ORIGINAL ARTICLE

# ROLE OF PALLIATIVE RADIOTHERAPY IN IMPROVING PERFORMANCE STATUS AND QUALITY OF LIFE IN PATIENTS WITH METASTATIC SPINAL CORD COMPRESSION

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**Background:** Palliative radiotherapy in patients with metastatic spinal cord compression is a well-known treatment modality but little is known whether it improves quality of life and performance status. Our study focusses on analyzing the impact of palliative radiotherapy on these two parameters in patients with metastatic spinal cord compression. **Methods:** We performed a prospective observational study from August 2020 to April 2021 to assess consecutive patients presenting to emergency department with suspected MSCC. We enrolled 24 patients in the study, and they were evaluated for their performance status and quality of life using ECOG and FACIT-PAL 14 scores respectively. Palliative radiotherapy was administered, and the patients were followed up four to six weeks later. Their ECOG and FACIT-PAL 14 scores before and after receiving palliative radiotherapy were analyzed. **Results:** The mean age of the patients was 48 (IQR 35–62), with 14 (58%) being male. 1 patient died soon after admission. Median dose fractionation was 2000 cGy. Median (IQR) of ECOG performance status score on admission and follow up was 2.5 (1.0–3.7) and 1.5 (1.0–3.7), $p$=0.719, respectively. Median (IQR) FACIT-PAL 14 score on admission and follow up were 35.5 (34.0–37.6) and 36.5 (30.2-44.7), $p$=0.277, respectively. Our results indicate that there was no statistically significant difference in the median ECOG performance status and FACIT PAL 14 scores before and after the administration of palliative radiotherapy. **Conclusion:** Our study indicates that palliative radiotherapy in patients with metastatic spinal cord compression had little benefit in objectively improving quality of life and performance status using the well-known and widely used scores. This lack of response could be due to delayed presentation of the patients. Earlier involvement of palliative care team could have improved both these parameters. Further research with larger population of patients over a longer period is needed to further assess these outcomes.

**Keywords:** Palliative radiotherapy; Quality of life; Performance status

**Citation:** Qamar F, Sajjad K, Haider I, Khan FU, Inam Y, Anjum M. Role of palliative radiotherapy in improving performance status and quality of life in patients with metastatic spinal cord compression. J Ayub Med Coll Abbottabad 2022;34(4 Suppl 1):949–52.

**DOI:** 10.55519/JAMC-04-S4-10570

## INTRODUCTION

Metastatic spinal cord compression (MSCC) is a well-known oncological emergency, arising in up to 10% of all adult patients with cancer.[1] It is more commonly seen in patients with breast, prostate and lung cancer, where the incidence is around 19%.[2] MSCC is defined as spinal cord or cauda equina compression by direct pressure and/ or induction of vertebral collapse or instability by metastatic spread or direct extension of malignancy that threatens or causes neurological disability.[3]

Common red flag symptoms include spinal pain, localized spinal tenderness, neurological symptoms such as radicular pain, limb weakness, difficulty walking, sensory loss, and bowel or bladder dysfunction. Early recognition of these symptoms is crucial in order to ensure timely assessment and prompt management and to prevent irreversible neurological damage.[4] The investigation of choice is an MRI of the spine, unless contraindicated because it can assess spinal instability.[5] The current standard MSCC palliative management include radiotherapy (either external beam radiotherapy or stereotactic ablative radiotherapy), surgical decompression and spine stabilization, separation surgery followed by SBRT and there is also some role of vertebroplasty, kyphoplasty and percutaneous spinal instrumentation. Systemic therapy including steroids have greater role in bridging the gap between definitive treatments for palliation of pain. Chemotherapy can also be used in chemo sensitive malignancy presenting with MSCC.[6]

According to a study aiming at the outcome of patients diagnosed with MSCC, the median survival after the diagnosis is less than 3 months.[7] Prognostic factors include age, gender, motor function at presentation, performance status, associated comorbidities, extent of primary disease and the interval between diagnosis and active management.[8] Because the indication for surgery in MSCC is usually limited to

patients with involvement of one spinal segment who have a good performance status and an expected survival of more than 3 months, RT alone is still an important modality in the treatment of MSCC.[9]

The aim of radiotherapy is to achieve local tumor control by reducing the size of the tumor. This can help reduce pressure on the spinal cord, leading to some or complete resolution of neurological symptoms and signs and may prevent further neurological deterioration. It can also relieve spinal and radicular pain and is believed to be a possible treatment option in patients with advanced disease and poor performance status[4] but there is lack of research on the role of palliative radiotherapy in the role of functional improvement of patients with MSCC.

However, radiotherapy does not eradicate mechanical pain, which may progress to bony instability, vertebral collapse, and has no role in asymptomatic MSCC.

Despite the well-established role of palliative radiotherapy in the management of patients with MSCC, little is known regarding the benefits of palliative radiotherapy on the quality of life (QoL) and performance status in these patients. Therefore, our study is aimed at assessing the role of palliative radiotherapy on performance status and QoL in patients with metastatic spinal cord compression in our institute.

## MATERIAL AND METHODS

This was a prospective observational study conducted in the Shaukat Khanum Memorial Cancer Hospital and Research Centre. The ethical approval for this study was obtained from the Institutional Review Board (IRB).

All patients presenting to Emergency department with symptoms/ signs suggestive of MSCC from 1st August 2020 to 30th April 2021 were invited to participate in the study. Patients having previously received palliative radiotherapy for MSCC, asymptomatic patients and terminally ill patients on end-of-life care pathway with MSCC were excluded from the study. A written informed consent was obtained from eligible patients willing to participate in the study (in Urdu language)

These patients were commenced on the hospital's MSCC pathway and managed as per the established local guidelines. Data on baseline patient characteristics including age, gender and primary cancer site was obtained through the hospital information system (HIS). Patients enrolled in the study were objectively assessed for performance status using Eastern Co-operative Oncology Group (ECOG) score and quality of life using Functional Assessment of Chronic Illness-Palliative Care (FACIT-Pal 14) tool at the time of CT simulation and patients were subjectively asked in language that was understandable to them by the responsible clinician. ECOG performance status is one of the most used approaches of quantifying ability of the patients with cancer to function while FACIT-Pal 14 is one of the few validated tools developed to assess quality of life in patients with advanced incurable illnesses which evaluates with 14 item subscales.

Both these scores were documented in case notes and data collection forms at the time of diagnosis of MSCC. Palliative radiotherapy was administered in the department of clinical and radiation oncology to treat MSCC in these patients. A total of 20 Gray dose was administered in 5 fractions. After a period of 4 to 6 weeks post-radiotherapy, patients were reviewed again in palliative care and oncology clinics. Both ECOG performance status and FACIT Pal- 14 score were again documented in the case notes and data collection forms on their first post radiotherapy visit.

The data was analyzed using SPSS statistics version 27. The normality of distribution was assessed using Kolmogorov-Smirnov Test. The quantitative data being non-normally distributed was expressed in Median (Interquartile range, IQR). The Wilcoxon Signed Rank test to assess the median for each of the two parameters before and after the administration of palliative radiotherapy for metastatic spinal cord compression (MSCC) was performed. A $p$ value of $<0.05$ was set to describe significant difference in the scores with the intervention.

## RESULTS

The mean age of the patients in the study was 48 years (Interquartile range, IQR 35–62) with 14 (58%) being male. The most common primary cancer site was prostate (37.5%) followed by breast cancer (29%).
The baseline patient characteristics are summarized in table-1.

**Table-1: Baseline characteristics of patients with metastatic spinal cord compression**

| Clinical Profile | | N | (%) |
|---|---|---|---|
| **Pain** | | 22 | 91.00 |
| **Neurological Deficit** | Motor | 17 | 70.00 |
| | Sensory | 4 | 16.00 |
| **Cord segment Involvement** | Cervical | 2 | 8.00 |
| | Thoracic | 18 | 75.00 |
| | Lumber | 6 | 25.00 |
| **Sphincter function Loss** | | 6 | 25.00 |
| **Radiculopathy** | | 4 | 16.00 |
| **Spine Instability** | | 3 | 12.00 |
| **Multiplicity of Spine mets** | | 13 | 54.00 |
| **Primary** Tumor **Site** | Breast | 12 | 50.00 |
| | Prostate | 6 | 25.00 |
| | Renal cell carcinoma | 2 | 8.00 |
| | Head & Neck | 2 | 8.00 |
| | Gynecology | 2 | 8.00 |
| **Grade** | High | 24 | 100.00 |
| **Other comorbidities** | | **8** | 33 |

Out of the 24 patients enrolled in the study, one patient passed away soon after the presentation to emergency department. ECOG performance status and FACIT-Pal 14 scores were evaluated in the remaining 23 patients at the time of presentation to emergency department**.** The median (IQR) ECOG and FACIT-Pal 14 scores on admission were 2.5 (1.0–3.7) and 35.5 (34.0–44.7) respectively**.** The mean interval from onset of symptoms to presentation was 6 days, and the mean interval between diagnosis of MSCC and the start of radiotherapy was 20 hours. 13/23 (56%) of patients had at least grade 4 power on Medical Research Council (MRC) power scale and radiological evidence of MSCC was confirmed on all 24 patients on their MRI whole spine scans,

After a mean follow up of 5.5 weeks (SD 1.2) following the completion of palliative radiotherapy, 3 patients had died from their disease and 2 patients missed their follow up appointments. The ECOG performance status and FACIT PAL 14 scores were performed on 18/24 (75%) on their first follow up after completion of palliative radiotherapy. Median (IQR) ECOG and FACIT-Pal 14 scores at the time of follow up were 1.5 (1.0–3.7) and 36.5 (30.2–44.7), respectively. There was no statistically significant difference for either the ECOG Performance status ($p$-value = 0.7) or the FACIT PAL 14 score ($p$-value 0.2) for the admission and follow up data.

These results are summarized in figure-1

Hence the difference in ECOG performance status and FACIT PAL-14 score before and after the administration of palliative radiotherapy in patients with MSCC was statistically non-significant in this study.

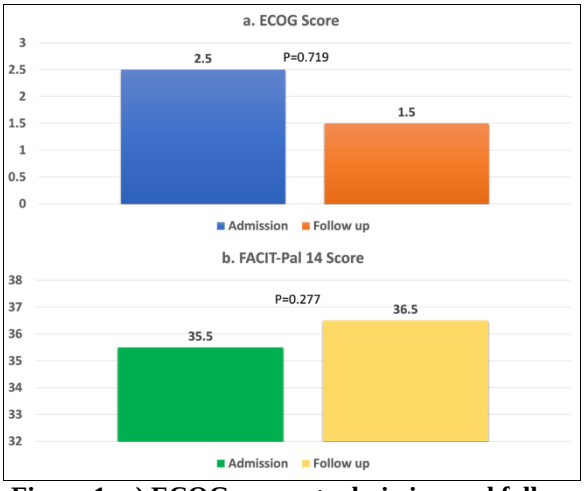


**Figure 1: a) ECOG score at admission and follow up. (b) FACIT PAL 14 score at admission and follow up**

## DISCUSSION

Our study assessed the role of palliative radiotherapy in Qol and performance status in patients with MSCC. Our study has indicated that there was no statistically significant improvement in either of the two parameters with the use of palliative radiotherapy. Both ECOG performance status and FACIT-Pal 14 scores are commonly used to measure functional status and quality of life in patients with cancer. The later has been found to be a valid and reliable tool in outpatient palliative care settings.[10]

To the best of our knowledge this was a unique study in this area. While there is strong evidence supporting the role of palliative radiotherapy in improving pain from bone metastases, there is very limited evidence evaluating its role in improving performance status and QoL in patients with MSCC. An international study investigating the role of palliative radiotherapy in patients with painful bone metastases showed that there is improvement in QoL in those patients with bone metastases who report better pain relief with palliative radiotherapy.[11]

Another study[12] showed that palliative radiotherapy improves QoL in patients with painful bone metastases who respond to treatment as compared to non-responders. However, none of these articles evaluated the role of palliative radiotherapy in patients with MSCC.

Our study did not demonstrate any significant improvement in performance status with palliative radiotherapy. This could be due to delay between the onset of symptoms and presentation. In our study this delay was for 6 days on average.

The mean follow-up time after administration of palliative radiotherapy was between 4–6 weeks with mean of 5.5 weeks in our study. This was in line with international recommendations for follow up after palliative radiotherapy for pain control. Palliative radiotherapy improves pain in the majority of patients in 2–3 weeks while acute side effects of palliative radiotherapy settle within 4–6 weeks.[13]

Early rehabilitation and involvement of supportive care can improve performance status and quality of life in patients with MSCC[4] with some evidence to show that it can even improve survival in those patients who have higher functional gains after rehabilitation[14]. Therefore, we advocate early rehabilitation with the involvement of palliative care team in the management of these patients for better outcome.

We chose the ECOG and FACIT PAL 14 scores to assess the QoL and performance status. This could be assessed through other scores. We used

these criteria as they are better established in our practice.

## CONCLUSION

Our study showed that although palliative radiotherapy is a commonly used treatment option in patients with MSCC, however there was no statistically significant improvement in either performance status or quality of life.

**Limitations:**

This is a prospective observational study, but does not randomize the patients into the palliative radiotherapy and control arms. Based on current clinical guidelines such a study will be difficult to conduct, however our work generates good hypothesis towards such a randomized trial in patients with poor baseline performance status.

The baseline performance status in our patients was borderline due to delayed presentation which worsened the neurological compromise from MSCC. This reduced the chances of full neurological recovery and hence performance status in our group of patients.

Careful patient selection is critical for the best possible treatment option and so is early detection and involvement of palliative care team to improve functional outcomes in these patients.

## AUTHORS' CONTRIBUTION

KS: Principal investigator, conceptualization of study design. MFQ: Literature search, data analysis. IH: Data collection, review of the manuscript. FK: Data collection, review. MA: Data collection, write-up & maintaining the site file. YI: Data collection, correspondence author.

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| *Submitted: January 11, 2022* | *Revised: March 1, 2022* | *Accepted: March 11, 2022* |
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