The haemoglobin levels of patients with prostate cancer treated with radical radiotherapy

Níveis de hemoglobina em pacientes com câncer de próstata tratados com radioterapia radical

DOI: 10.46981/archv5n1-011

Recebimento dos originais: 02/02/2024
Aceitação para publicação: 28/03/2024

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ABSTRACT
Introduction: The worldwide estimate points to prostate cancer as the second most frequent cancer in men worldwide, where radiotherapy has been an important modality of curative treatment in managing this neoplasia. The prevalence and impact of cancer-related anemia are not widely known, and it may be overlooked or considered clinically significant. It is believed that the outcomes and toxicity of radiotherapy in prostate cancer treatment may be influenced by blood hemoglobin levels. Objective: To evaluate hemoglobin levels in patients with prostate cancer before and after radiotherapy treatment. Methods: Retrospective, longitudinal study of patients diagnosed with malignant prostate neoplasms undergoing external radiotherapy. Hemoglobin levels were measured before radiotherapy and after treatment completion (20-40 days). Anemia was defined by the World Health Organization as men with values less
than 13 g/dl. Prostate cancer recurrence risk classification was based on the National Comprehensive Cancer Network risk criteria. Results: Forty patients were evaluated with measurement of Hemoglobin levels before and after radiotherapy treatment. The mean age was 67 years. According to the risk group classification, 4 patients were low-risk (10%), 27 patients were intermediate-risk (67.5%), and 9 patients were high-risk (22.5%). The mean pre-radiotherapy Hemoglobin levels were 13.3 g/dL, and the mean post-radiotherapy Hemoglobin levels were 10.4 g/dL, p < 0.0001. Conclusion: In this study, a reduction in serum Hemoglobin levels was observed after radiotherapy, highlighting the need for better monitoring of these patients.

**Keywords:** radiotherapy, prostatic neoplasms, anemia.

**RESUMO**

Introdução: A estimativa mundial aponta o câncer de próstata como o segundo câncer mais frequente em homens em todo o mundo, sendo a radioterapia uma modalidade importante de tratamento curativo para gerenciar essa neoplasia. A prevalência e o impacto da anemia relacionada ao câncer não são amplamente conhecidos, podendo ser negligenciados ou considerados clinicamente significativos. Acredita-se que os resultados e a toxicidade da radioterapia no tratamento do câncer de próstata possam ser influenciados pelos níveis de hemoglobina no sangue. Objetivo: Avaliar os níveis de hemoglobina em pacientes com câncer de próstata antes e após o tratamento com radioterapia. Métodos: Estudo retrospectivo e longitudinal de pacientes diagnosticados com neoplasia maligna de próstata submetidos à radioterapia externa. Os níveis de Hemoglobina foram medidos antes da radioterapia e após a conclusão do tratamento (20-40 dias). A anemia foi definida pela Organização Mundial da Saúde por valores inferiores a 13 g/dL. A classificação do risco de recorrência do câncer de próstata foi baseada nos critérios de risco da National Comprehensive Cancer Network. Resultados: Quarenta pacientes foram avaliados com medição dos níveis de Hemoglobina antes e após o tratamento com radioterapia. A idade média foi de 67 anos. De acordo com a classificação do grupo de risco, 4 pacientes eram de baixo risco (10%), 27 pacientes eram de risco intermediário (67,5%) e 9 pacientes eram de alto risco (22,5%). Os níveis médios de Hemoglobina pré-radioterapia foram de 13,3 g/dL e os níveis médios de Hemoglobina pós-radioterapia foram de 10,4 g/dL, p < 0,0001. Conclusão: Neste estudo, observou-se uma redução nos níveis séricos de Hemoglobina após a radioterapia, destacando a necessidade de um melhor monitoramento desses pacientes.

**Palavras-chave:** radioterapia, neoplasias da próstata, anemia.

**1 INTRODUCTION**

The worldwide estimate points to prostate cancer as the second most frequent cancer in men worldwide\(^1\), where radiotherapy has been an important modality of curative treatment in managing this neoplasia. The prevalence and impact of cancer-related anemia are not widely known, and it may be overlooked or considered clinically significant. However, restoring normal hemoglobin (Hb) concentrations in patients undergoing radiotherapy has the potential to improve local tumor control and survival, as well as significantly enhance the patient's quality of life\(^2\).

While there are emerging data on the importance of Hb levels in some types of cancer, there is limited published data on its role in prostate cancer. It is believed that the outcomes and toxicity of radiotherapy in prostate cancer treatment may be influenced by blood Hb levels\(^3\).
2 OBJECTIVE

To evaluate hemoglobin (Hb) levels in patients with prostate cancer before and after radiotherapy treatment.

3 METHODS

Retrospective, longitudinal study of patients diagnosed with malignant prostate neoplasms undergoing external radiotherapy. Hb levels were measured before radiotherapy and after treatment completion (20-40 days). Anemia was defined by the World Health Organization (WHO) as men with values less than 13 g/dl.

Prostate cancer recurrence risk classification was based on the National Comprehensive Cancer Network (NCCN) risk criteria, with patients classified into low-risk, favorable and unfavorable intermediate-risk, and high-risk groups. PSA levels were also evaluated.

Patients indicated for hormonal blockade (central and/or peripheral) began hormonal treatment after the collection and measurement of Hb in this study.

Inclusion criteria: prostate neoplasia with confirmatory histopathological diagnosis, referred for radiotherapeutic treatment with or without antiandrogen therapy. Exclusion criteria: Metastatic disease, initiation of chemotherapy, or hematological diseases.

For the descriptive statistical analysis of the collected data, the Statistical Package for the Social Sciences (SPSS) program, version 23.0, was used. Only results with a significance level of 5% probability (P ≤ 0.05) and a 95% confidence interval were considered.

The study was approved by the Research Ethics Committee of the School of Medicine of the Federal Fluminense University - CAAE: 58121422.1.0000.5243.

4 RESULTS

Forty patients were evaluated with measurement of Hb levels before and after radiotherapy treatment. The mean age was 67 years (range 55-79 / 95% CI 65-69 / SD ± 5.4). According to the risk group classification, 4 patients were low-risk (10%), 27 patients were intermediate-risk (67.5%), and 9 patients were high-risk (22.5%). Patients received a dose of external radiotherapy of 70 Gy in 28 fractions (moderate hypofractionation). Table 1 presents the general characteristics of the evaluated patients.

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SMOKING
The mean pre-radiotherapy Hb levels were 13.3 g/dL (range 12-16.5 / 95% CI 13.0-13.6 / SD ± 0.9), and the mean post-radiotherapy Hb levels were 10.4 g/dL (range 9-13 / 95% CI 10.0-10.7 / SD ± 1.1), with a statistically significant difference, p < 0.0001.

5 DISCUSSION

It has been suggested that prostate cancer survival outcomes and radiotherapy toxicity may be influenced by Hb levels. The Trans-Tasman Radiation Therapy Oncology Group study (RTOG 96.01) reported late radiation toxicity in its 5-year median follow-up of 818 prostate cancer patients treated with androgen deprivation therapy and radiotherapy. They found that patients with higher pre-treatment Hb had reduced late rectal toxicity. In our study, a lower Hb level was observed after radiotherapy.

NCCN guidelines recommend transfusion or erythropoietin for symptomatic patients with Hb of 10-11 g/dL and state that erythropoietin should be strongly considered if Hb falls below 10 g/dL. These recommendations were based on studies that showed an improvement in the quality of life of cancer patients but not in their survival with anemia correction.

6 CONCLUSION

In this study, a reduction in serum Hb levels was observed after radiotherapy, highlighting the need for better monitoring of these patients.
REFERENCES


