

## Case Report

## Invasive cutaneous squamous cell carcinoma of scalp: A case report



Alok Dahal<sup>a,\*</sup>, Durga Neupane<sup>b</sup>, Nimesh Lageju<sup>b</sup>, Lokesh Shekher Jaiswal<sup>c</sup>,  
Sushant Chaudhary<sup>b</sup>, Arpana Chhetri Budhathoki<sup>d</sup>, Shiva Pratik Sah<sup>e</sup>, Sushil Sharma Subedi<sup>b</sup>

<sup>a</sup> Department of Surgery (Division of Neurosurgery), B.P. Koirala Institute of Health Sciences, Dharan, Nepal

<sup>b</sup> Department of Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal

<sup>c</sup> Department of Surgery (Division of CTVS), B.P. Koirala Institute of Health Sciences, Dharan, Nepal

<sup>d</sup> Department of Surgery, Lumbini Medical College and Teaching Hospital, Lumbini, Nepal

<sup>e</sup> Department of Surgery, Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal

## ARTICLE INFO

## Keywords:

Case report  
Invasive  
Cutaneous  
Squamous cell carcinoma

## ABSTRACT

**Introduction and importance:** Cutaneous Squamous cell carcinoma(cSCC) represents approximately 16% of scalp tumors. Overall, cSCC is significantly more common in the oropharyngeal mucosa than the skin. Smoking is a risk factor for mucosal lesions, risk factors for developing cutaneous SCC include age, ultraviolet light exposure, chronic scarring, history of ionizing radiation, androgenetic alopecia (in men), and immunosuppression. The rates of bone invasion in cutaneous SCC have not been well noted in the literature.

**Case report:** We report a case of 57-year-old man with invasive squamous cell carcinoma of scalp with extension into bone, cortex and dura mater. Gross total removal of the tumor with extension of bony defect followed by repair of dura and repair of skin defect by VY advancement flap was done under general anaesthesia. At a 3-month follow-up, his wound is well healed. No evidence of metastasis is noted.

**Discussion:** Cutaneous squamous cell carcinoma (cSCC) is the second most common non-melanoma skin cancer, and its incidence is steadily increasing. Although the majority of cSCCs are successfully eradicated by surgical excision, advanced cSCC poses a significant risk in terms of morbidity, impact on quality of life, and risk of death.

**Conclusions:** Invasive cutaneous squamous cell carcinoma of scalp is a rare entity. Invasion to bone, cortex, and dura mater is furthermore rare. Therefore, proper management of advanced cSCC is of the utmost importance since local invasion, delayed diagnosis, and metastasis contribute to increased costs and morbidity. A multi-disciplinary team approach is recommended.

## 1. Introduction

Cutaneous Squamous cell carcinoma(cSCC) encompasses approximately 16% of scalp tumors [1]. Overall, cSCC is significantly more common in the oropharyngeal mucosa than the skin. Smoking is a risk factor for mucosal lesions, whereas, risk factors for developing cutaneous SCC include age, ultraviolet light exposure, chronic scarring, history of ionizing radiation, androgenetic alopecia (in men), and immunosuppression. The rates of bone invasion in cutaneous SCC have not been well established in the literature. However, 20 out of 53 immunocompromised patients with cutaneous SCC of the scalp were found to have bone invasion in one retrospective study[2]. Invasion to bone is associated with poor prognosis[3].

We report a case of 57-year-old man with invasive squamous cell carcinoma of scalp with extension into bone, cortex and dura mater. Gross total removal of the tumor with extension of bony defect followed by repair of dura and repair of skin defect by VY advancement flap was done under general anaesthesia. At a 3-month follow-up, his wound is well healed. No evidence of metastasis is noted. This case report is reported according to SCARE guideline [4].

## 2. Case report

A 57-year-old man, hypertensive, chronic smoker and farmer by occupation presented with a highly vascular mass of dimension approximately 5\*6 cm over right parieto-occipital region with active

\* Corresponding author.

E-mail addresses: [Dahalalok015@gmail.com](mailto:Dahalalok015@gmail.com) (A. Dahal), [neupanedurga26@gmail.com](mailto:neupanedurga26@gmail.com) (D. Neupane), [nimesh.lageju@yahoo.com](mailto:nimesh.lageju@yahoo.com) (N. Lageju), [Lokesh\\_shekher@yahoo.com](mailto:Lokesh_shekher@yahoo.com) (L.S. Jaiswal), [888sushantchaudhary@gmail.com](mailto:888sushantchaudhary@gmail.com) (S. Chaudhary), [buterfunk101@gmail.com](mailto:buterfunk101@gmail.com) (A.C. Budhathoki), [shivapratik@gmail.com](mailto:shivapratik@gmail.com) (S.P. Sah), [sushilss907@gmail.com](mailto:sushilss907@gmail.com) (S.S. Subedi).

<https://doi.org/10.1016/j.amsu.2022.104702>

Received 3 August 2022; Received in revised form 11 September 2022; Accepted 11 September 2022

Available online 15 September 2022

2049-0801/© 2022 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

bleeding from the lesion since 2 years (Fig. 1). He had history of injury at the same site in his childhood which resulted in chronic scarring.

It wasn't a Marjolin's ulcer and no any radiation was planned. Margins were clear. According to the patient, the mass was very small before 2 years and he neglected it until it increased in size. On presentation, he had left sided hemiparesis and significant pain over the lesion. He revealed significant exposure to sun. However, no previous radiation exposure was reported. Except for the chronic scarring in the primary site of lesion, he did not present ulcerative lesions, scars or any other skin lesion. Serology for both HIV and HCV proved negative. He wasn't on any immunosuppressive agents. Rest of the systemic examination was normal. Contrast-enhanced computed tomography of the head revealed a homogenously enhanced mass involving the bony part of parieto-occipital region which involved adjacent dura mater and underlying cortex. He was then planned for the surgery. Preoperative work-up was done. Gross total removal of the tumor with extension of bony defect followed by repair of dura and repair of skin defect by VY advancement flap was done under general anaesthesia. Fig. 2 shows the tumor invasion into the cortex, dura mater and the bone. On histopathology, a diagnosis of invasive squamous cell carcinoma (SCC) of scalp was established. At a 3-month follow-up, his skin defect is well healed. No evidence of metastasis is evident. Due to the economic constraint of the patient, follow-up based on symptomatology is planned.

### 3. Discussion

Cutaneous squamous cell carcinoma (cSCC) is the second most common nonmelanoma skin cancer, and its incidence is rapidly increasing [5]. Although the majority of cSCCs are successfully intervened by surgical excision, advanced cSCC imposes a significant risk in terms of morbidity, impact on quality of life, and risk of death. Therefore, proper management of advanced cSCC is of the utmost importance since local invasion, delayed diagnosis, and metastasis lead to increased



Fig. 1. A highly vascular mass of 5\*6 cm over right parieto-occipital region with active bleeding.

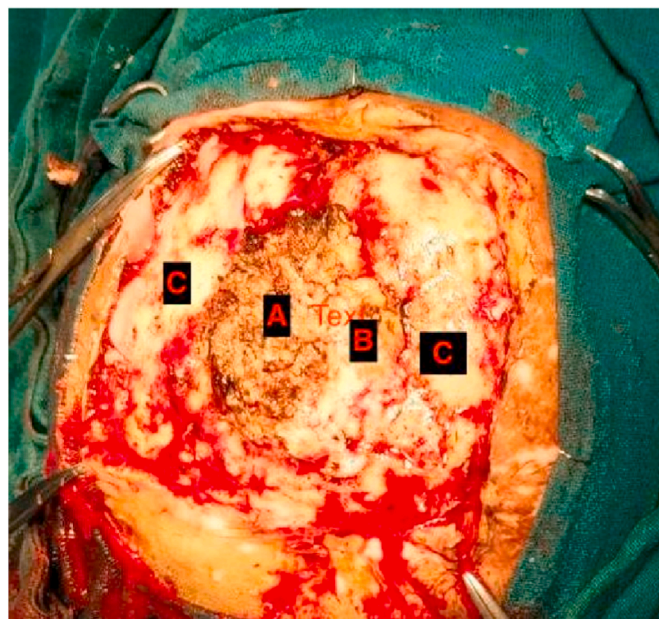


Fig. 2. Post-operative image of invasive squamous cell carcinoma of scalp showing. A: Invasion to cortex.

B: Invasion to dura mater.

C: Invasion to adjacent bone.

costs and morbidity [6]. Our patient had significant risk factors for cSCC. Higher age, history of chronic scarring, and ultraviolet light exposure most probably have predisposed to it.

Compared to those occurring elsewhere on the skin, the incidence of tumors on the scalp is increasing. Approximately, only 1%–2% of all scalp tumors are malignant, they include up to 13% of all malignant cutaneous neoplasms and cSCC is the second most prevalent malignant among them [7]. Chiu et al. [8] examined 398 Taiwanese patients with malignant scalp tumors and concluded that basal cell carcinoma (41.2%) was the most common malignant scalp tumor, followed by squamous cell carcinoma (16.6%).

Depth of invasion is a significant prognostic indicator of cSCC of the scalp. In a retrospective study, dural involvement of the tumor reduced 3-year survival from 83% to 22% [9]. Advanced scalp cancer may often be considered inoperable especially when the dura or brain parenchyma is involved. So, handling these problems in the head and neck region often requires close cooperation among surgical specialists. Therefore, a multidisciplinary approach including a neurosurgeon and a plastic surgeon is often necessary to ensure safe tumor removal and adequate reconstruction.

Standard therapy for localized cutaneous SCC is surgical excision via either standard excision, curettage and electrodesiccation (C&E), or Mohs micrographic surgery (MMS) [10]. Radiotherapy is an effective adjuvant in selected patients for tumor control [10]. The five-year local recurrence rate for primary cutaneous SCC was 3.1%, 3.7% and 8.1% for MMS, C&E and for standard excision respectively [11]. Success rates for combined surgical excision and radiotherapy is not well established. Treatment of invasive or metastatic cutaneous SCC may include surgical resection with or without adjuvant radiotherapy, epidermal growth factor inhibitors, or cisplatin-based chemotherapy. The aforementioned strategies are primarily based on retrospective data, owing to the rarity of metastatic disease [10]. In our case, preoperative work-up was done. Gross total removal of the tumor with extension of bony defect followed by repair of dura and repair of skin defect by VY advancement flap was done under general anaesthesia. At a 3-month follow-up, his skin defect is well healed. No evidence of metastasis is evident.

#### 4. Conclusions

Invasive cutaneous squamous cell carcinoma of scalp is a rare entity. Invasion to bone, cortex, and dura mater is furthermore rare. Therefore, proper management of advanced cSCC is of the utmost importance since local invasion, delayed diagnosis, and metastasis contribute to increased costs and morbidity. A multi-disciplinary team approach is recommended.

#### Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Ethical approval

Not required.

#### Sources of funding

None.

#### Author contributions

Alok Dahal(AD), Durga Neupane(DN), Nimesh Lageju(NL), Lokesh Shekher Jaiswal(LSJ) = Study concept, Data collection, and surgical therapy for the patient.

Alok Dahal(AD), Durga Neupane(DN), Nimesh Lageju(NL), Lokesh Shekher Jaiswal(LSJ), Sushil Sharma Subedi(SSS) = Writing- original draft preparation.

Alok Dahal(AD), Durga Neupane(DN), Sushant Chaudhary(SC), Arpana Chhetri Budhathoki(ACB), Shiva Pratik Sah(PS) = Editing and writing.

Alok Dahal(AD), Durga Neupane(DN), Nimesh Lageju(NL) = senior author and manuscript reviewer.

All the authors read and approved the final manuscript.

#### Declaration of competing interest

None.

#### Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

#### Guarantor

Alok Dahal.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Provenance and peer review

Not commissioned, externally peer-reviewed.

#### Acknowledgment

None.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104702>.

#### References

- [1] C.-S. Chiu, C.-Y. Lin, T.-T. Kuo, Y.-Z. Kuan, M.-J. Chen, H.-C. Ho, Malignant cutaneous tumors of the scalp: a study of demographic characteristics and histologic distributions of 398 Taiwanese patients, *J. Am. Acad. Dermatol.* 56 (2007) 448–452, <https://doi.org/10.1016/j.jaad.2006.08.060> [PubMed] [CrossRef] [Google Scholar].
- [2] S. Kadakia, Y. Ducic, D. Marra, D. Chan, M. Saman, R. Sawhney, Cutaneous squamous cell carcinoma of the scalp in the immunocompromised patient: review of 53 cases, *Oral Maxillofac. Surg.* 20 (2016) 171–175, <https://doi.org/10.1007/s10006-016-0545-6> [PubMed] [CrossRef] [Google Scholar].
- [3] A. Jambusaria-Pahlajani, P.A. Kanetsky, P.S. Karia, W.-T. Hwang, J.M. Gelfand, F. M. Whalen, Evaluation of AJCC tumor staging for cutaneous squamous cell carcinoma and a proposed alternative tumor staging system, *JAMA Dermatol* 149 (2013) 402–410, <https://doi.org/10.1001/jamadermatol.2013.2456> [PubMed] [CrossRef] [Google Scholar].
- [4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus surgical Case REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [5] S.K.T. Que, F.O. Zwald, C.D. Schmults, Cutaneous squamous cell carcinoma: incidence, risk factors, diagnosis, and staging, *J. Am. Acad. Dermatol.* 78 (2018) 237–247 [PubMed] [Google Scholar].
- [6] G.P. Guy Jr., S.R. Machlin, D.U. Ekwueme, K.R. Yabroff, Prevalence and costs of skin cancer treatment in the U.S., 2002–2006 and 2007–2011, *Am. J. Prev. Med.* 48 (2015) 183–187 [PMC free article] [PubMed] [Google Scholar].
- [7] P. Andrade, M.M. Brites, R. Vieira, A. Mariano, J.P. Reis, O. Tellechea, et al., Epidemiology of basal cell carcinomas and squamous cell carcinomas in a department of dermatology: a 5 year review, *An. Bras. Dermatol.* 87 (2012) 212–219 [PubMed] [Google Scholar].
- [8] C.S. Chiu, C.Y. Lin, T.T. Kuo, Y.Z. Kuan, M.J. Chen, H.C. Ho, et al., Malignant cutaneous tumors of the scalp: a study of demographic characteristics and histologic distributions of 398 Taiwanese patients, *J. Am. Acad. Dermatol.* 56 (2007) 448–452 [PubMed] [Google Scholar].
- [9] W.M. Mendenhall, R.J. Amdur, R.W. Hinerman, J.W. Werning, R.S. Malyapa, D. B. Villaret, et al., Skin cancer of the head and neck with perineural invasion, *Am. J. Clin. Oncol.* 30 (2007) 93–96 [PubMed] [Google Scholar].
- [10] Work Group, Invited Reviewers, J.Y.S. Kim, J.H. Kozlow, B. Mittal, J. Moyer, et al., Guidelines of care for the management of cutaneous squamous cell carcinoma, *J. Am. Acad. Dermatol.* 78 (2018) 560, <https://doi.org/10.1016/j.jaad.2017.10.007>, 78, ([PMC free article][PubMed] [CrossRef]).
- [11] D.E. Rowe, R.J. Carroll, C.L. Day Jr., Prognostic factors for local recurrence, metastasis, and survival rates in squamous cell carcinoma of the skin, ear, and lip. Implications for Treatment Modality Selection, *J. Am. Acad. Dermatol.* 26 (1992) 976–990, [https://doi.org/10.1016/0190-9622\(92\)70144-5](https://doi.org/10.1016/0190-9622(92)70144-5) [PubMed] [CrossRef] [Google Scholar].