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Palliative Intensity Modulated Radiation Therapy for Symptomatic Adrenal Metastasis

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ABSTRACT

Metastasis to the adrenal glands is quite common; especially from melanomas, breast, lung, renal and gastro-intestinal tumours. The most common tumour found in the adrenals in post mortem series is a metastatic tumour; incidence ranging from 13 to 27%. The diagnosis of adrenal metastasis is now more common and easier due to staging and subsequent follow up with Computed tomography /Magnetic resonance imaging and or positron emission tomography-computed tomography imaging studies. Most of the times these metastatic lesions are clinically occult and those that do have clinical symptoms complain of pain, nausea, vomiting and early satiety. We irradiated a patient of non small cell lung cancer with adrenal metastasis with palliative Intensity Modulated Radiation Therapy and achieved a good response in terms of pain relief, stable disease and no side effects of the treatment..

Keywords: Adrenal gland; IMRT; metastasis; palliative radiotherapy.

INTRODUCTION

The most common tumour found in the adrenals in post mortem is a metastatic tumour,[1] incidence ranging from 17.6 to 35% from lung cancers and from 13 to 27% from other malignancies. About 50% of melanomas, 30 to 40% of breast and lung cancers and 10 to 20% of renal and gastro-intestinal tumours metastasize to the adrenals.[2] Up to 40% of patients with NSCLC develop unilateral or bilateral adrenal metastasis as the carcinoma progresses.

We present a case of non small cell lung cancer with adrenal metastasis treated with Intensity Modulated Radiation Therapy (IMRT).

CASE REPORT

A 65 year male was diagnosed as non small cell lung cancer (NSCLC) left lung in August 2006 and underwent left pneumonectomy. Histopathological was 3x2x1cm adenocarcinoma; poorly differentiated; 1/17 lymph nodes without extracapsular extension. He received 4 cycles of chemotherapy with Gemcitabine and cisplatin from Sep 2006 to June 2007. On 1st December 2008 Computed Tomography (CT) thorax revealed three lesions (right lower lobe; left pleural based and right hilar node with moderate left pleural effusion). He was started on chemotherapy with Docetaxel. PET-CT on 8 December 2008 revealed left moderate pleural effusion; a nodule in superior segment of right lower lobe and a right hilar node with a left pleural based non FDG avid lesion. CT scan of the thorax on 20 February 2009 revealed increase in the size of all lesions. Since the left pleural based lesion was ametabolic; he was planned for loco-regional radiotherapy.

He received 60 Gy to the planning target volume (PTV) (66Gy to the PET-CT based active disease) in 30 fractions over 6 weeks with IMRT from 3 March 2009 to 10 April 2009. PET CT on 8 July 2009 revealed nodular lesion superior segment of right lower lobe (unchanged); enlarged necrotic right hilar node; left encysted pleural effusion and a bulky lateral limb of the left adrenal [Standardized Uptake Value (SUV) max of 10]. In November 2009 he complained of moderate to severe left flank pain. PET CT revealed active disease involving right hilar lymph node; superior segment of right lower lobe and left adrenal gland (increase in the size and SUV of the left adrenal gland). He was started

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on pemetrexate chemotherapy and after 2 cycles; CT scan in Feb 2010 did not show any change of the adrenal gland and nor was there any relief in the flank pain.

He was planned for palliative radiotherapy with IMRT to the left adrenal gland for pain relief. After CT simulation; a planning CT and PET CT fusion was carried out and the tumour volume with the adjacent critical and dose limiting structures (bowel, liver, kidney, stomach and spinal cord) were drawn. Daily treatment portal verification was done with the help of Cone beam CT (CBCT) and the shift (if any found) was applied. He received 30 Gy in 10 fractions over 2 weeks from 8th February 2010 to 19th February 2010 without any untoward effects. After 2 weeks he experienced excellent pain relief and was off analgesics.

PET CT on 3rd May 2010 and subsequently on 15th October 2010 revealed status quo of the thoracic disease and a non FDG avid adrenal lesion which had also decreased in size.

PET-CT scan on 3rd May 2011 revealed mild increase in the size and SUV max of all the lesions except the left adrenal gland; which was still ametabolic. His original biopsy / surgery blocks and slides were not of good quality to carry out EGFR receptor studies and the patient was unwilling for a fresh biopsy. He was therefore empirically started on oral Gefitinib; which he took for 5 months. PET-CT on 11th October 2011 revealed status quo of the lung lesions; ametabolic adrenal lesion and development of two new liver lesions. CT guided Fine needle aspiration cytology (FNAC) from the liver lesion was positive for metastatic adenocarcinoma.

He was given the option of palliative chemotherapy using Vinorelbine but he refused and opted for oral Erlotinib; which he took from November 2011 to Jan 2012. Ultrasonography of the abdomen and pelvis after 3 months of Erlotinib revealed increase in the size of the liver lesions and development of ascites. He refused for any active management and opted for best supportive care. In September 2012 he went into hepatic coma and expired.

He had achieved excellent pain relief for the symptomatic adrenal lesion and the adrenal metastatic lesion was ametabolic from 19 February 2010 to the last documented imaging study (PET-CT of 11 October 2011); for a period of approximately 20 months.

DISCUSSION

Usually adrenal metastases are unilateral; bilateral lesions being observed in less than 3% of patients with lung cancers. These metastatic tumours are clinically occult. Those who have clinical symptoms complain of pain, nausea, vomiting and early satiety and hypoadrenalism.

Treatment for adrenal metastasis is considered in case of symptoms (usually severe pain) and because it has been shown that aggressive treatment of oligometastatic disease can often be considered curative as it prolongs disease free survival.[3-5]

A large number of local treatment modalities include radiofrequency ablation (RFA),[6] cryotherapy, laparoscopic adrenalectomy and radiotherapy as a palliative modality.[7]

Adrenalectomy as a treatment modality has shown long term survival in approximately 25 % of cases in a meta-analysis.[8] Adrenal surgery may be indicated in patients in whom the primary lesion is well controlled; is the initial metastasis; disease free interval is long and no co-metastatic lesion is detected in other tissues.[9]

Radiotherapy for adrenal metastasis has been generally limited for effective palliation. Soffen et al treated 16 patients with adrenal metastasis with palliative radiotherapy with doses ranging from 29.5 to 45 Gy with 2.5 to 3 Gy per fraction.[10] The authors achieved an overall response of 75% and concluded that a dose of 30 Gy in 10 fractions is reasonable; associated with minimal morbidity and a high probability of achieving effective palliation.

Recently there have also been reported studies on the safe and effective use of Stereotactic Body Radiotherapy (SBRT) for the treatment of adrenal metastases.[4,5]

We used IMRT to treat the adrenal metastatic lesion to a dose of 30 Gy in 10 fractions over two weeks with daily CBCT verification. The patient achieved excellent pain relief; had no gastro-intestinal or renal toxicity and the adrenal metastatic lesion was ametabolic for a period of approximately 20 months.

CONCLUSION

Palliative radiotherapy using Intensity Modulated Radiation Therapy (IMRT) for a painful adrenal metastatic lesion is non invasive; ideal for patients with poor general condition; is an outpatient modality; achieves excellent pain control with limited toxicity and may contribute to survival of these patients.

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