

Role of Immunotherapy in Renal Cell Carcinoma; A Case Study

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Abstract

Case Report

Introduction: The most common cancer of kidney is- renal cell carcinoma. Early diagnosis can make a hope from the recovery of the disease. The incidence of renal cell carcinoma is commonly found in elderly aged patients. Sometimes it occurs in one kidney whereas, sometimes it effects both kidneys. Smoking, overweight, taking excessive painkillers can increase the chance of renal cell carcinoma. **Case Presentation:** A 57 years old Bangladeshi diabetic male patient, was diagnosed as right sided renal cell carcinoma (stage pT3cN0G2) along with the chief complaint of recurrent gross hematuria came to outdoor in April 2020. After confirmed diagnosis surgery had done followed by medications. From 10/03/2022, patient started 1 cycle of oral therapy with tablet Sunitinib. After that, immunotherapy and targeted therapy were advised to start with injection Pembrolizumab 200mg every three weeks followed by tablet Axitinib 5mg for every two weeks. Patient received 17 cycles of Pembrolizumab followed by Axitinib and got the last cycle at 24/02/2024. **Conclusion:** With the minimal side effects, it is evident that, Pembrolizumab has shown a positive response to the patient. It has added the new standard care of treatment of renal cell carcinoma at intermediate-high or high risk of recurrence following nephrectomy or following nephrectomy and resection of metastatic lesions.

Keywords: Carcinoma, diagnosis, Pembrolizumab, nephrectomy, renal.

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BACKGROUND

A disease, where uncontrolled cell growth occurs and spread throughout the body is known as cancer. Due to the disruption of etiological and pathological mechanisms, it may affect the cell division, differentiation and metabolism. Altering their metabolism, tumor cells maintain unregulated rapid cellular proliferation and survival. Genetic alteration occurs in 50% of human tumors, as a consequence, it may lead to the inactivation of some tumor suppressor proteins. It can be occurred in any parts of our body [1].

Among all of the leading causes of death in this world, cancer is one of them. Approximately 18.1 million new cases of cancer patients were found in the year of 2018. Among them, 9.5 million people were died due to cancer related causes. In cases of both sexes, lung cancer is the leading causes of death due to cancer. However, country to country varies these incidences of cancer or death for cancer in the reason of different life styles, food habits and socioeconomic conditions. Due to the rapid growing incidence, within 2040, the expected death due to cancer may be 16.4 million [2].

Comparing to other cancerous tumors, the presence of renal cell carcinoma is not rare at all. Although early diagnosis and resection increase the chance of cure, the overall prognosis of this disease is not satisfactory. The main reasons of poor prognosis are, metastasis and recurrency. It is observed that, 74% mortality was found in 1 year and 96% mortality was found in 3 years in case of advanced renal cell carcinoma [3].

Although pathologic stage is known as a vital prognostic factor, still now TNM staging system is commonly used for classification and treatment. pT3 and pT4 are the classification of locally advanced RCC. Hence, the outcome of in renal cell carcinoma majorly depends on the staging and grading [4].

Case Study (Renal Cell Carcinoma)

A 57 years old Bangladeshi diabetic male patient, was diagnosed as right sided renal cell carcinoma (stage pT3cN0G2) along with the chief complaint of recurrent gross hematuria came to outdoor in April 2020. This hematuria was complicated which caused clot retention and as a consequence, there was a need of

bladder washout. Patient was suggested to do routine examination along with ultrasonogram and CT scan of abdomen and chest. USG and CT of abdomen showed 7cm tumor in right kidney with tumor thrombus into inferior vena cava above diaphragm, no hilar lymph node was found. CT chest revealed thrombus up to right atrium which was 5mm indeterminate nodule in tight lung along with small mediastinal lymph nodes. CT chest also confirmed minor coronary artery disease. After observing all the reports patient was suggested to undergo surgery. Combined operation was done at 19/10/2022 with cardiothoracic and vascular surgery (CTVS) - via tri-radiate incision, right nephrectomy along with IVC thrombectomy was done with removal of tumor thrombus under cardiopulmonary bypass along with circulatory arrest. In other investigations, patient was also suggested to do MRI of brain which revealed mild chronic micro vascular ischemic changes in both cerebral hemispheres (Fazekas grade 1). No further treatment was given to the patient till February 2022.

PET CT scan was done in 14/02/2022. In case of abdominal and pelvis finding, FDG avid (F-fluorodeoxyglucose) (SUV max 6.19) two subtle hypodense areas were noted, one in right lobe and another in left lobe of liver. In case of head neck, FDG avid (SUV max 8.67) one was enlarged and one sub centimeter lymph nodes were seen in level II and supraclavicular region on the left side of neck. Larger one was found at level II, measuring about 1.37 cm in long axis and 1.30 cm in short axis. FDG avid (SUV max 7.44) enlarged and matted lymph nodes were seen in para- aortic region. FDG avid (SUV max 6.95) few soft-tissue density was seen in different areas of parietal and visceral peritoneum; largest one was measuring about 3.51 cm anteroposterior *2.80cm transverse * 3.66cm in craniocaudal dimension. Multiple cortical based small hypodense areas of variables size were noted in left kidney better visualized in post contrast scan, few of them were FDG avid (SUV max 5.68). On the other hand, FDG avid (SUV max 8.85) multiple enlarged and sub- centimeter lymph nodes were seen in right paratracheal, precranial, sub-cranial, pre-vascular, and aorto-pulmonary window regions. The largest one was in pre-vascular region, measuring about 2.35 cm in long axis and 1.76cm in short axis. FDG avid (SUV max 3.93) sub-centimeter lymph nodes were in right hilar region.

Treatment Details

After confirmed diagnosis surgery had done followed by medications. From 10/03/2022, patient started 1 cycle of oral therapy with tablet Sunitinib. After that, immunotherapy and targeted therapy were advised to start with injection Pembrolizumab 200mg every three weeks followed by tablet Axitinib 5mg for every two weeks. Patient received 17 cycles of Pembrolizumab followed by Axitinib and got the last cycle at 24/02/2024. During treatment with these regimens, no major side effect was recorded.

Patient Outcome

After receiving immunotherapy, the scan reports which was advised in follow up indicated good response to treatment. Now patient's general condition is good and stable and is under follow up.

DISCUSSION

According to the Food Drug Administration (FDA), Pembrolizumab was recommended for renal cell carcinoma from the year of November 17, 2021 [5].

A previously randomized double blind control trial which was done by 498 renal cell carcinoma patients and had high risk of recurrence after nephrectomy. In this trial, patients were given adjuvant Pembrolizumab (at a dose of 200 mg). The outcome was positive and this immunotherapy had shown disease-free survival compared to placebo [6].

Another randomized, double-blind trial revealed that, 564 patients with intermediate-high or high risk of recurrence of RCC received Pembrolizumab 200 mg for three weeks and significantly improved disease-free survival after nephrectomy or mastectomy [7].

On the other hand, in another previous study, Pembrolizumab along with Lenvatinib showed a significant progression in 352 patients of advanced renal cell carcinoma. The commonest adverse effects were fatigue, diarrhea, musculoskeletal pain [8]. However, in this case study, minimal adverse effect was found during treatment period.

CONCLUSION

The patient showed significant recovery with treatment by Pembrolizumab. The adverse effects were minimal with comparison to previously established drug regimens. Patient is now clinically stable and leading their regular life in a healthy manner.

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