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Case Report and Perioperative Management of Rare Squamous Cell Carcinoma with Bladder Invasion, Right Renal Pelvis Hydronephrosis and Acute Myocardial Injury

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ABSTRACT

Squamous cell carcinoma (SCC), the most common type of cervical cancer, is significantly influenced by human papillomavirus (HPV) infection worldwide, particularly in developing countries. While presenting with symptoms like vaginal bleeding and pelvic pain, early diagnosis and treatment remain challenging, especially in cases where tumor invasiveness is not evident. This case presents a rare scenario where the patient developed bladder invasion alongside right renal pelvis hydronephrosis and acute myocardial injury (potentially related to acute coronary syndrome), in addition to confirmed SCC diagnosis. The case highlights the importance of multidisciplinary collaboration and comprehensive preoperative evaluation in identifying potential cardiac complications. The patient received a combined immunotherapy and radiotherapy regimen that failed to achieve expected outcomes, with postoperative cardiac complications further underscoring the necessity of thorough preoperative assessment and physician-patient communication. Although this case provides valuable clinical insights, its uniqueness limits the broad applicability of the findings. Future efforts should focus on validating the efficacy and safety of this treatment protocol through multicenter clinical trials, laying the foundation for optimized management of SCC patients and advancing related research and development.

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FOREWORD

Squamous cell carcinoma (SCC), the most common type of cervical cancer, originates from squamous epithelial cells in the cervix. Epidemiological data indicate that cervical cancer has a high incidence rate globally, particularly in developing countries, and is closely associated with human papillomavirus (HPV) infection [1]. The disease typically presents symptoms such as vaginal bleeding and pelvic pain. As it progresses, the tumor may invade surrounding organs like the bladder, leading to complex complications [2].

In clinical practice, early diagnosis and treatment of squamous cell carcinoma are crucial. However, the diagnostic process often faces numerous challenges, particularly in cases where tumor invasiveness is not evident. Tumors may infiltrate surrounding tissues or metastasize through the lymphatic system, leading to delayed diagnosis [3,4]. Additionally, discrepancies between imaging findings and pathological interpretations can occur, which may affect treatment decision-making [5].

This case demonstrates a unique clinical presentation where the patient was diagnosed with squamous cell carcinoma and exhibited rare manifestations of tumor invasion into the bladder, accompanied by right-sided hydronephrosis and acute myocardial injury (potentially acute coronary syndrome) [6,7]. The complex clinical scenario underscores the critical importance of multidisciplinary collaboration, emphasizing the need for comprehensive preoperative evaluations to identify potential cardiac complications and optimize patient management during treatment [8].

By meticulously documenting the patient's treatment process and perioperative management, this case study not only provides valuable clinical insights for similar cases but also serves as a reference for future therapeutic approaches. It promotes clinical practice improvement, reduces medical dispute risks, and enhances patient safety. This case report holds significant clinical value, contributing to the advancement of research and understanding regarding cervical cancer and its related complications.

CASE PROFILES

Patient Information

The patient was a 64-year-old female with a height of 160 cm and weight of 60 kg, with a Body Mass Index (BMI) of 23.4. Medical history: She had intermittent vaginal bleeding for over three months. On January 22,2025, she underwent cervical biopsy at another hospital, which confirmed squamous cell carcinoma through pathological examination, recommending immunohistochemical analysis. For further diagnosis and treatment, she was transferred to our hospital's Third Gynecology Department on January 24,2025. During hospitalization, the tumor was found to have invaded the bladder, causing right renal pelvis hydronephrosis. Under general anesthesia, cystoscopy and cystoscopic resection of the mass were performed on January 26,2025, after which she returned to the ward. On January 27,2025, a right renal pelvis stoma was created under ultrasound guidance. Subsequently, on January 28,2025, she received paclitaxel combined with carboplatin chemotherapy along with intravenous infusion of pembrolizumab. Discharged on January 29,2025, she was readmitted two days later (February 17,2025) for radiotherapy and immunotherapy. After completing comprehensive examinations, she began radiotherapy on February 21,2025, receiving 28 external beam treatments and 3 internal/external beam treatments by April 8, 2025. During this period, she underwent four cisplatin sensitization regimens and received 200 mg of pembrolizumab infusion on February 7 and March 20,2025. Regular follow-up tests included blood routine, liver/kidney function, and urine analysis during radiotherapy. Finally, she was discharged on April 8, 2025.

During follow-up outpatient treatment, the patient received intravenous injections of pembrolizumab 200 mg on April 10, May 22, June 12, July 23, August 14, and September 4, 2025. On September 23,2025, the patient was referred to our hospital's Second Department of Urology for a nephrostomy tube removal and ureteral stent implantation procedure.

Clinical Findings

Electrocardiogram (ECG) results demonstrated sinus bradycardia with a heart rate of 52 beats per minute. Chest X-ray revealed left pulmonary streaks and calcifications, with recommendations for follow-up observation. The imaging also indicated atherosclerosis and mild cardiac enlargement. Routine blood tests, coagulation profiles, biochemical parameters, and eight-item immunological panel showed no significant abnormalities. Historical ECG and chest X-ray records from different periods were as follows: normal ECG on January 24,2025; sinus bradycardia on February 17; left ventricular high voltage on September 23. Chest X-rays demonstrated increased lung markings and left lower pulmonary streaks, consistent with atherosclerosis and mild cardiac enlargement. Pulmonary CT scans showed bronchitis and mild retroventricular hydropneumothorax. Cardiac color Doppler ultrasound revealed aortic valve sclerosis with minor mitral and tricuspid regurgitation.

Diagnostic Evaluation

Preoperative evaluation indicated myocardial injury risk, particularly following radiotherapy and chemotherapy. During surgery: The patient entered the operating room at 15:15 via walking, with baseline monitoring showing blood pressure 127/70 mmHg, heart rate 58 bpm, and oxygen saturation 98%. Anesthetic induction involved sufentanil, cyclohexolane, and rocurbamine. After intubation, continuous monitoring revealed progressive hypotension and bradycardia, with the heart rate dropping to 35 bpm. Intravenous atropine was administered to elevate heart rate while maintaining anesthesia and monitoring blood pressure. Sudden cardiac arrest occurred during surgery, with heart rate plummeting to 25 bpm. Although medication gradually restored heart rate, blood pressure dropped significantly requiring metaraminol and norepinephrine for stabilization. Postoperatively, the patient regained consciousness with grade IV muscle strength in all limbs, but exhibited recurrent aggressive movements necessitating sedation and analgesia.

Therapeutic Measure

During the surgical procedure, multiple pharmacological interventions were administered to manage the patient's severe cardiac and blood pressure fluctuations. These included intravenous injections of atropine, metaraminol, and norepinephrine, along with invasive arterial monitoring and blood gas analysis to assess metabolic stability. Cardiac ultrasound and 12-lead electrocardiogram results indicated impaired cardiac function, raising concerns about potential acute coronary syndrome and heart failure. After multidisciplinary consultation, a comprehensive cardiac status evaluation was conducted to formulate an appropriate

treatment plan.

Follow-Up and Outcomes

The patient regained consciousness in the early hours of September 25,2025, with clear cognition and able to follow instructions. All four limbs demonstrated grade IV muscle strength. During follow-up visits, the patient maintained spontaneous breathing with equal-sized and round pupils, showing sensitive light reflexes. Blood pressure was maintained with low-dose dobutamine and norepinephrine, averaging approximately 80 mmHg. On September 26, the patient exhibited multiple aggressive movements. After sedation and analgesia, the condition gradually stabilized. However, inadequate preoperative evaluation, insufficient risk communication, and delayed intraoperative coordination with surgeons were identified as potential causes of medical disputes. Future measures should emphasize enhanced professional knowledge acquisition and risk management awareness to improve patient safety.

Discuss

Research on squamous cell carcinoma reveals significant variations in clinical manifestations and treatment responses among patients. In this case, the tumor invading the bladder is relatively rare, whereas most documented cases present with invasive squamous cell carcinoma triggered by chronic bladder inflammation. Studies indicate that the development of squamous cell carcinoma is closely associated with chronic irritation and infections (such as schistosomiasis), particularly prevalent among adults in specific regions [9]. Conversely, younger patients are less frequently reported in literature, and most cases lack clear signs of bladder invasion [9]. Notably, treatment response differences warrant attention, with some studies showing poorer responses to chemotherapy and radiotherapy in squamous cell carcinoma, especially when accompanied by squamous metaplasia, leading to unfavorable prognosis [10]. However, the innovative combination of immunotherapy and radiotherapy adopted in this case may offer a more promising therapeutic option for patients.

A thorough analysis of this case highlights the critical importance of preoperative evaluation and patient communication. As evidenced by relevant literature, inadequate preoperative assessment may lead to cardiac complications, particularly in patients undergoing surgery after chemotherapy or radiotherapy [11]. Furthermore, multiple studies have confirmed the correlation between cancer treatment and myocardial injury, underscoring the vital need for comprehensive cardiac function evaluation before surgery [10,11]. The insufficient cardiac monitoring and crisis management in this case further underscores the necessity of multidisciplinary collaboration. Postoperative surveillance revealed the patient's development of confusion and aggressive behavior, which may be related to postoperative recovery processes and medication reactions. This indicates that clinical practice requires enhanced close observation and management of patient status to ensure timely adjustments to treatment plans [9-15].

This case further emphasizes the importance of preoperative evaluation, especially for patients with potential cardiovascular disease.

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