CASE REPORT

Intensity Modulated Radiotherapy is an Effective Treatment for Basosquamous Cell Cancer

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Abstract

Basosquamous cell carcinoma is an uncommon skin cancer with an incidence rate between 1.5% and 2.7%. Surgical excision is the therapy of choice for most skin neoplasm. Depending on the tumor presentation size, location, and patient general condition, there are complementary approaches available: radiation therapy, for curative intent or used as an alternative to maximize local control and symptomatic relief. The case is a 54-year-old male with a seventeen-year history of six times recurrent Basosquamous cell cancer that started as a skin nodule on the left nasolabial fold and ended with a mass penetrating into the left ethmoid sinus and orbital cavity. The patient was then treated using intensity modulated radiotherapy as the only effective second alternative modality after debulking surgery. Radiation intent was curative, aiming for eradication of the tumor, maximizing the local control and relief of symptoms. The follow-up demonstrated an eighty percent tumor shrinkage as measured on imaging studies in addition to an excellent cosmetic outcome. Intensity modulated radiotherapy proved to be an efficient treatment modality, with acceptable toxicity and excellent local control, when the patient did not prefer the surgical option for the cosmetic compromise.

Keywords

Basosquamous cell cancer, Intensity modulated radiotherapy, Head and neck cancer.

Introduction

Basosquamous cell carcinoma (BSCC) is an uncommon skin cancer (at an incidence rate between 1.5% and 2.7%) reported in various retrospective studies after reviewing non-melanoma skin cancer cases.

Tumor location is similar to other types of basal cell carcinoma (BCC): the majority of the lesions arise in the head and neck area (80%), with the central face and perinasal areas being the most common locations (30%)[1]. The tumor can also occur on the neck, trunk, and extremities.

BSCC has distinct morphological and biological features that distinguish it from the common form of BCC and squamous cell cancer (SCC). Today, most dermatologists define BSCC as a subtype of BCC, ranging from a characteristic combination of BCC and squamous cell carcinoma with or without a transition zone to any BCC with evidence of keratinization[2,3].

Research showed that the most affected site by SBCC is the cervicofacial area (71.7%) followed by the trunk (10%), limbs (9.6%) and scalp (3.7%) regions; with a recurrence rate of 10%, occurring mainly in the head and neck area [4].

The importance of distinguishing BSCC from BCC or SCC lies in their significantly greater tendency to metastasize to distant sites, with incidence rates ranging between 5% and 7%[4-6]. In addition, some authors believe that BSCC has more aggressive behavior and a higher propensity for local recurrence[7]. In other reports the presence of perineural invasion has considerably higher rates of metastatic disease and local recurrence when compared to those without perineural invasion[8]. However, the degree of differentiation and the size of the initial lesion are not significant factors[8].

Most authors recognize that BSCC carcinoma has a nonspecific clinical presentation, and the diagnosis is made only subsequent to a biopsy. Surgical excision using Mohs' micrographic surgery is the therapy of choice[3]. Depending on the tumor presentation, several alternative therapies are available: radiation therapy, cryotherapy, immunological and photodynamic treatment[5-7]. There are no general guidelines for the treatment of BSC. This may be due to its rarity, growth patterns or debates about its histological definition.

The case presented is of a patient with recurrent BSCC of the left nasolabial fold and extensive locoregional invasion of left ethmoid and orbital cavity who underwent multiple surgeries and finally received radical radiotherapy. This report presents details of radiotherapy treatment such as dose prescription, treatment delivery technique, tumor response, acute and long term side effects.

Case Report

This case is of a 54-year-old male with seventeen-year history of recurrent BSCC, that started as a skin nodule on the left nasolabial fold and ended with a mass penetrating into the left ethmoid sinus and orbital cavity.

The patient's cancer history started in 1996, when he was first diagnosed by a nodule arising in the left nasolabial area, which was excised at the time. Pathology showed BCC, with no further details comments on the margins, size, and risk factors like lymph-ovasular invasion and perineural invasion.

In 2003 the patient had the first recurrence, which was treated with a second surgical excision, and in 2005 the second recurrence occurred in the same location; this time resection and reconstructive graft from post oracular skin were performed.

The third recurrence occurred in 2010, when the patient presented with obstructed nose and occasional nasal bleeding. Contrast-enhanced computed tomography (CT) scan showed once more local progression: a bulky mass involving the left nasal cavity, ethmoid sinus, maxillary sinus and destruction of the medial and inferior orbital wall of the left eye. Metastatic workup (chest CT scan and bone scan) was negative. This time an attempt for complete resection failed, and the histopathology was consistent with BSCC.

The patient was then referred for radiotherapy as the only effective alternative modality after surgery, with curative intent aiming to eradicate the tumor, maximize the local control and relief of symptoms.

Management

The patient had a full examination of the eye. There was a hard painless mass bulging through the area between the medial orbit and nose bridge. The covering skin was red nodular, but no ulcers or open wound on the skin were observed. The function of the left eye, which was close to the tumor, was intact, no visual field loss or extra-ocular muscle paralysis was noticed.

Neurological exam was normal, including higher brain functions (conscious, memory and orientation) and cranial nerves functions including olfactory, ophthalmic, trochlear, trigeminal and abducent nerves and the rest of the systemic examination was unremarkable.

CT scan showed a mass occupying the left sphenoid sinus, left nasal cavity, and invading the left orbit causing exophthalmos. The mass invaded the lateral border of the medial rectus muscle and extended superior to fill the left ethmoid sinus, cribriform plate and come to abut a small portion of the left frontal lobe.

Treatment

The patient received intensity-modulated external beam radiotherapy at King Abdulaziz University Hospital, Jeddah.

In this case radiotherapy using IMRT was used only at the fifth recurrence, after surgery had achieved the maximum cosmetic function and radiation was recommended as an alternative to complete resection with curative intent to avoid orbit exoneration and achieve better cosmesis.

Planning CT images of the patient were acquired in the treatment position, with a customized thermoplastic head-and-neck mask. The gross tumour volume (GTV), clinical target volume (CTV), planning target volume (PTV) and the organs at risk (brain stem, lens, eyes, parotids, *etc*.) were delineated on each slice.

IMRT treatment plan was performed using 6MV photons and partial non-coplanar arcs. The total dose was 70 Gy delivered in 35 fractions over seven weeks to the planning-target-volume (PTV), which encompassed the tumor and areas at high risk of recurrence.

The treatment plan met the Radiation Therapy Oncology Group (RTOG) dose guidelines[8] for IMRT planning, as shown in Figure 1.

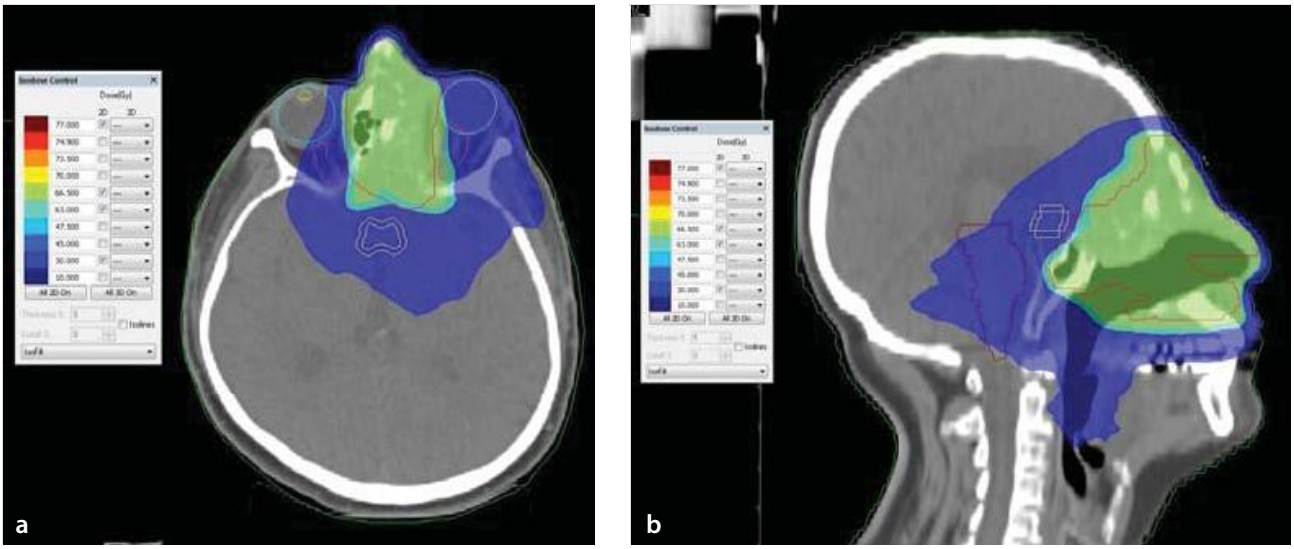

Figure 1. Planning CT images showing radiation dose distribution, in axial (a) and sagittal (b) views. The dose is displayed in isodose bands; green: 66.5 Gy (95% of prescribed dose of 70 Gy), turquoise: 63 Gy (90% of prescribed dose of 70 Gy), blue: 30 Gy.

Data of PTV dose coverage were as following: mean dose to the PTV was 70 Gy, 95% of PTV received 97.2% of the prescribed dose, and maximum dose (hot spot) inside PTV was 9% of the prescribed dose.

Dose to the surrounding organs-at-risk (OARs) were as following: the maximum dose to neurological structures brain stem, optic chiasm, right and left optic nerve were respectively 50.3 Gy, 54 Gy, 54 Gy, and 55.3 Gy . Right and left eyes received mean doses of 21.9 Gy and 43.3 Gy, respectively. Right and left lens received maximum doses of 11.6 Gy and 27.8 Gy, respectively. Mean doses to parotids were 7.4 Gy to right and 28.6 Gy to left.

The radiation therapy started August 20 and ended October 10, 2013.

The patient tolerated the treatment very well, except for expected side effects, as grade 1 dermatitis, teary eye, and nasal dryness.

Follow-Up

Patient completed 12 months of follow-up. Every three months he had a physical examination including higher brain function and cranial nerves and a CT scan of the sinuses, neck and chest were performed to evaluate the radiological response. CT images showed a measurable shrinkage of the tumor and decreased enhancement (measured as 80 % on CT scan), as shown in Figure 2. In the follow-up visits the patient denied any blurry vision or loss of the visual field or acuity; occasional teary eye was reported. He also denied dry mouth, loss of taste, headache, double vision, facial numbness. In addition, acceptable side effects, such as occasional dry eye and dry nasal cavity, were noticed at follow-up presentation. Clinical examination showed excellent cosmetic outcome over the medial naso-orbital bridge. Cranial nerves exam were unremarkable, visual field was intact. No evidence of distant lung metastasis was observed.

Discussion

It is not unusual for patients diagnosed with BSCC to have had BCC in the past [9]. This is a case report in which a long-standing lesion on the left nasolabial skin, initially diagnosed as BCC, was later found to have BSC histology without regional metastases. It is also common that various biopsies of large lesions diagnosed as BSCC later showed histopathological characteristics of BCC and the local recurrence presents as BSC.

Recent attempts have been reported that early identify the BSCC, using the dermatoscopy to describe the tumor features and finding that detection of at least one dermatoscopic criterion of both BCC and SCC should raise suspicion for the tumor to be BSCC[15,16]. Other more specific criteria to diagnose BSCC include recognition of Maple leaf-like areas, short fine superficial telangiectasia, multiple small erosions, and shiny white-red structure fewer areas[10,11]. All efforts for early detection and prediction of BSCC can guide the treatment to be more aggressive and comprehensive from the first presentation.

Due to the rarity of cutaneous BSCC of the head and neck area, the literature is scarce in guidelines for appropriate treatment plan. While most of the authors recognize that the disease presents in advanced stages and requires radical surgical excision, only few recommend aggressive multimodal therapy, including lymph nodes dissection, radiotherapy or chemotherapy, while others suggest as indications for radiation therapy the poor general health, elderly age, contraindication

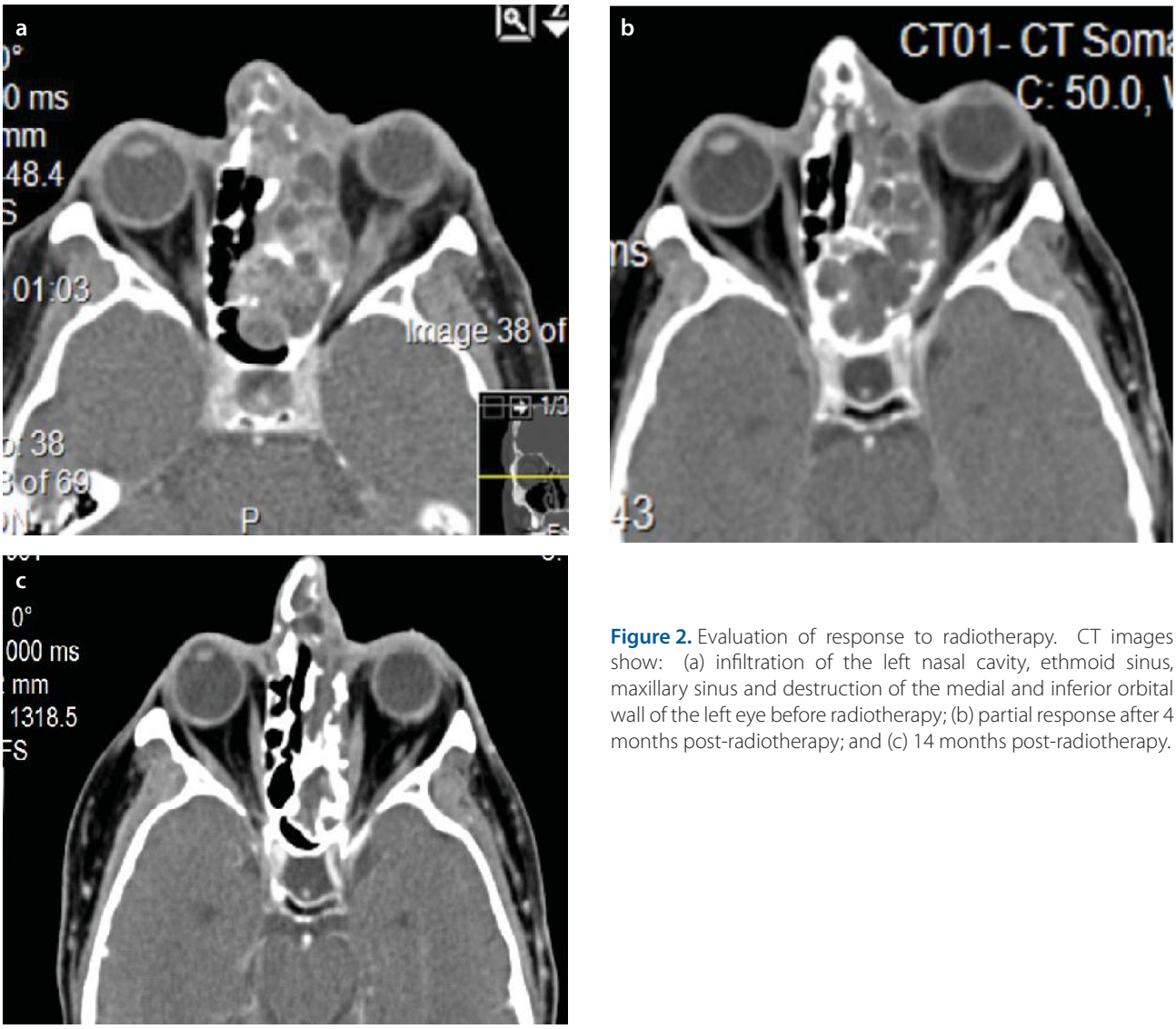

Figure 2. Evaluation of response to radiotherapy. CT images show: (a) infiltration of the left nasal cavity, ethmoid sinus, maxillary sinus and destruction of the medial and inferior orbital wall of the left eye before radiotherapy; (b) partial response after 4 months post-radiotherapy; and (c) 14 months post-radiotherapy.

for surgery, and tumor size between 1 and 5 cm[17-20]. The reported radiation doses are also various, ranging from 35 Gy for palliative treatments to 70 Gy for curative intent[4,17-20]. The recent advances in radiotherapy technology and knowledge has led to significant changes in radiation treatment planning and delivery: if most of the treatments in the 90s era were delivered by ortho-voltage X-ray and electrons, the recent studies describe the use of photons in three-dimensional conformal radiotherapy (3D-CRT) or IMRT techniques[4,20].

The few case reports presented in the literature describe BSCC of head and neck receiving palliative radiotherapy with doses of 44-50 Gy, and achieving good local control of the disease after follow-ups of 8-18 months[17,18,21,22]. Nevertheless, Thariat *et al*. investigated the outcomes of 51 patients with BSCC of the head and neck who received radical radiotherapy with a median radiation dose of 70 Gy and, after 5 years follow-up, found disease-free survival rates of 63% and overall survival rates of 85%[4].

Radiotherapy and chemotherapy typically treat unresectable tumors, and the intent for a curative or a palliative treatment is based on the realistic chances of tumor control. Several factors are taken into consideration in treatment management: patient's performance status and specific co-morbidities; the possibility of delivering curative doses of radiation with minimal damage to vital structures; the loco-regional extension of the disease; and the presence of distant metastases.

In the present case the recurrence occurred in the nasal area in proximity to radiation sensitive organs such as eyes, lens, chiasm and brain. Due to clinical condition of the patient, his refusal to go to further surgeries and the possibility of scarifying the affected eye with poor cosmetic outcome, as well as the use of an advanced radiotherapy technique such as IMRT that enabled delivery of high radiation dose while sparing the nearby healthy tissue, it was possible to offer the patient a treatment with curative intent.

The cosmetic and local response in the follow-up of this case showed a very promising outcome. This could encourage radiation oncologists to recommend aggressive treatments, employing high radiation dose and highly conformal radiation therapy, but at the same time paying attention to the OARs tolerance; therefore balancing the local control against the inherent radiation toxicity.

Conclusion

This report is of a case of basosquamous cell cancer where IMRT proved to be an efficient treatment modality while the surgical outcome was not promising good cosmetic outcomes.

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تقرير الحالة: تقنيه العلاج الإشعاعي المقنن الكثافة يعتبر علاج فعال لسرطان الجلد ومنه سرطان الخلية القاعدية الحرشفية

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المستخلص. يعتبر سرطان الخلايا القاعدية الحرشفية نوع من أنواع سرطان الجلد غير المألوف (معدل الإصابة من ١,٥٪-٢,٧٪) كما يعتبر الاستئصال الجراحي هو العلاج الموصي به لمعظم الأورام الجلدية. واعتماداً على مكان وخصائص الورم تحدد العملية الجراحية. كما أن هناك العديد من العلاجات البديلة المتاحة مثل العلاج الإشعاعي. سنعرض حالة مريض ذكر بالغ من العمر ٥٤ عاما مشخص بسرطان الجلد القاعدي الحرشفي منذ سبعة عشر عاما. تكررت عوده السرطان في نفس مكانه ستة مرات. بدأ بكتلة صغيرة على سطح الجلد على المنطقة الأنفية الشفوية اليسرى وانتهت بكتلة اختراقات الجيب الغربالي الأيسر والتجويف المداري المصاحب لنفس الجهة. في المرة الأخيرة وبعد تعرض المريض لست عمليات استئصال جراحي للورم تم علاجه باستخدام العلاج الإشعاعي (IMRT)، وتعتبر الطريقة الثانية الوحيدة الفعالة البديلة بعد الجراحة. كان الهدف من الإشعاع العلاجي القضاء على الورم، وتعظيم السيطرة عليه بأقل أعراض جانبية مصاحبة . أظهرت نتيجة المتابعة أنه تم تقليص الورم بدرجة تصل إلى ثمانين في المائة ونتائج تجميلية ممتازة. ومن هذه الحالة تبين أن العلاج الاشعاعي المقنن الكثافة (IMRT) طريقة علاج فعالة مع مصاحبة لأعراض جانبية مقبولة، وقد حصل المريض على سيطرة محلية ممتازة للورم، عندما لم يكن يفضل المريض الخيار الجراحي الذي كان سيؤثر بشكل سلبي على الناحية التجميلية.