

Intracranial Invasion of a Basal Cell Carcinoma of the Scalp

David Mathieu, David Fortin

ABSTRACT: Objective and importance: Basal cell carcinomas are common lesions that can have a locally invasive behavior. The authors present a case of a scalp lesion with skull and dura-mater invasion that was unrecognized prior to surgical undertaking. **Clinical presentation:** A 66-year-old female presented with an extensive ulcerating lesion on the frontal scalp, deemed to be a basal cell carcinoma. The plastic surgery team brought her to the operating room for resection but subsequently backed off after the discovery of bony invasion. Imaging revealed extensive bony and epidural extension. **Intervention:** Resection of the invaded frontal scalp, bone, dura-mater and proximal part of the superior sagittal sinus was performed. This was followed by a reconstructive procedure consisting of a duraplasty, a cranioplasty, and a skin rotation flap and partial-thickness skin grafting. **Conclusion:** Radiological evaluation of scalp basal cell carcinomas should be done prior to surgery to rule out any bony or intracranial invasion.

RÉSUMÉ: Envahissement intracrânien d'un carcinome basocellulaire du cuir chevelu. Objectif et importance: Le carcinome basocellulaire est une lésion fréquente dans laquelle on peut observer un envahissement local. Les auteurs présentent un cas de lésion du cuir chevelu avec envahissement du crâne et de la dure-mère qui n'avait pas été soupçonné avant la chirurgie. **Observation clinique:** Une patiente âgée de 66 ans a consulté pour une ulcération importante à la région frontale du cuir chevelu chez qui on a posé un diagnostic de carcinome basocellulaire. L'équipe de chirurgie plastique a interrompu l'exérèse de la lésion après avoir constaté en salle d'opération son extension à l'os. L'imagerie a montré une extension importante de la tumeur à l'os et à la dure-mère. **Intervention:** On a procédé à une résection de la région envahie par la tumeur au niveau du cuir chevelu, de l'os, de la dure-mère et de la partie proximale du sinus longitudinal supérieur. Par la suite, la patiente a subi une chirurgie de reconstruction, soit une dura plastie, une cranioplastie et la mise en place d'un lambeau cutané de rotation ainsi que d'un greffon de peau mince. **Conclusion:** On devrait procéder à une évaluation radiologique des carcinomes basocellulaires du cuir chevelu avant la chirurgie pour éliminer la possibilité qu'il existe un envahissement osseux ou intracrânien.

Can. J. Neurol. Sci. 2005; 32: 546-548

Basal cell carcinomas (BCC) are common skin neoplasms with generally an indolent course, but they can be locally invasive if left untreated for a long period of time.¹ We present a rare case of BCC of the scalp with histologically-proven bony and dural invasion that was treated in our institution.

CASE REPORT

A 66-year-old female, known only for diabetes and hypertension, presented with a five-year history of a progressive ulcerative lesion on the anterior frontal area of the scalp, which was strongly suspicious of a basal cell carcinoma. The extent of this lesion was approximately 8 x 8 cm, and it appeared adherent to the underlying tissues. The patient was brought to the O.R. for resection of this lesion by the plastic surgery team, but the intervention was discontinued after the discovery of macroscopic bony

invasion by the tumor. Subsequent imaging with brain computed tomogram (CT) scan and magnetic resonance imaging (MRI) demonstrated extensive bilateral infiltration of the frontal bone, with epidural and possible dural extension (Figures 1 and 2). A second operation was accomplished by our neurosurgery team for total tumor removal. At the time of the procedure, all the macroscopically abnormal frontal bone was resected. An epidural tumor extension was adherent to the dura and the anterior portion of the superior

From the Department of Neurosurgery/Neuro-Oncology, Centre Hospitalier Universitaire de Sherbrooke, Université de Sherbrooke, Sherbrooke, Canada.

RECEIVED NOVEMBER 24, 2004. ACCEPTED IN FINAL FORM MAY 18, 2005.

Reprint requests to: David Fortin, Centre Hospitalier Universitaire de Sherbrooke (CHUS), 3001 12e avenue Nord, Sherbrooke, Quebec J1H 5N4 Canada

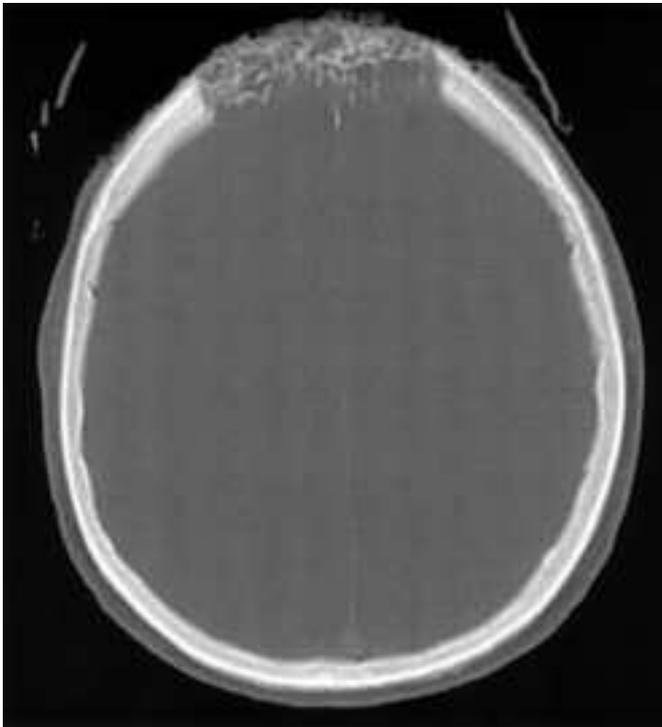


Figure 1: Head CT scan with bone windows. Invasion and destruction of the frontal bone is demonstrated bilaterally.



Figure 2: Gadolinium-enhanced sagittal T1-weighted imaging, midline cut. The frontal bone appears abnormally widened, with abnormal heterogeneous enhancement. Dural invasion cannot be adequately appreciated on the MRI images.

sagittal sinus (Figure 3), which prompted a resection of these structures. After the tumor resection was considered total, a duraplasty and cranioplasty were performed. The skin defect was subsequently obliterated with a scalp rotation flap and a partial-thickness skin graft. Pathologic analysis revealed a basal cell carcinoma with extensive bony and dural invasion (Figure 4). The post-operative period was uneventful, and she was discharged home after a few days. Clinical and radiological follow-up at six months revealed no signs of recurrent disease, and the patient remained well neurologically.

DISCUSSION

Basal cell carcinomas are the most common neoplasms affecting human beings, and represent approximately 65-75% of all skin cancers.² Annual incidence, which is reported to be 146 per 100 000 population in the USA,³ and as high as 726 per 100 000 in Australia,⁴ is increasing worldwide by up to 10% per year.³ These lesions are generally caused by unprotected exposure to ultraviolet light, and common predisposing conditions include lightly-pigmented skin, family history of skin cancer, and immunodeficiency states.¹ BCC also occurs as part of familial neoplastic syndromes, like the Gorlin-Gotz syndrome.⁵ These tumors generally present as an ulcerative lesion with indurated margins on the head, neck or trunk, but may also manifest as erythematous plaques or skin nodules. They tend to be slow-growing and indolent, but can be locally invasive if left untreated for a long period of time. Metastasis occurs very rarely

and usually as part of end-stage disease. Treatment options include resection, radiation therapy and topical chemotherapy, with the best cure rates achieved by radical resection.¹

While the head is the most frequent site of occurrence, most cases arise on the face with rare primary involvement of the scalp. Extensive invasion of facial structures, sometimes leading to orbital and intracranial extension, is a well-described situation with BCC of the face.^{6,7} However, only a few cases of intracranial invasion from a scalp BCC have been reported in the literature.⁸⁻¹¹ This usually happens by intraosseous and intradural spread, although one case of primary intracranial BCC has been reported.² All reported cases were locally advanced ulcerative lesions that were either neglected by the patients or lost to follow-up. This clinical situation, even though rare, must be recognized prior to undertaking a simple resective surgery if one wants to plan an adequate intervention. Radiological evaluation with CT scanning and MRI will reveal any tumoral infiltration of the cranial vault or intracranial extension. These diagnostic modalities should be performed in the presurgical evaluation of patients deemed at risk, with locally advanced disease, to avoid surprises in the operating room and multiple unnecessary procedures.

Basal cell carcinomas, although occurring infrequently on the scalp, can produce extensive cranial and intracranial invasion if left unchecked for a long time. Radiological evaluation should be

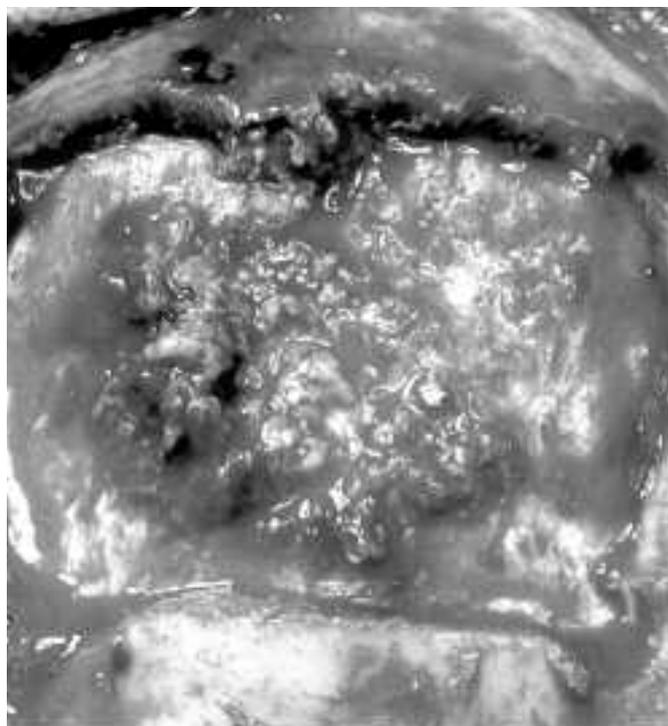


Figure 3: Operative photograph. Macroscopic dural invasion is evident after excision of the abnormal frontal bone.

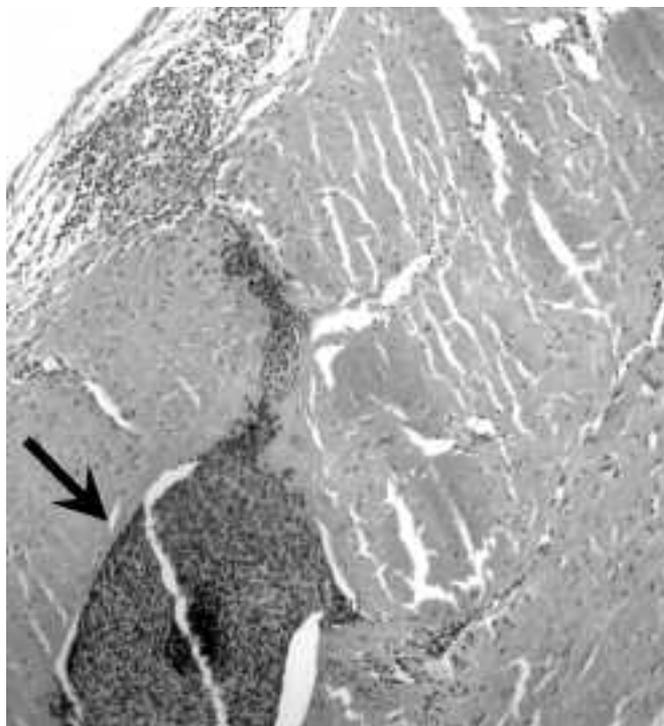


Figure 4: Dura-mater, microscopic view. Basal cell carcinoma cells are seen invading the dura (arrow).

performed liberally when this occurrence is suspected, which may require an extensive resective and reconstructive procedure to achieve a good oncologic and cosmetic result.

REFERENCES

1. Wong CSM, Strange RC, Lear JT. Basal cell carcinoma. *BMJ* 2003; 327:794-798.
2. Gall C, Buttner A, Bise K, Steiger HJ. Primary intracranial metatypical basal cell carcinoma: case report. *Neurosurgery* 1997; 41:279-282.
3. Miller DL, Weinstock MA. Nonmelanoma skin cancer in the United States: incidence. *J Am Acad Dermatol* 1994; 30:774-778.
4. Marks R, Staples M, Giles G. Trends in non-melanocytic skin cancer treated in Australia: the second national survey. *Int J Cancer* 1993; 53:585-590.
5. Lasso JM, Garcia-Tutor E, Bazan A. Aggressive basal cell carcinoma of the temporal region in a patient with Gorlin-Gotz syndrome. *Ann Plast Surg* 2000; 44:429-434.
6. Takemoto S, Fukamizu H, Yamanaka K, et al. Giant basal cell carcinoma: improvement in the quality of life after extensive resection. *Scand J Plast Reconstr Surg Hand Surg* 2003; 37:181-185.
7. Veness MJ, Biankin S. Perineural spread leading to orbital invasion from skin cancer. *Australas Radiol* 2000; 44:296-302.
8. Schroeder M, Kestlmeier R, Schlegel J, Trappe AE. Extensive cerebral invasion of a basal cell carcinoma of the scalp. *Eur J Surg Oncol* 2001; 27:510-511.
9. Parizel PM, Dirix L, Van den Weyngaert D, et al. Deep Cerebral Invasion by Basal Cell Carcinoma of the Scalp. *Neuroradiology* 1996; 38:575-577.
10. Long SD, Kuhn MJ, Wynstra JH. Intracranial extension of basal cell carcinoma of the scalp. *Comput Med Imaging Graph* 1993; 17:469-471.
11. Ko CB, Walton S, Keczek K. Extensive and fatal basal cell carcinoma: a report of three cases. *Br J Dermatol* 1992; 127:164-167.