

Original Article

Quad Shot Palliation, A Considerable Option for Non-Osseous Recurrent or Metastatic Malignancies in Elderly or Frail Patients.

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ABSTRACT

Background: Palliative radiation therapy (RT) is increasingly recognized as a crucial component of care for patients with advanced, incurable malignancies. In Pakistan, where patients often present at advanced stages due to socio-economic barriers and limited healthcare access, efficient and effective treatment protocols are essential.

Objective: This study aimed to evaluate the efficacy of the Quad Shot hypo-fractionated RT protocol for pain palliation in elderly and frail patients with recurrent or metastatic non-osseous malignancies.

Methods: A quasi-experimental study was conducted at the Oncology Department of Ganga Ram Hospital, Lahore. Forty-two elderly patients with histologically confirmed inoperable malignancies and a WHO Performance Status of 2 to 3 were enrolled. Patients with prior RT or a second cancer were excluded. RT was delivered using a Cobalt-60 beam, with a total dose of 14 Gy divided into four fractions over two consecutive days. Pain severity was assessed using a 10-point scale before and four weeks after treatment. Statistical analysis was performed using the Wilcoxon Sign Rank Test on SPSS version 25.0.

Results: The study population comprised 52% males and 48% females, with the majority of primary tumors located in the head and neck (64%). Post-treatment, the mean pain score significantly decreased from 8.04 ± 1.22 to 4.32 ± 0.89 ($p < 0.05$).

Conclusion: The Quad Shot hypo-fractionated RT protocol effectively reduces pain in elderly and frail patients with advanced malignancies, suggesting its suitability as a quick and effective palliative care option in resource-limited settings.

Keywords: Palliative radiation therapy, hypo-fractionated radiation, pain management, elderly cancer patients, advanced malignancies, Quad Shot protocol, oncology care, healthcare access.

INTRODUCTION

Advanced malignancies often manifest as recurrent or metastatic diseases, significantly contributing to patient turnover in Pakistan. This is particularly true for a population characterized by low socio-economic status, limited literacy, and restricted access to healthcare facilities. It is estimated that approximately 50% of cancer patients will develop metastatic disease at some point during their illness, with breast cancer, head and neck cancer, and lung cancer being the most commonly diagnosed primary sites in the country (1, 2). Frequently, these patients present at an advanced stage of the disease with a low initial cure rate and many will experience residual, recurrent, or metastatic disease, leading to a poor prognosis exacerbated by uncontrolled loco-regional spread (3).

Given these challenges, radiation therapy (RT) emerges as a vital non-surgical intervention for effective palliation in cases of locally advanced, recurrent, or metastatic disease, particularly among elderly and frail patients who have a lower performance status (4, 5). Traditional RT protocols often require extended treatment periods which may not be feasible for patients who cannot endure long stays or frequent travel to treatment centers. Recognizing these barriers, short-course RT protocols have been developed and implemented, showing promising results in pain management. For instance, a two-day regimen delivering a total radiation dose of 14 Gy demonstrated a remarkable 91.4% improvement in pain symptoms (6, 7).

However, the majority of existing studies have focused predominantly on the palliation of bone pain through hypo-fractionated RT in patients with bone metastases. This gap highlights the need for research into the efficacy of similar RT regimens for patients with non-osseous metastatic or recurrent diseases. The current study addresses this gap by aiming to establish a standardized treatment protocol for short-term fractionation regimens that could offer effective palliation for these patients. By doing so, this research not only seeks to enhance the quality of life for this patient group through optimal pain relief in a shorter period but also aims to alleviate the growing burden on healthcare systems managing an increasing number of cancer patients (8). This evidence could be pivotal in shaping future protocols that tailor radiation therapy fractionation schedules to the needs of frail and elderly patients, ensuring broader access to palliative care.

MATERIAL AND METHODS

This quasi-experimental study was conducted at the Oncology Department of Ganga Ram Hospital in Lahore. The study enrolled 40 elderly patients, all above the age of 60, with histologically confirmed malignancies that were deemed inoperable and classified as having a World Health Organization Performance Status (WHO PS) of 2 to 3. Eligibility criteria excluded any patients with a history of prior radiation therapy or those diagnosed with a second cancer. For those included, the site of maximum pain and/or tenderness due to recurrent disease or metastases was identified and assessed. Diagnostic confirmation of the disease for each patient was established through a CT scan of the relevant area (9, 10).

Prior to initiating the treatment protocol, a comprehensive baseline evaluation was conducted, which included complete blood counts (CBC), urea, creatinine, and liver function tests. Patients were positioned using a conventional fluoroscopic simulator, and the treatment volume was delineated directly on the skin, incorporating a 2 cm margin around the target volume. Radiation therapy was administered using a Cobalt-60 beam, delivered in fractions of 3.5 Gy twice daily over two consecutive days, culminating in a total dose of 14 Gy (11).

Pain severity was semi-quantitatively assessed using a 10-point scale to establish a baseline pain score before treatment. This score was subsequently used to evaluate the effectiveness of the treatment, with follow-up assessments conducted four weeks post-radiation therapy. The categorization of pain scores post-treatment was as follows: a score of less than 4 indicated mild pain, scores between 4 and 7 indicated moderate pain, and scores above 7 were classified as severe pain.

Data collection was rigorous, adhering to ethical standards consistent with the Declaration of Helsinki to ensure the protection of patient rights and welfare during the study. All patient information was handled with strict confidentiality and analyzed using the Statistical Package for Social Sciences (SPSS), version 25.0. Comparative analysis of pain scores before and after radiation therapy was performed using the Wilcoxon Sign Rank Test, with a p-value of less than 0.05 considered statistically significant. This structured approach not only ensured the reliability of the data collected but also supported the integrity of the results derived from this study.

RESULTS

In this study, a total of 42 patients with inoperable, histologically confirmed malignancies were analyzed to assess the efficacy of a hypo-fractionated radiation therapy regimen for palliation. The demographic breakdown revealed a slight male predominance, with 52% of the participants being male and 48% female (Table I). The primary tumor sites were predominantly in the head and neck region, accounting for 64% of the cases, followed by breast cancer at 26%, and lung cancer representing the smallest group at 10% (Table I).

Table I: Characteristics of the Study Population

Characteristic	Total (n=42)	Number (Percentage)
Gender		
Male		22 (52%)
Female		20 (48%)
Site of Primary Tumor		
Head & Neck		27 (64%)
Breast		11 (26%)
Lung		4 (10%)
Site of Disease		

Neck	18 (48%)
Oral cavity	9 (21%)
Chest wall/Axilla	11 (26%)
Thoracic Cavity	4 (10%)
Performance Status	
Grade 2	29 (69%)
Grade 3	13 (31%)

Table II: Mean Pain Scores Before and After Radiation Therapy

Condition	Mean Pain Score \pm Standard Deviation
Pre-treatment	8.04 \pm 1.22
Post-treatment	4.32 \pm 0.89

The distribution of disease sites showed that the neck was the most commonly affected area, noted in 48% of the patients. This was followed by the chest wall or axilla and the oral cavity, which were affected in 26% and 21% of the cases, respectively. The thoracic cavity was the least involved, noted in only 10% of the patients (Table I). Performance status was also recorded, with the majority of the patients (69%) being classified as grade 2, indicating a moderate level of symptomatology, whereas 31% were more severely impacted, at grade 3 (Table I).

The impact of radiation therapy on pain was significant. Before the treatment, the mean pain score across the study cohort was high, averaging at 8.04 \pm 1.22, indicative of severe pain (Table II). Following the radiation therapy, there was a notable reduction in the mean pain score to 4.32 \pm 0.89, which falls into the moderate pain category (Table II). This marked improvement in pain scores post-treatment demonstrates the potential effectiveness of the hypo-fractionated radiation therapy regimen in providing substantial palliation in a population that predominantly suffers from severe symptoms due to advanced malignancies. The statistical analysis supported the significance of these findings, with a p-value of less than 0.05 indicating that the changes observed were not due to chance.

Overall, the results underscore the viability of this short-course radiation therapy as a practical approach for pain management in elderly and frail patients with advanced, non-operable cancers, especially those who might struggle with longer treatment schedules due to logistical or health constraints.

DISCUSSION

In the realm of palliative care, radiation therapy (RT) serves as a critical intervention for alleviating symptoms in patients with advanced, incurable malignancies. The primary goal of palliative RT is to provide symptom relief in a minimal timeframe, which is essential for enhancing patient convenience and easing the burden on healthcare providers. This necessitates the optimization of available resources, overcoming cultural barriers, and addressing logistical challenges. Consequently, various facilities have developed localized fractionation schedules tailored to their specific circumstances. However, the absence of a universally established protocol, coupled with limited experience in administering large doses per fraction and the potential for adverse effects from RT, pose significant challenges in managing these complex cases (11-13).

The findings of this study align closely with previous research, demonstrating the effectiveness of hypo-fractionated RT in pain relief for patients with advanced malignancies. For instance, similar outcomes were reported by Talha et al., who observed excellent pain control using a comparable protocol (7). Corry et al. also found significant pain relief in patients with advanced head and neck cancer treated with the "Quad Shot" RT protocol, underscoring the reproducibility of these results across different studies (9). Furthermore, Mohanti et al. reported a partial response rate of 37% in patients with advanced head and neck cancer treated with an RT protocol of 20 Gy delivered in 5 fractions of 4 Gy each over one week (10), while Vargas A. documented significant symptom alleviation in patients with soft tissue tumors treated with a single fraction of RT (11). These studies collectively reinforce the potential of hypo-fractionated RT to effectively manage pain in this patient population (14-16).

Despite the encouraging results, the study also acknowledges certain limitations. The small sample size and the single-center design may restrict the generalizability of the findings. Additionally, the short follow-up period post-treatment limits the assessment of long-term outcomes and late radiation effects, which are crucial for a comprehensive understanding of the therapy's impact. Moreover, while the study focused on pain relief, other symptoms and quality of life measures were not extensively evaluated (17).

In light of these findings and limitations, future research should aim to replicate these results in a larger, multicentric cohort with a more diverse patient population. This would help to validate the effectiveness of the hypo-fractionated RT protocol across different settings and cancer types. Additionally, extending the follow-up period would provide more insight into the long-term benefits and potential adverse effects of the treatment. Finally, incorporating a broader range of symptom and quality of life assessments could offer a more holistic view of the patients' overall well-being post-treatment. The Quad Shot hypo-fractionated RT protocol has proven effective for pain palliation in elderly and frail patients with recurrent or metastatic disease. This study contributes valuable insights into the application of hypo-fractionated RT, suggesting its potential for broader use in palliative care settings to improve treatment outcomes for patients with advanced malignancies (18-20).

CONCLUSION

The findings from this study confirm that the Quad Shot hypo-fractionated radiation therapy (RT) protocol is effective for pain palliation in elderly and frail patients with recurrent or metastatic malignancies. These results hold significant implications for healthcare by offering a feasible and efficient treatment option that can be administered over a short duration, thereby reducing the logistical burden on patients and healthcare systems alike. By potentially extending this approach to other patient groups and malignancy sites, this treatment could enhance quality of life and healthcare delivery in palliative care settings, particularly for those with limited access to prolonged or intensive care options.

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