

Contact radiotherapy for non-melanoma skin cancer of the face: Experience of Tunisian Center

Radiothérapie de contact des tumeurs cutanées de la face de type non mélanome: Expérience d'un centre Tunisien

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Received: 18 April 2021; Accepted: 30 September 2021; Published online: 31 October 2021

ABSTRACT

Objective: Radiation therapy has shown to be an effective option that could be proposed as a definitive or adjuvant treatment in the management of non-melanoma skin cancers of the face. The aim of this study was to evaluate the clinical outcome and cosmetic results after contact radiotherapy for non-melanoma skin cancers.

Methods: From 2010 to 2015, thirty-five patients with histologically-proven diagnosis of basal cell carcinoma and squamous cell carcinoma of the face have been treated with exclusive or post operative contact radiotherapy.

Results: Of the 35 tumors, 31% were peri-orbital, 31% were peri-nasal, 23% were jugal and 15% were in the labial corner. Median tumor size was 17.5 mm. Histological type was basal cell carcinoma 71.4% of cases and squamous cell carcinoma in 28.5%. Radiotherapy was exclusive in 66% of cases and post-operative in 34%.

After a median follow-up of 34 months, three patients presented local tumor recurrence.

Disease free survival rates at 3 and 5 years were 88% and 60% respectively.

The aesthetic outcome was scored as "good" in 86% of cases. Five patients (14%) were scored as "acceptable".

Conclusion: Our findings suggest that contact radiotherapy is an effective alternative for non-melanoma skin cancers of the face.

Keywords: basal cell carcinoma, squamous cell carcinoma, contact radiotherapy

RÉSUMÉ

Objectif: Evaluer les résultats cliniques et esthétiques de la radiothérapie de contact pour les tumeurs cutanées de la face de type non mélanome.

Méthode: Entre 2010 et 2015, 35 patients atteints de carcinome basocellulaire ou de carcinome épidermoïde de la face étaient traités par radiothérapie de contact exclusive ou adjuvante. La radiothérapie était effectuée à l'aide d'un appareil THERAPAX HF150.

Résultats: L'âge médian au moment du diagnostic était de 66 ans [15 – 91 ans]. Parmi les 35 tumeurs, 31% étaient situées en péri orbitaire, 31% en péri nasal, 23% étaient jugale et 15% au niveau de la commissure labiale. La taille tumorale médiane était de 17,5 mm [4 – 80 mm]. Le type histologique était un carcinome basocellulaire dans 71,4% des cas et un carcinome épidermoïde dans 28,5% des cas.

La radiothérapie était exclusive dans 66% des cas et post opératoire dans 34% des cas.

Après un suivi médian de 34 mois, trois patients ont récidivé localement.

La survie sans maladie à 3 et 5 ans était respectivement de 88% et 60%.

Le résultat esthétique était jugé «bon» dans 86% des cas. Cinq patients (14%) ont été jugés «acceptables».

Conclusion: Nos résultats suggèrent que la radiothérapie de contact est une alternative efficace pour les tumeurs cutanées de la face de type non mélanome. C'est une technique bien tolérée permettant un contrôle local satisfaisant.

Mots clés: Carcinome basocellulaire, Carcinome épidermoïde, Radiothérapie de contact.

INTRODUCTION

Non-melanoma skin cancers (NMSC) of the face are a large entity requiring a multidisciplinary approach. The most frequent histological type is basal cell carcinoma (BCC) followed by squamous cell carcinoma (SCC) [1]. The standard treatment is surgical excision [2], but radiotherapy is an interesting alternative, notably contact radiotherapy. Indeed, the anatomical complexity

of the cephalic extremity is itself a challenge in terms of surgery and radiotherapy as well. Contact irradiation could be an effective option for the treatment of NMSC in non-surgical patients or when the tumor is localized in a cosmetically sensitive area. The aim of this study was to evaluate the clinical outcome and cosmetic results after contact radiotherapy for non-melanoma skin cancers.

METHODS

All patients treated with contact radiotherapy in our department between 2010 and 2015 with histologically-proven diagnosis of BCC and SCC of the face was retrospectively reviewed. Primary radiotherapy was used for nonsurgical patients including large lesions for which surgical intervention poses the risk of functional deficits. Adjuvant radiotherapy was indicated for aggressive or incompletely resected tumors.

Epidemiological data were collected from available registries. Radiotherapy was carried using a THERAPAX HF150 device which includes a high voltage generator, an X-ray tube and a micro-press console which allows the selection of X-rays between 30 and 150 KV. The variation of the irradiation fields is defined by circular applicators specific to the device: diameters of 1, 1.5, 2, 2.5, 3 and 5cm were used for a source to surface distance (SSD)=15cm. Diameters of 10 and 15cm were used for a SSD=25cm.

The contact radiotherapy device was installed in a dedicated room of reduced dimensions.

During treatment, patients were followed weekly. Follow-up visits after treatment completion were scheduled according to our practice: every three months for the first two years then every six months for three years and yearly afterwards. Acute and late toxicities were scored by the Radiation Therapy Oncology Group (RTOG) scale [3].

Clinical, functional and aesthetic outcome were available from the registries in all cases. Aesthetic outcome was scored according to the following scale: “good” was defined as no atrophy, no telangiectasia and no depigmentation; as “acceptable” or as “not acceptable” according to the presence of moderate or severe atrophy, telangiectasia or depigmentation, respectively.

RESULTS

Patients’ characteristics

From 2010 to 2015, a total of 35 patients (35 tumors) with biopsy-proven BCC or SCC underwent radiation therapy at our department.

Medium age at diagnosis was 66 years with a range of 15 to 91 years. Twenty-three of patients were males and twelve were women.

Of the 35 tumors, 31% were peri-orbital, 31% were peri-nasal, 21% were jugal, 15% were in the labial corner and 2% were auricular.

BCC was the predominant NMSC accounting for 71.4% of cases, while SCC represented 28.5% of cases. Tumor size at presentation ranged from 4 mm to 80 mm with a median diameter of 17.5 mm. Fifty-four percent were greater than 15 mm.

Patients and tumor characteristics are summarized in Table I.

Primary radiotherapy was performed in the majority of patients (66% of cases).

Adjuvant radiotherapy after incomplete surgical

excision was performed in 34% of cases. The total delivered doses were 70 Gy (2 Gy/fraction) in 13 patients (37%), 66 Gy (2 Gy/fraction) in 3 patients (8.6%), 64 Gy (2 Gy/fraction) in 3 patients (8.6%), 60 Gy (2 Gy/fraction) in 8 patients (22.9%) and 61.2 Gy (3.4Gy/fraction) in 8 patients (22.9%).

Table I: Patient Characteristics

Characteristics	Patients number (%)
Age (years)	
< 60	9 (25.7%)
>=60	26 (74.3%)
Sex	
Male	23 (65.7%)
female	12 (34.2%)
Histological type	
basal cell carcinoma	25 (71.4%)
squamous cell carcinoma	10 (28.5%)

Radiation therapy toxicity

Radiodermatitis was observed in 23% of cases. It was grade 1 in 38% and grade 2 in 62% of cases. Lesions were developed in the irradiated area and evolved favorably after treatment completion.

Outcomes

The median follow-up was 34 months [12-94 months]. Three out of 35 patients presented local or loco-regional tumor recurrence. All the cases of recurrence were observed in cases of primary radiotherapy.

One patient with peri-nasal SCC showed treatment failure at the primary site after

62 months and refused salvage treatment. The other two cases developed a second primary BCC after respectively 11 and 12 months. None of the tumors developed on the site of prior radiotherapy. These recurrences were salvaged with surgery.

Disease free survival rates at 3 and 5 years were 88% and 60% respectively.

The aesthetic outcome was scored as “good” in 86% of cases. Five patients (14%) were scored as “acceptable”. (Figure 1 and 2)



Figure 1: BCC of the ear before contact radiotherapy



Figure 2: Clinical response after contact radiotherapy for BCC of the ear

DISCUSSION

The three-year and five-year outcomes of our study are very encouraging and confirm the results of previous studies reporting favorable outcomes after contact radiotherapy for NMSC of the face.

NMSC of the face are very common among caucasians. As in our study, BCC is the most common histological type followed by SCC [4]. Treatment options include surgery, radiotherapy, photodynamic therapy and topical agents. Mohs Micrographic Surgery (MMS) is currently the mainstay of therapy, with a reported 5-year cure rate of 93.5–99% for primary BCC [5] and 96.9% for primary SCC [6].

The choice of treatment modalities depends on tumors characteristics, cosmetic and functional results after treatment and medical conditions of the patient.

Radiation therapy is an effective therapeutic option that may also be indicated as a definitive or adjuvant treatment in the management of NMSC.

Radiation therapy modalities are diverse. It can be given via X-ray therapies with kilovolt (KV) to megavolt (MV) photons, electron beam therapy and brachytherapy [7]. Superficial X-rays machine with X-rays produced at potentials of 50–150 kV (kilovolts) is commonly used for tumors at very shallow depth, that is, 5 mm [8].

The source to skin distance (SSD) is generally between 10 to 30 cm [7].

NCCN guidelines recommend radiation therapy for NMSC in selected situations. It is often reserved for patients older than 60 years because of concerns about long-term squeals.

The NCCN panel suggest adjuvant radiotherapy in case of high-risk histologic features such as perineural involvement or positive margins [9,10].

Hennequin et al. recommends radiotherapy in BCC for patients older than 60 years who are unable to tolerate surgery, for non-sclerodermiform histology and for tumors occurring in non-sensitive areas. For SCC, primary radiotherapy is indicated in inoperable cases and when complete surgical resection is at risk of cosmetic or functional impairment. The dose usually required is 60 to 70 Gy.

Adjuvant radiotherapy could be proposed in case of poor prognosis factors. Pathological high risk features are: tumor size \geq 2cm, tumor thickness \geq 3mm, poorly differentiated tumors and perineural involvement. Adjuvant radiotherapy is also indicated in case of lymph node involvement [11].

The avril trial is the only randomized trial comparing surgery and radiotherapy in the treatment of primary BCC of the face measuring less than 4 cm. Patients in the radiotherapy group were treated either with interstitial brachytherapy, contact therapy and conventional radiotherapy. Results showed that the failure rate was significantly lower in surgery than in radiotherapy and that surgery may also be preferred for its cosmetic result [12].

Petrovich et al. reported treatment outcomes from 896 patients (467 BCC, 362 SCC and mixed), treated with radiotherapy. Superficial X-rays beams were used for

the treatment of small lesions, and patients with larger skin lesions were treated with 250 to 300 kV.

The overall local control was 97% at 5 years and 96% at 10 years, with excellent cosmetic outcomes [13].

Lovett et al. analyzed retrospectively a total of 339 NMSC lesions treated with diverse modalities. Superficial X rays were given to 187 patients. Overall tumor control rate was 86% in all lesions. Superficial radiotherapy technique showed a local tumor control of 93–100%, depending on tumor size [14].

Belaid et al. reported treatment outcomes of 108 patients with epithelial eyelid cancers, treated either with cobalt, low-dose-rate interstitial brachytherapy and contact radiotherapy. Five-year local recurrence-free rate, disease-free survival and overall survival were respectively 90%, 90% and 97%. Radiation therapy and especially brachytherapy allowed good local control rates and acceptable toxicities [15].

Regarding toxicity, it is noteworthy that, in our study, no acute toxicity was recorded in 77% of treated lesions, grade 2 toxicity rate was 62% and no grade 3 toxicity was reported.

Coquard et al. evaluated the results of adjuvant contact irradiation using 50 kV photons after resection of conjunctival malignancies, in 14 patients. Local control rates were excellent with only one recurrence noted [16].

Caccialanza et al. performed a retrospective study on 1188 patients with a total of 2002 primary malignant epithelial neoplasms that had been treated by contact, superficial, and intermediate radiotherapy. Cosmetic results were evaluated as “good” or “acceptable” in 84.01% of the treated lesions. Contact radiotherapy achieved a better cosmetic result than other modalities [17].

CONCLUSION

According to our results, contact radiotherapy is effective for BCC and SCC in terms of tumor local control and cosmetic outcomes.

NMSC are very frequent cutaneous cancers, often located on the face. Although surgery remains the gold standard of therapy, radiotherapy can be used as an alternative option. In high-risk situations, or in cases where surgery would lead to impaired cosmetic outcomes, contact radiotherapy is a well-tolerated technique which can be realized on an ambulatory basis.

Competing Interests

The authors declare that they have no potential conflict of interest relevant to this article.

Compliance with ethical standards

Conflict of interest: The authors stated that there is no conflict of interest.

Funding Statement: The authors received no specific funding for this work.



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