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Case Report

Renal Metastasis in Carcinoma Pyriform Fossa treated with SBRT: A Case Report and a Brief Review

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Abstract

Head and neck cancers are the most common cancers in male in India. The most common site of metastasis being lung. Isolated metastasis to the kidney is a rare phenomenon in head and neck cancers. This article highlights a 65 year old male with carcinoma pyriform fossa with lung and renal metastasis progressed on Palliative chemotherapy and immunotherapy was treated with Stereotactic Body Radiotherapy (SBRT) to left kidney.

Keywords

Pyriform fossa, SBRT, Carcinoma, Kidney, Palliative radiotherapy

Introduction

Laryngeal cancer is the seventh most common cause of cancer in males [1].The main modalities of treatment are surgery followed by chemo-radiotherapy or concurrent chemo-radiotherapy (CTRT). With advances in
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treatment, there is considerable improvement in the survival of the patients. Whenever the disease progresses, the patient receives some form of palliative treatment. The commonest site of metastasis from head and neck malignancies is to the lungs, liver, bones, adrenal glands and kidney. However, metastasis to the kidney is rare. This is the first reported case of carcinoma pyriform fossa (CA-PFS) post CTRT, progressing to involve the lung and kidney, treated with palliative stereotactic body radiotherapy (SBRT) to the kidney.

Case Report

A 65-year-old male, diagnosed case of CA-PFS (locally advanced disease) treated with CTRT in 2018, was disease free for 1 year, developed cough and pain over the chest wall. Whole body fluoro-deoxy glucose positron emission computer tomography (WB FDG PET CT) was performed which was suggestive of B/L lung nodules and small lesion in the left kidney. Biopsy from the lung and the renal mass was suggestive of metastatic squamous cell carcinoma. Immuno histochemistry was done and tumour cells showed to be diffusely and strongly positive for CK5/6 and negative for PAX8 and CK20. GATA3 was predominantly negative with focal weak positivity in some cells (Figure 1) suggestive of head and neck primary. The patient received 6 cycles of 1st line palliative chemotherapy paclitaxel 175mg/m² and carboplatin AUC 5 X 6 cycles 3 weekly regimens. Post 6 cycles WB FDG PET CT was suggestive of progressive disease. The patient further received 3 cycles of immunotherapy Nivolumab 480 mg 4 weekly regimens. The response assessment WB FDG PET CT was suggestive of progressive disease; the size of the lesion of the left upper pole kidney increased from 2.9x3.2x5.1cm standard value uptake (SUV) of 9.0 to 4.7x6.4x5.8cm (SUV 11.4) along with the involvement of left renal hilum and para-aortic nodes (Figure 2). The patient developed pain in the left loin and was having restriction of movement. Hence was planned for palliative radiotherapy. The patient received palliative SBRT 25 Gray (Gy) /5 fractions to the left kidney mass in the upper pole, left para aortic mass on Elekta versa HD machine, treatment was planned on Monaco treatment planning system (Figure 3). To reduce the motion errors, active breath control (ABC) technique was used. The patient was assessed for acute toxicity, was followed up 15 days, 1 month after completion radiotherapy. The patient was symptom-free at the end of one month follow-up. The patient was continued on Nivolumab. The patients WB FDG PET CT were done for response assessment after 3 months of completion of radiotherapy. The lung nodules were still present with stable disease, but the left renal mass had completely resolved completely (SUV- 2.2) (Figure 4).

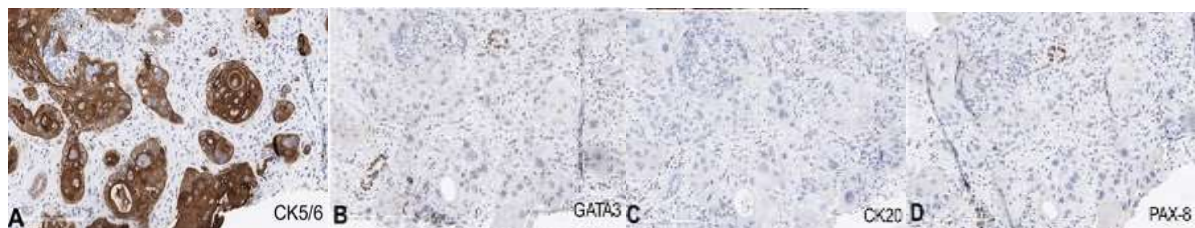


Figure 1: Immunohistochemistry CK5/6, GATA3, CK 20 and PAX 8.

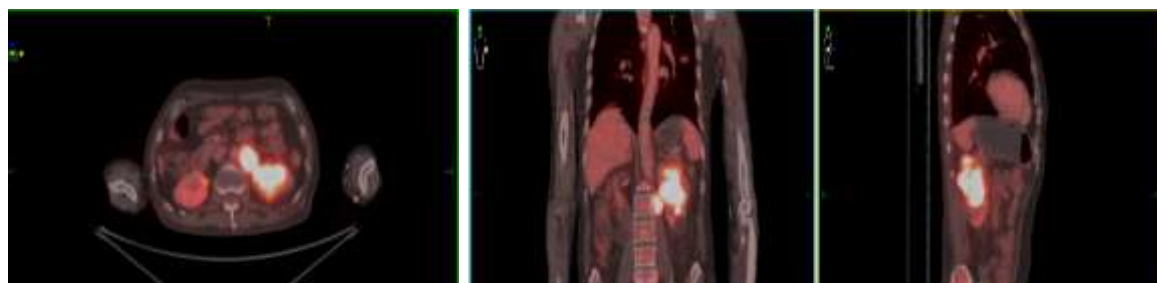


Figure 2: WB FDG PET CT showing increased uptake left kidney.

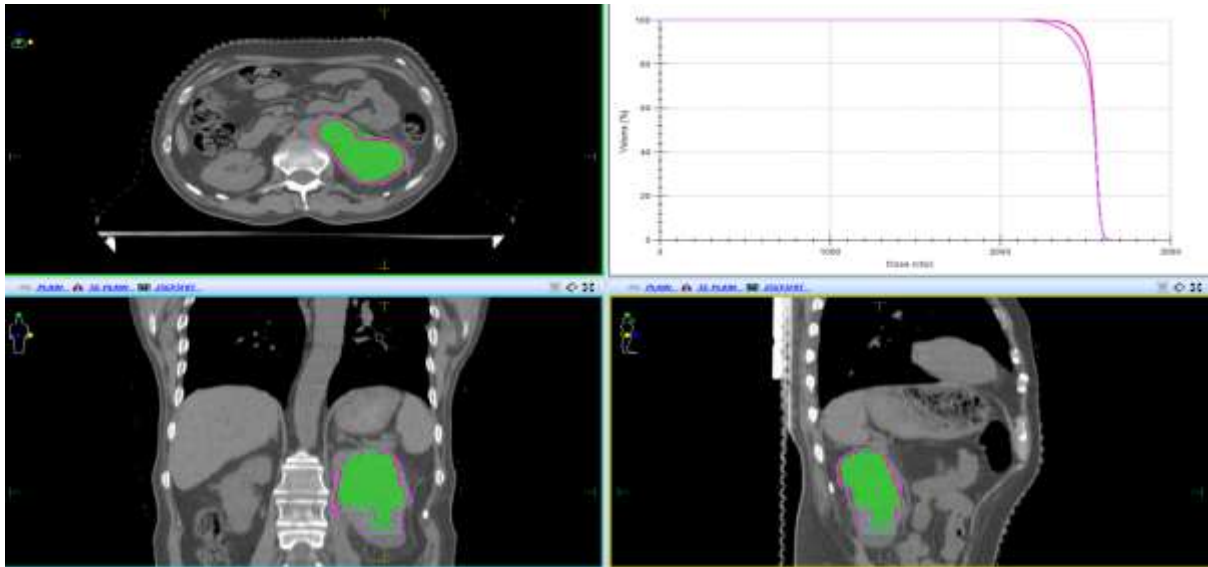


Figure 3: Treatment plan showing 100% dose delivered to Planning target volume (PTV). The isodose lines shown are dose delivered to Gross tumour volume (GTV) and Planning target volume (PTV) receiving 100% dose.

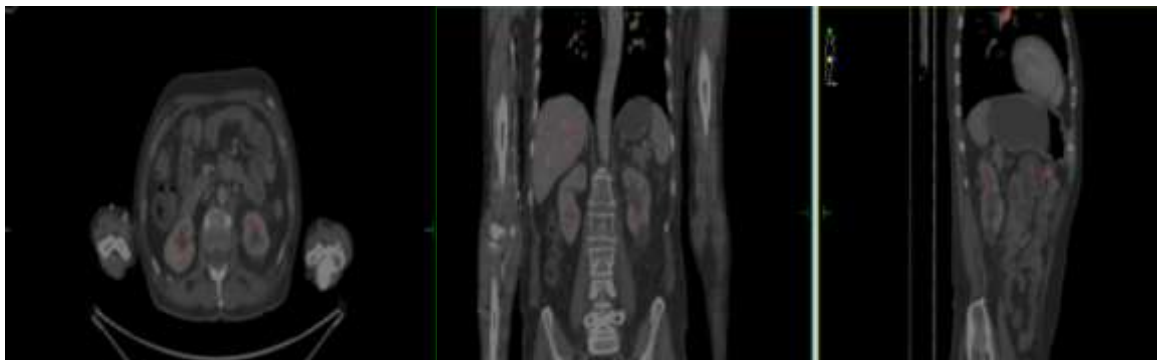


Figure 4: WB FDG PET CT shows near complete radiological resolution of the Left renal mass (SUV 2.2).

Discussion

Head and neck cancers are the most common cancers in males in India. The incidence of distant metastasis in head and neck cancers is about 15-25% as per the literature available [2]. The incidence of metastasis is in the following order: lungs being the most common primary site of metastasis, followed by liver, bones, adrenal and kidney. The renal metastases do not present with any clinical symptoms. According to literature, renal metastatic tumours are mainly located in the cortical zone close to the glomerular vascular plexus and seldom spread to urothelial tissue, so that the incidence of microscopic haematuria is 12% ~ 31% [3].

Retrospective studies done on renal metastasis from different primaries have shown that 6% of the primary is due to head and neck malignancies; the most common primary being Lung accounting for about 80%. In this series, over 50% of the patients were asymptomatic at presentation and 30% had flank pain. 77.5% had solitary involvement of the kidney. 32% of the patients underwent nephrectomy of the patients underwent nephrectomy. The median survival was about 14 months. There was no survival benefit in patients undergoing surgery. 8 out of nine patients with head and neck malignancies underwent surgery [4]. In our case, the patient had undergone CRTT, following which the patient developed lung metastasis. The patient received palliative chemotherapy, progressed with a small lesion in the left kidney, was started on immunotherapy Nivolumab, the

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lesion in the lung and kidney progressed (Figure 2). The patient had pain in the left flank. The biopsy was done and IHC was suggestive of metastatic squamous cell carcinoma from the pyriform fossa. The patient was not willing for nephrectomy. Hence, the patient was planned for palliative SBRT. In stage IV and oligo-metastatic disease, SBRT is being frequently used in the recent past. This is generally preferred due to relatively low toxicity rates and higher local control in selected groups of patients. This has not only improved the local disease free progression, also has improved overall survival [5-12].

There is not enough data to suggest if SBRT is an effective form of treatment in patient with renal metastasis from other primaries. Case series published by Verma V and Simone CB, is the only data available for SBRT for renal metastasis from lung primary [13] (Table 1).

Table 1: Renal Metastasis treated with Stereotactic body radiotherapy (SBRT).

N O	Author	Age/s ex	Diagnosis of the primary disease	Histology of primary/secondary (kidney biopsy)	Sites of metastasis	Flank pain	Systemic therapy/local treatment	SBRT dose to renal mass	Outcome
1	Verma V, Simone CB ¹³	57y/F	Lung	Adenocarcinoma/renal biopsy not done. imaging suggestive of metastasis	Brain and kidney	+	yes	24Gy/3 fractions	Complete response at 6 months
2	Verma V, Simone CB ¹³	77y/M	Lung	Squamous/metastatic squamous	Kidney	-	yes	30Gy/5 fractions	DFS- 8 months
3	Verma V, Simone CB ¹³	69y/M	Bronchogenic	Poorly differentiated carcinoma/imaging suggestive of metastasis	Brain, bone, liver, kidney	+	yes	24Gy/3 fractions	Clinical no pain at 1 month
4	Verma V, Simone CB ¹³	72y/M	Lung	Adenocarcinoma/metastatic adenocarcinoma	Kidney	+	yes	24Gy/3 fractions	Partial response at 3 months
5	Cai J ¹⁵	53y/F	Lung	Squamous cell carcinoma/metastatic squamous cell carcinoma	Kidney	-	yes	Not available	Not available
6	Present study*	65y/M	Pyriform fossa	Squamous/metastatic squamous	Lung, kidney	+	yes	25Gy/5 fractions	Clinical no pain at 1 month. PET CT at 3months, complete resolution of the lesion.

Hypo-fractionated palliative radiotherapy is practiced especially by using two-dimensional (2DRT) and three-dimensional radiotherapy (3DCRT) in low resource settings. This is associated with significant toxicity to surrounding structures like the small bowel, liver, and pancreas which gets irradiated when treatment is being delivered. Clinically, the patient develops significant nausea, vomiting and loose motion. With the advent of better and highly conformal radiation techniques, it is possible to deliver high ablative doses of radiation in single or multiple fractions to tumours with minimal doses to the surrounding normal structures. This significantly reduces acute toxicities during the course of treatment as well as reduces significant long term morbidities. This provides the best palliation and also the treatment is completed in a short period of time. The usual SBRT dose used for renal metastasis is 25Gy in three to five fractions. In our case, the patient received palliative SBRT 25Gy in 5 fractions to the left renal mass along with the renal hilum and para-aortic mass (Figure 3).

One of the other challenges faced during delivery of such high doses of radiation is the margin of error is very minimal and tumour miss can result in devastating results with significant toxicity to the surrounding structures. Organ motion is due to respiratory movements of the diaphragm. The kidney is fixed to the retroperitoneal fascia and the Gerota's fascia. The motion of the kidneys during free breathing is about <10mm in the anteroposterior and lateral directions with free breathing [14,15]. To address this issue, ABC technique was used wherein the patient is asked to hold the breath in deep inspiration for a fixed time of 10-15 seconds and treatment is delivered only during this phase and the process is repeated every after every 1-2 minutes of rest.

This has to be accounted for during planning to prevent geographic misses. The gross tumour volume (GTV) was contoured and a planning target volume (PTV) of an additional 2 mm was given. The 100% iso-dose to GTV volume was achieved as in Figure 2. The patient was treated with 25Gy/5 fractions. The patient did not have any toxicity during the course of the treatment. At 15 days and one month of follow-up the patient was stable; there was no pain. The patient was not on any analgesics for pain control. Three months following completion of treatment, the patient had complete resolution of the left renal mass (Figure 4).

Conclusion

Renal metastasis from head and neck malignancies is very rare. Therefore, as there is no added survival benefit with nephrectomy and in patients not willing for surgery, SBRT can be considered as a non-invasive option for palliative treatment. SBRT to kidney is well tolerated without any significant morbid side effects.

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