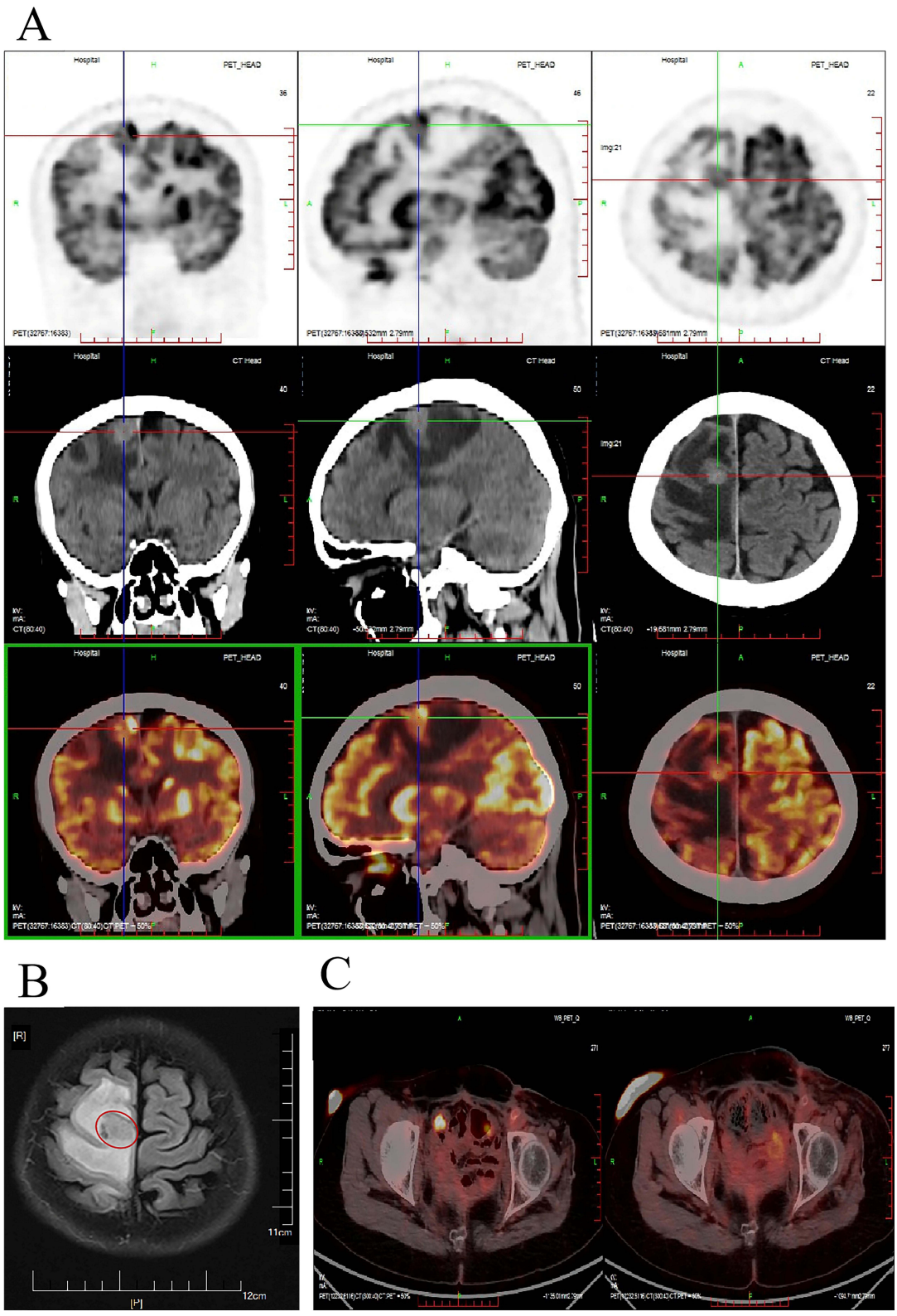

Figure 3 Imaging data of the patient BM preoperative. (**A**) 18F-FDG PET/CT shows high metabolic nodules in the right frontal lobe, considered brain metastases with peripheral edema; (**B**) Brain MRI contrast scan in which the red circle shows the metastatic lesion and peripheral edema; (**C**) 18F-FDG PET/CT showed that the pelvic cavity was changed after PE, and no abnormal increase in metabolism was observed.

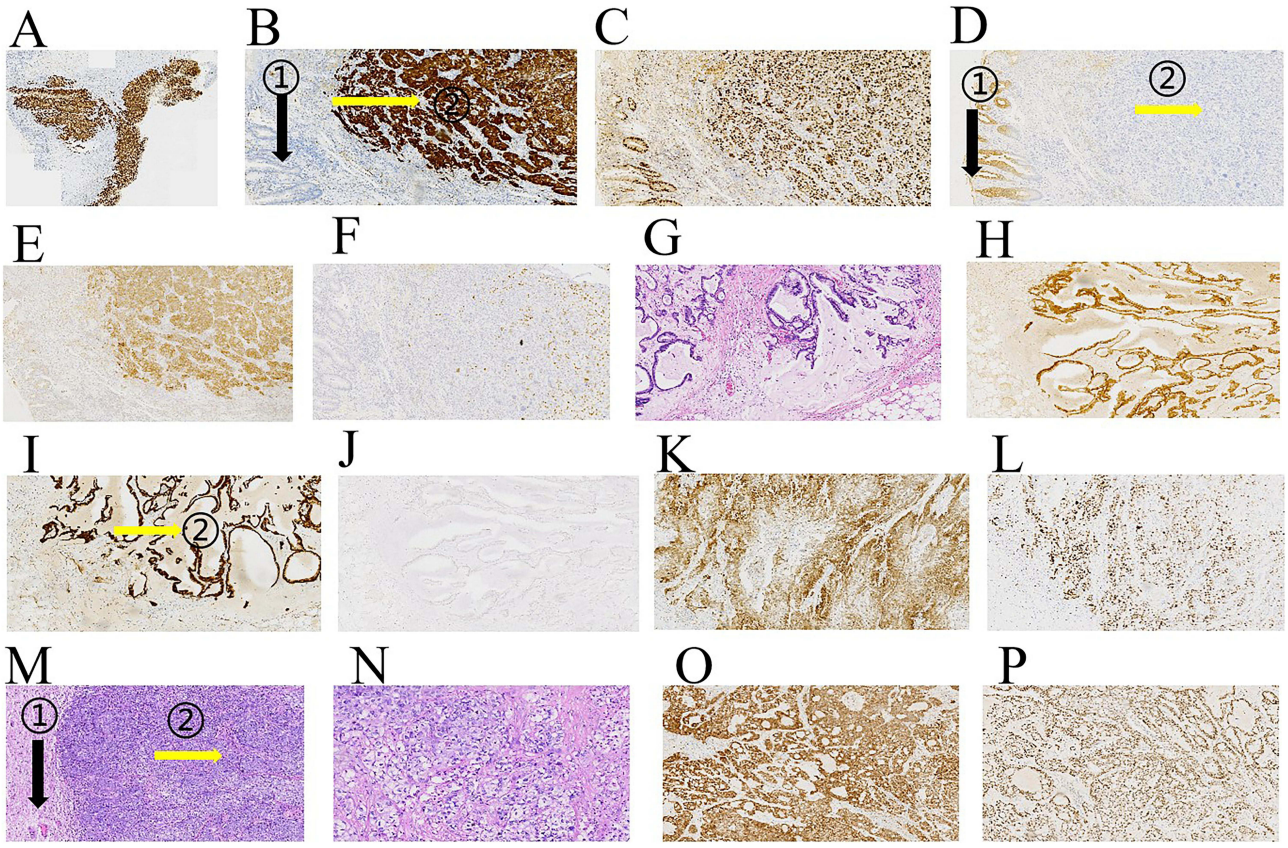

Figure 4 Histopathological examination of the patient. (**A–J**) are from the palliative "colectomy" specimen tissue. (**A**) Whole slide image of section stained with p16; (**B**) Section stained with p16, tumor is positive (yellow arrow ②), while intestinal mucosa is negative (black arrow ①) (40x); (**C**) Section stained with Ki-67 of sigmoid colon, showing 70% positivity (40x); (**D**) Section stained with CK20, intestinal mucosa is positive (black arrow ①), while tumors is negative (yellow arrow ②) (total magnification x40); (**E**) Section stained with CK 5/6 of tumor is positive (40x); (**F**) Section stained with p40 of tumor is partially positive (40x); (**G**) Periintestinal fatty adenocarcinoma (H&E; 40x); (**H**) The Periintestinal fat section stained with Villin is positive (40x). (**I**) The Periintestinal fat section stained with p16 is positive (40x); (**J**) The Periintestinal fat section stained with CK20 is negative (40x); (**K** and **L**) are from the PE postoperative metastatic tissue. (**K**) Section stained with p16 is positive (40x); L. Section stained with Ki-67 is positive 70% (40x); (**M**–**P**) are from the BM metastatic tissue. M. Left brain tissue (black arrow ①), right tumor solid growth (yellow arrow ②) (H&E; 40x); (**N**) Myxoid area of BM metastases (H&E; 40x); (**O**) Section stained with p16 is diffuse positive (40x); (**P**) Section stained with p53 shows mutant expression.

to improve the survival rate of patients and the focus of clinical research. Therefore, recurrent or persistent CC is the difficulty in the treatment of gynecological malignant tumor, and is also the key point to improve the survival rate of patients and the focus of clinical research. The improvement of surgery and the enhancement of radiotherapy concept provide technical guarantee for the effective treatment of recurrent or persistent CC.[7,8,19] However, there are significant geographical differences in the burden of CC among countries and regions around the world. Compared with developed countries, the morbidity and mortality rates in low-income and middle-income countries are five times higher.[1,20] China and India account for approximately 42% of new CC cases and 39% of CC deaths worldwide.[20] In 2021, there were over 660,000 new cases, with approximately 20% of them occurring in China.[3] The application of immunotherapy and targeted therapy make the maintenance treatment of recurrent or persistent CC possible.[9,10] For patients with external pelvic recurrence or metastasis, individualized comprehensive treatment should be decided according to the scope of recurrence or metastasis.[21]

The technique of PE was proposed by Alexander Brunschwig in 1948 as a palliative treatment for CC patients with residual or recurrent disease after radiotherapy.[22] But now, PE is a radical surgical approach that aims to remove the tumor with free oncologic margins (R0), this surgical procedure that involves the removal of multiple internal and external pelvic organs, including the reproductive system, urinary system, and intestine system. It can be divided into front, back, or all, depending on the excised structure. In the last century, due to the high perioperative mortality rate of PE, satisfactory survival rate could not be achieved.[23] In the past few decades, with the optimization of drug candidate

selection and advances in medical technology, such as those related to surgical techniques, perioperative care, critical care, and radiology, the mortality rate of PE has dropped to less than 5%, and the 5-year survival rate can reach 20%–70%.[7,8] However, due to the patients' previous radiotherapy and chemotherapy, local tissues are affected to varying degrees, which not only makes the operation difficult but also has a 50% incidence of serious complications, including incision infection, urinary system infection, gastrointestinal or urinary tract fistula, and intestinal obstruction, etc. Patients may need permanent stomy, which will affect the patients' quality of life to a certain extent.[24] Therefore, PE surgical indications should be strictly screened, mainly for patients who can achieve complete resection, such as excluding patients with central recurrence of pelvic wall invasion, lymph node metastasis, and distant metastasis, which can provide a higher chance of cure.[25]

ICIs offer a new treatment option with an acceptable toxicity profile although the survival benefit is variable, immunotherapy has been applied to CC and has achieved certain results.[9,10,26] In persistent, recurrent, or metastatic CC, Pembrolizumab plus chemotherapy, with or without bevacizumab, could provide clinically meaningful improvements in Overall survival (OS). At the same time, adverse events ≥ Grade 3 increased, but there was no difference.[10] In order to find a more effective and durable treatment regimen, ICIs was added to the standard chemotherapy studied in the Keynote-826 trial. In recurrent or metastatic CC patients with PD-L1 combined positive score greater than or equal to 1, Pembrolizumab combined with or without bevacizumab platinum-based dual drugs resulted in significant prolongation of PFS and OS.[26] Median PFS was 10.4 months in the Pembrolizumab group and 8.2 months in the placebo group. Median OS at 24 months was 53% in the Pembrolizumab group and 41.7% in the placebo group.[26] However, in the CALLA trial (NCT 03830866), PFS improvement was not statistically significant in patients receiving Durvalumab and CRT compared to patients receiving CRT alone (65.9% and 62.1%, respectively, at 24 months).[27] The differences in PFS observed between Keynote-A18 and CALLA may be attributed to differences in the study population and the ICIs used. Again, the importance of screening suitable ICIs and CC for curative effect was explained.

Another study analyzing the role of bevacizumab in CC showed that when included in the treatment regimen, the risk of progression or death was reduced by nearly 40%,[28] and the findings underscore the indispensable role of bevacizumab. A Phase III randomized trial (NCT04697628), evaluated Antibody-drug conjugates, tisotumab vedotin (TV) for recurrent disease progression during or after treatment with chemotherapy or metastatic CC in utility.[28] Patients were randomly assigned to the TV monotherapy group or to the investigator-selected topotecan, vincristine, gemcitabine, irinotecan, or Pemetrexed group. Sixty-four percent and 27.5% of patients had previously received bevacizumab or ICIs, respectively. Compared with the chemotherapy group, patients in the TV group had a 30% lower risk of death and a statistically significant longer median PFS and OS.[28] As a result, TV is quickly becoming a viable option for patients with recurrent first-line treatment options that have failed, or metastatic CC. There are also ongoing clinical trials that have yet to reach their endpoints and have the potential to change the standard treatment of locally advanced CC. The evaluation of the triple/quadruple combination of TV, carboplatin, Pembrolizumab in combination with or without bevacizumab will also shape the first-line treatment of recurrent or metastatic CC, and the combination will become a new treatment frontier and bring new treatment options to patients.

In our study, a woman diagnosed with cervical adenocarcinoma at stage IIIC1r a year ago was given. Concurrent chemoradiotherapy, the efficacy was PR. Four years ago, she underwent palliative surgery for intestinal perforation and was diagnosed with a first recurrence of CC (PFS: 28m) and had a clear clinical diagnosis of ASC. Continue to be given Six courses of intravenous chemotherapy combined with immunotherapy. Yet the efficacy was evaluated as PR after 4 courses of treatment. Despite continued Immunomaintherapy, enterovaginal leakage still occurred, and abdominal CT indicated pelvic metastasis, so PE was given. Although the diagnosis was flawed, our treatment of this patient represents the latest advances in the treatment of advanced and relapsing CC.[7,8,10] Immunomaintherapy is recommended after PE surgery. Patients choose follow-up for personal reasons. In Aug 2024, the patient was diagnosed with brain metastases (Figure 2C). Treatment options include surgery, radiotherapy, chemotherapy, and immunotherapy.[13,15,16] After a Multi-Disciplinary Treatment (MDT), resection of cerebral hemisphere lesions was performed. Although we developed chemotherapy combined with bevacizumab and immunotherapy for the patient after surgery, the patient finally refused follow-up treatment and chose follow-up. It also reflects the individualized treatment plan for patients with brain metastases.

Although BM of CC are not common, patients with metastatic lesions may present with some identifiable symptom patterns, including elevated intracranial pressure, headache, nausea, vomiting, epileptic seizures and limb weakness.[12] The presence of these symptoms in patients with a history of malignant advanced CC may indicate metastatic lesions. Although imaging plays a significant role in diagnosing BM of CC, when the imaging shows a primary brain tumor, such as glioma, a correct diagnosis and timely treatment should be provided in combination with the patient's medical history and histopathological examination.[29] Some scholars have studied the treatment plans for BM of CC. After gamma knife radiosurgery for BM of CC, neurogenic death and neurological degeneration were significantly higher, and the local tumor control rate was significantly reduced.[30] Among BM patients, favorable prognostic factors include age under 50 years old, no extracranial mass, no other metastatic lesions, and a high Karnofsky performance status score.[31] However, given the poor prognosis of patients with BM of CC, efforts to understand the metastasis routes of BM, diagnostic regimens and determine effective treatment regimens will improve the prognosis of patients.

In this study, we report a rare case of multiple metastatic ASC. It is worth noting that when the patient was initially treated, the local cervical lesions were mainly adenocarcinoma, so that it was misdiagnosed as cervical adenocarcinoma, and the pelvic recurrence was mainly squamous carcinoma. However, when brain metastases occur, adenocarcinoma is dominant. The patient had poor response to chemotherapy and immunotherapy after pelvic metastasis, and the efficacy was evaluated as PR, suggesting a poor prognosis. The patient's quality of life after PE surgery is facing multi-dimensional challenges in terms of physiology, psychology and society, but it is not "impossible to improve".[25] The patient received collaborative support such as postoperative rehabilitation training and psychological counseling. Six months after the operation, they gradually adapted to the physical changes and maintained a certain degree of autonomy and happiness in life. At present, the patient's ECOG physical status was 1–2, with occasional discomfort such as abdominal pain, and no drug intervention is required. I can take care of myself and also handle some family work. Unfortunately, due to personal reasons, I have not returned to work yet. Our patients have been treated with PE and have achieved encouraging responses and survival benefits. When brain metastases occur, MDT is followed by re-surgery. The choice of treatment is often based on the number of metastases in the patient's clinical state, tumor size, and metastases in other organs. For this patient, although distant metastasis occurred, the metastatic foci were relatively isolated. After repeated discussions by the MDT team, it was considered that the probability of RO resection was relatively high, and surgical treatment was given to the patient. The prognosis of the patient also confirmed the correctness of our MDT decision. While this is one case, the efficacy and inferred response mechanisms deserve further validation, but it does give us a lot to encourage and think about. For cervical tumors, squamous cell carcinoma and adenocarcinoma may have different metastasis mechanisms, which need to be further verified. Because ASC is less effective against chemoradiotherapy and may lead to a worse prognosis, more clinical trials are called for stratified management of histology in order to better suit first-line treatment options for ASC. At present, there is a lack of evidence on the effects of ICIs and PE on patients with ASC and BM, and we hope that our case can provide a reference for the prognosis assessment and treatment of patients with similar manifestations.

Conclusion

To our knowledge, this is the first report of a patient with recurrent and metastatic ASC with brain metastases after PE. In this patient, pelvic metastases combined with enterovaginal leakage threatened the urinary system and important pelvic neurovascular structures. Brain metastases may threaten the life of patients at any time. After MDT, the patient experienced PE and resection of cerebral hemisphere lesions. The patient's complex medical history presented a number of contraindications for surgical treatment, and efforts by the MDT team ultimately made her a candidate for surgical resection. We hope that our case can provide a reference for the prognosis assessment and treatment of patients with similar manifestations. Finally, this case emphasizes the importance of long-term and close follow-up for patients with CC. Timely detection of metastatic foci and taking active intervention measures may help prolong the survival period of patients and improve their quality of life. More clinical and basic research is needed in the future to further reveal the metastasis mechanism of CC and provide a basis for formulating more effective diagnosis and treatment strategies.

Abbreviations

ASC, Cervical adenosquamous carcinoma; BM, brain metastasis; ICIs, immune checkpoint inhibitors; CC, cervical cancer; CR, complete response; ECOG, Eastern Cooperative Oncology Group Performance Status; HPV, human papillomaviruses; PD, Progressive disease; PE, Pelvic exenteration; PR, partial response; RT, radiotherapy; PFS, progression-free survival; OS, Overall survival; CRT, Chemoradiation; TV, tisotumab vedotin; MDT, Multi-Disciplinary Treatment.

Data Sharing Statement

Data sharing is not applicable to this article as no datasets were generated or analyzed in this study.

Ethics Statement

The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Ethics Approval and Consent to Participate

The manuscript was required to publish the case details by institutional approval of the First Hospital of Jilin University (Supplementary Document 1).

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests for this work.

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