

Radiation Therapy for Non-Melanoma Skin Cancer: A Study of 63 Cases

Bounid Oumayma^{1*}, Iharti Rokkaya¹, Hadraoui Ghita¹, El-khadir Youness¹, Barkich Samir¹, Oumghar Nezha¹, Darfaoui Mouna¹, El Omrani Abdelhamid¹, Khouchani Mouna¹

¹Radiation Oncology Department, Hematology and Oncology Hospital, Mohammed VI University Hospital, Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakech, Morocco

DOI: [10.36347/sasjm.2024.v10i04.009](https://doi.org/10.36347/sasjm.2024.v10i04.009)

| Received: 06.03.2024 | Accepted: 15.04.2024 | Published: 20.04.2024

*Corresponding author: Bounid Oumayma

Radiation Oncology Department, Hematology and Oncology Hospital, Mohammed VI University Hospital, Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakech, Morocco

Abstract

Original Research Article

Cutaneous carcinomas are the most common skin cancers. Our work aims to identify the epidemiological and clinicopathological characteristics of cutaneous carcinomas, especially squamous cell carcinomas and basal cell carcinomas, treated and monitored at the Oncoradiotherapy Department of the Mohammed VI University Hospital of MARRAKECH, treated with radiotherapy, and to evaluate their efficacy and tolerance. Our study is retrospective and descriptive. We collected data from 63 patients treated and monitored between 2019 and 2022 at the Marrakech University Oncohematology Hospital. For each patient, we collected epidemiological, clinicopathological, therapeutic, and evolutionary data using an exploitation form. The age of the patients ranged from 27 to 95 years, with a peak between 61 and 70 years and a median of 64.32. Males predominated (74.6%). The matte skin phenotype was the most common, present in more than half of the patients. Among 63 patients surveyed, 69.8% had a history of prolonged sun exposure. Tumors of the head and neck were found in 65% of cases, with clinical appearance varying: 36.5% ulcerative-budding, 31.7% budding, 22.2% nodular, 6.4% sclerodermiform, and 3.2% ulcerated. Recurrences accounted for only 27% of consultations, and precancerous lesions were found in only 16% of patients. Most patients consulted at locally advanced stages (68.2%). Histologically, squamous cell carcinoma was confirmed in 63.5% of patients. External radiotherapy was performed in all patients, using three-dimensional conformal technique, adjuvant in 77.7% of cases, exclusive definitive in 19%, and palliative in 3.2% of cases. No patient received brachytherapy. Acute complications were observed in 52% of cases and late complications in 8%. After an average follow-up of 2 years, 76% of patients are still being followed in good disease control status with a complete response in 83% of them, 11% local recurrence, and 6% distant metastases. The incidence of cutaneous carcinomas is steadily increasing due to longer lifespans and behavioral habits, particularly repeated sun exposure. Prevention and early diagnosis strategies help improve prognosis.

Keywords: Cutaneous carcinomas, Radiation Therapy, skin cancers, Oncoradiotherapy Department, Marrakech.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Cutaneous carcinomas are the most common cancers in the United States and France. Their incidence is steadily increasing due to longer lifespans and behavioral habits, particularly repeated sun exposure [1]. In Morocco, according to the Rabat registry 2009 edition, skin cancer ranks 8th in men and 10th in women [2]. Mainly distinguished are : basal cell carcinomas (BCC), the most common, are slow-growing tumors characterized by local and regional destructive potential. Epidermoid or squamous cell carcinomas (SCC) have a more aggressive evolution, with initially lymphophilic and then hematogenous metastatic potential. A variety of therapeutic options are available and include surgical

excision, radiotherapy (RT), cryotherapy, and topical agents. Although surgical excision is considered the main therapeutic approach for the curative treatment of BCC and SCC, radiotherapy can play an integral role in definitive and adjuvant settings [3, 4]; it has proven useful as a first-line treatment for exclusive curative purposes, adjuvant to surgery, or palliative [5-7]. It is considered an effective primary treatment for non-melanoma skin cancer (N-MSK), with significant cure rates in most series [8]. The objective of this study is therefore to evaluate the efficacy and tolerance of adjuvant or exclusive conformal radiotherapy in patients treated for skin carcinoma.

Citation: Bounid Oumayma, Iharti Rokkaya, Hadraoui Ghita, El-khadir Youness, Barkich Samir, Oumghar Nezha, Darfaoui Mouna, El Omrani Abdelhamid, Khouchani Mouna. Radiation Therapy for Non-Melanoma Skin Cancer: A Study of 63 Cases. SAS J Med, 2024 Apr 10(4): 258-261.

MATERIALS AND METHODS

Patients

This is a retrospective study spanning three years, from 2019 to 2022, involving 63 patients followed at the oncology-radiotherapy department of the oncology-hematology hospital of the university hospital center of Marrakech, for malignant non-melanoma skin tumors confirmed histologically and treated with radiotherapy.

Methods

For each patient, we collected data using an individual exploitation form:

- Identity: age, sex, phototype, geographic origin, as well as the time between lesion appearance and consultation.
- The initial examination allowed noting the characteristics of the tumor: number, location, appearance, and size.
- Signs of regional extension (lymph node areas) and metastasis were sought.
- The histological type of the tumor lesion was important to specify. Additional paraclinical

assessment was performed, as indicated, to determine the local, regional, and distant tumor extension. Follow-up during consultations at the service consisted of a clinical examination every three months in the first year, then every six months for two years, then annually. Other complementary examinations were performed based on the symptoms presented by the patients.

RESULTS

During the study period, 63 patients with a skin tumor were admitted to our service for radiotherapy. The age of the patients ranged from 27 to 95 years, with a peak between 61 and 70 years and a median of 64.32 years. Males accounted for 74.6% of cases. The average consultation time was eight months. The matte skin photo type accounted for 55.5% of patients, followed by fair skin phototype in 36.5% of cases, and dark skin in 7.9% of cases. The history of sun exposure was found in 69.8% of patients, all of rural origin. The clinicopathological characteristics of the tumors are presented in Table 1.

Table 1: Clinicopathological Characteristics of Diagnosed Tumors

Anatomoclinical Characteristics	Percentage (%)	
Tumor Location	- Head and neck	65
	- Extremities	30.2
	- Trunk	4.8
Appearance	- Ulcerated-budding	36.5
	- Budding	31.7
	- Ulcerated	3.2
	- Nodular	22.2
	- Sclerodermiform	6.4
Stage	- Localized	28.6
	- Locally advanced	68.2
	- Metastatic	3.2
Lesion	- Primary	73
	- Recurrent	27
Precancerous Condition	- De novo lesion	84
	- Precancerous lesion	16
Histological Type	- SCC (Squamous Cell Carcinoma)	63.5
	- BCC (Basal Cell Carcinoma)	30.2
	- Other	6.3

External radiotherapy was performed on all patients using a three-dimensional conformal radiotherapy technique with 6MV X-ray photons in 73% of patients, while 27% were treated with electron beams. Radiotherapy was adjuvant in 77.7% of cases, exclusively definitive in 19%, and palliative in 3.2% of cases. The delivered dose ranged from 50 to 70 Gy depending on the indication, histological type, location, and tumor stage, with conventional fractionation of 1.8-2 Gy per fraction, 5 days a week. Palliative external radiotherapy was delivered according to the two protocols: 3 Gy x 10 and 4 Gy x 5. No patient received brachytherapy.

This radiotherapy was complicated by acute effects in 52% of cases, consisting of acute radiodermatitis and/or alopecia for scalp tumors, and by late complications in 8%.

After an average follow-up of 2 years, 76% of patients are still being followed with good disease control status, with a complete response in 83% of them, 11% experiencing local recurrence, and 6% distant metastases.

DISCUSSION

The worldwide incidence of non-melanoma skin cancers continues to increase as the global population ages and sun exposure rises. There are numerous therapeutic options available for patients with non-melanoma skin cancer, including carcinomas, among which radiotherapy stands as an effective option.

Although excision is often the preferred treatment for most operable non-melanoma skin cancers, radiotherapy can be considered an effective non-surgical option in definitive or adjuvant settings, yielding better aesthetic and functional outcomes compared to excision [9]. The role of radiotherapy in the treatment of these tumors has been established in a review of 597 patients with non-melanoma skin cancer of the head and neck treated with X-rays at a dose of 50 to 60 Gy, with a 5-year local control rate of 92% for squamous cell carcinoma (SCC) and 96% for basal cell carcinoma (BCC), respectively [10]. There are several radiotherapy techniques available.

Low-energy radiotherapy is delivered by specific devices that are becoming increasingly less available in radiotherapy centers, using photon beams with maximum energy ranging from 50 to 200 kV. This beam profile is ideal for treating skin cancers, as the maximum dose is delivered to the skin and rapidly decreases in depth, penetrating less through eye protections, facilitating its use around the eye [11]. It has been shown to achieve tumor control of 93 to 100% depending on the lesion size, whereas electron beam radiation ensured tumor control of 72 to 88% in the same study [12]. Another study demonstrated a 5% recurrence risk at five years in patients with low-risk non-melanoma skin cancer treated with superficial radiotherapy [13].

Electron beam radiotherapy (EBRT) has the advantage of treating superficial lesions without causing significant damage to deeper structures and can be useful in treating skin cancers on bony prominences or cartilaginous structures [14]. For electrons, the dose to the skin increases with energy and field size, which is often small for a skin tumor. To compensate for this surface dose deficiency and attenuate the dose in depth, it is recommended to use bolus, carefully applied to the skin. Thus, the irradiated depth area is wider than the irradiated skin area, so it is important to take this parameter into account when using multiple adjacent beams [15]. The use of electrons appears to yield similar results to low-energy radiotherapy if used correctly, especially when combined with bolus [16].

Interstitial brachytherapy is another subtype involving the insertion of a radioactive catheter into the tumor bed and is used to treat skin cancers in difficult areas such as the eyelids [17]. A study conducted by 16 members of the American Brachytherapy Society indicated that the majority of them prefer brachytherapy

over external radiotherapy due to the shorter treatment time, treatment compliance for irregular targets, and shallow dose deposition [18].

Currently, ASTRO recommends radiotherapy as a definitive curative treatment modality, at a BED10 dose between 70 and 93 Gy in conventional fractionation 5 days a week, for patients with BCC or SCC who cannot undergo or refuse surgery or for anatomical locations where surgery may compromise function or aesthetics, and it is not recommended in cases of genetic disease predisposing to increased radiosensitivity. In postoperative situations for BCC or SCC, adjuvant RT at a BED10 dose between 60 and 79 Gy in classic 5 days a week fractionation, is indicated in case of extensive perineural spread. It is recommended if there is a close or positive margin without the possibility of reoperation, in case of recurrence after previous negative margin resection, for T3/T4 and locally advanced tumors involving bones and muscles, or in case of desmoplastic tumor [19]. According to the 2021 SFRO, for BCC, although surgery remains the therapeutic option of choice, the indication for RT depends on prognostic factors such as histological subtype, anatomical location, recurrence, and quality of surgery, thus defining 3 prognostic groups (good, intermediate, poor). It is indicated; at a dose ranging from 50 to 70 Gy; in case of R1 lesions or recurrence, or if surgery is not feasible. It is contraindicated in cases of basal cell nevus syndrome and xeroderma pigmentosum, patients younger than 60 years old, sclerodermiform basal cell carcinomas, and in certain anatomical areas (ear, hand, foot, leg, external genitalia). For SCC, they are classified into two groups (low risk or significant risk of recurrence and/or metastases) based on: tumor size (less than or greater than 2 cm or 1 cm in periorificial areas), invasion thickness greater than or equal to 3 mm, adherence to the deep plane, presence of perineural sheathing, and undifferentiated character. External radiotherapy should be systematically discussed for the second group; as adjuvant at a dose of 45 to 50 Gy or as exclusive treatment at a dose of 66 to 70 Gy for tumor in situ [15].

The advantages and disadvantages of radiotherapy should be taken into account, but overall, radiotherapy is a well-tolerated treatment with well-defined acute and late toxicities. Some of these common complications, especially for head and neck locations, include alopecia, pigmentation changes, telangiectasias, fibrosis, atrophy, oral mucositis, gingivitis, tooth loss, and loss of salivary gland function, in addition to more serious complications such as soft tissue or bone necrosis, cataracts, conjunctival scarring, or eyelid deformation may occur [20].

CONCLUSION

The incidence of cutaneous carcinomas is steadily increasing due to longer lifespans and behavioral habits, particularly repeated sun exposure. Prevention

and early diagnosis strategies improve prognosis. Radiotherapy, indicated based on tumor- and/or patient-related factors, which can be administered as external beam technique or via direct application of brachytherapy, is a versatile, effective, well-tolerated, and easily accessible modality.

Declaration of Interest: The authors declare that they have no conflicts of interest.

REFERENCES

1. Grange, F. (2008). Épidémiologie des cancers cutanés en France Dépistage et cancers cutanés Paris: Springer 9-20.
2. Registre de Rabat 2005. <http://biblio.medramo.ac.ma/bib/Registre-Cancer-Rabat%202006-2008.pdf> (édition 2009)
3. Kwan, W., Wilson, D., & Moravan, V. (2004). Radiotherapy for locally advanced basal cell and squamous cell carcinomas of the skin. *International Journal of Radiation Oncology* Biology* Physics*, 60(2), 406-411.
4. Manyam, B. V., Garsa, A. A., Chin, R. I., Reddy, C. A., Gastman, B., Thorstad, W., ... & Koyfman, S. A. (2017). A multi-institutional comparison of outcomes of immunosuppressed and immunocompetent patients treated with surgery and radiation therapy for cutaneous squamous cell carcinoma of the head and neck. *Cancer*, 123(11), 2054-2060.
5. Motaparthy, K., Kapil, J. P., & Velazquez, E. F. (2017). Cutaneous squamous cell carcinoma: review of the eighth edition of the American Joint Committee on cancer staging guidelines, prognostic factors, and histopathologic variants. *Advances in Anatomic Pathology*, 24(4), 171-194.
6. Barysch, M. J., Eggmann, N., Beyeler, M., Panizzon, R. G., Seifert, B., & Dummer, R. (2012). Long-term recurrence rate of large and difficult to treat cutaneous squamous cell carcinomas after superficial radiotherapy. *Dermatology*, 224(1), 59-65.
7. Perez, C. A. (1991). Management of incompletely excised carcinoma of the skin. *International journal of radiation oncology, biology, physics*, 20(4), 903-904.
8. Grossi Marconi, D., da Costa Resende, B., Rauber, E., de Cassia Soares, P., Fernandes, J. M., Mehta, N., ... & Chen, A. (2016). Head and neck non-melanoma skin cancer treated by superficial X-ray therapy: an analysis of 1021 cases. *PLoS One*, 11(7), e0156544.
9. Garbutcheon-Singh, K. B., & Veness, M. J. (2019). The role of radiotherapy in the management of non-melanoma skin cancer. *Australasian Journal of Dermatology*, 60(4), 265-272. doi: 10.1111/ajd.13025
10. Schofield, J. K., Linos, E., & Callander, J. (2016). Management of skin cancer in the frail elderly: time for a rethink?. *British Journal of Dermatology*, 175(5), 855-856.
11. Mendenhall, W. M., Amdur, R. J., Hinerman, R. W., Cогnetta, A. B., & Mendenhall, N. P. (2009). Radiotherapy for cutaneous squamous and basal cell carcinomas of the head and neck. *The Laryngoscope*, 119(10), 1994-1999.
12. Lovett, R. D., Perez, C. A., Shapiro, S. J., & Garcia, D. M. (1990). External irradiation of epithelial skin cancer. *International Journal of Radiation Oncology* Biology* Physics*, 19(2), 235-242.
13. Cогnetta, A. B., Howard, B. M., Heaton, H. P., Stoddard, E. R., Hong, H. G., & Green, W. H. (2012). Superficial x-ray in the treatment of basal and squamous cell carcinomas: a viable option in select patients. *Journal of the American Academy of Dermatology*, 67(6), 1235-1241.
14. Miller, R. A., & Spittle, M. F. (1982). Electron beam therapy for difficult cutaneous basal and squamous cell carcinoma. *British Journal of Dermatology*, 106(4), 429-436.
15. Hennequin, C., Rio, E., Quéro, L., & Clavere, P. (2021). Radiotherapy of skin cancers, SFRO.
16. Griep, C., Davelaar, J., Scholten, A. N., Chin, A., & Leer, J. W. H. (1995). Electron beam therapy is not inferior to superficial x-ray therapy in the treatment of skin carcinoma. *International Journal of Radiation Oncology* Biology* Physics*, 32(5), 1347-1350.
17. Mareco, V., Bujor, L., Abrunhosa-Branquinho, A. N., Ferreira, M. R., Ribeiro, T., Vasconcelos, A. L., ... & Jorge, M. (2015). Interstitial high-dose-rate brachytherapy in eyelid cancer. *Brachytherapy*, 14(4), 554-564.
18. Likhacheva, A. O., Devlin, P. M., Shirvani, S. M., Barker, C. A., Beron, P., Bhatnagar, A., ... & Kamrava, M. (2017). Skin surface brachytherapy: A survey of contemporary practice patterns. *Brachytherapy*, 16(1), 223-229.
19. Likhacheva, A. (2020). Definitive and Postoperative Radiation Therapy for Basal and Squamous Cell Cancers of the Skin: Executive Summary of an American Society for Radiation Oncology Clinical Practice Guideline. Clinical Practice Guideline 2020.
20. Cheraghi, N., Cогnetta, A., & Goldberg, D. (2017). Radiation Therapy in Dermatology: Non-Melanoma Skin Cancer. *Journal of drugs in dermatology: JDD*, 16(5), 464-469.