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Education

Basal Cell Carcinoma with intravascular invasion

EDUCATION

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Summary:

We report the case of a 59-year-old Caucasian male with a primary infiltrative BCC with vascular invasion on the right temple. An excision biopsy was taken and histology confirmed BCC, 2.5mm thick, invading into the reticular dermis. The patient underwent a scar excision which demonstrated no further malignancy. The patient showed no clinical signs of recurrence 2 years after diagnosis.

Relevance:

Basal cell carcinoma (BCC) is the most common human malignancy and its incidence is increasing. Less than 1% of BCCs metastasize and very few cases of intravascular invasion by a primary BCC have been reported. This report discusses the clinical features of a BCC, the population at risk and summarises all known cases of BCC with vascular invasion in the literature.

Take Home Messages:

Due to the rarity of basal cell carcinoma with vascular invasion, there is a poor understanding of the disease process and the metastatic potential, resulting in uncertainty for clinician and patient regarding appropriate management.

Introduction

Basal cell carcinoma (BCC) is the most common malignancy in humans and its incidence is increasing worldwide. (1) Risk factors include exposure to sunlight, a lower Fitzpatrick skin phototype, genetic factors and burn scars. (2,3) The Fitzpatrick scale is a classification system that ranks the amount of melanin in a person's skin. Both the colour of skin, and how it reacts to ultraviolet light are taken into consideration:

1. Skin type I never tans and always burns. Skin is pale white, eyes are blue or green and hair is red or blond.

2. Skin type II tans poorly and burns easily. Skin and eyes are fair.

3. Skin type III tans after initially burning. Skin is a darker white.

4. Skin type IV tans easily and burns minimally. Skin is light brown.

5. Skin type V tans darkly and rarely burns. Skin is brown.

6. Skin type VI always tans darkly and never burns. Skin is dark brown or black. (4)

These risk factors explain how BCCs are most frequently found on the head and neck of white males in their fifth to sixth decade. (2) Despite the high prevalence, less than 1% of cases metastasize. (2,5–9) Of the few that do, the spread of metastases is thought to be via a lymphatic and haematological route. Very few cases of intravascular invasion by a primary BCC have been reported. (5–8,10) We report the rare case of a 59 year old Caucasian male with a primary infiltrative BCC on his right temple with vascular invasion.

Case Report

A 59 year old gentleman was referred to Dermatology with a 1.5x1.5cm pearly papule on his right temple, present for approximately two years duration. Clinically, the lesion was thought to be a basal cell carcinoma. The patient has skin type 2 and with the exception of his father having prostate cancer, no family history of malignancy of any kind. Relevant past medical history included numerous benign skin lesions such as a trichofolliculoma on his right forehead. He had eczema affecting his face as a child, but not into adulthood. Social history included high sunlight exposure, as he has been working outside as a manual labourer for the past 13 years. An excision biopsy of the presenting lesion was taken. The histology confirmed a basal cell carcinoma infiltrating the local vasculature (figure 1), 2.5mm thick, invading into the reticular dermis. CD31 immunostain (figure 2) and BerEP4 immunostain (figure 3) confirmed basal cell carcinoma within the vascular channels. There was positive expression of BerEP4, EMA, MNF116 and CK7. There was no expression of CK20 or TTF-1. This immunoprofile makes the lesion extremely unlikely to be an incidental metastatic malignancy. In addition, there was no clinical evidence of a second primary. The patient underwent a wider scar excision, which demonstrated no further malignancy. At follow up after 2 years, there was no evidence of recurrence of the BCC on the right temple and there was no lymphadenopathy or hepatosplenomegaly. The patient was subsequently discharged from dermatology.

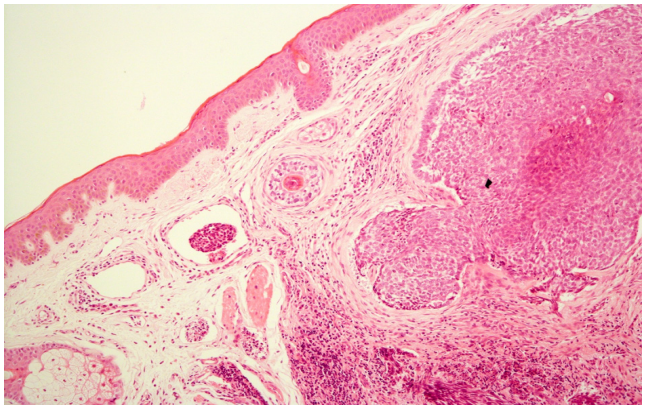

Figure 1: H&E X20 magnification, showing basal cell carcinoma within vessel. 1) Island of BCC within the dermis. 2) Vascular space. 3) Intravascular BCC.

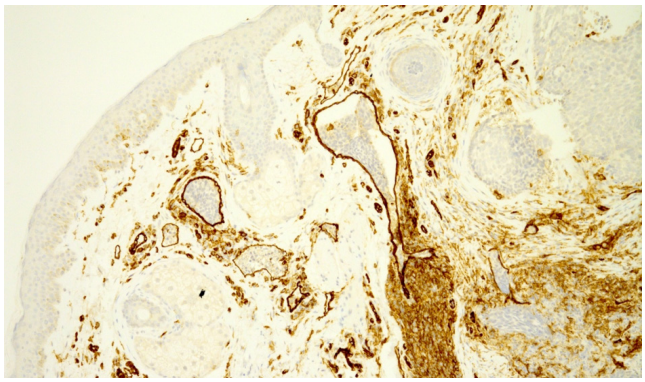

Figure 2: CD31 immunostain highlighting the walls of the vascular channels (arrowed) containing basal cell carcinoma 903x677mm (72 x 72 DPI). Note that the tumour does not stain with this antibody.

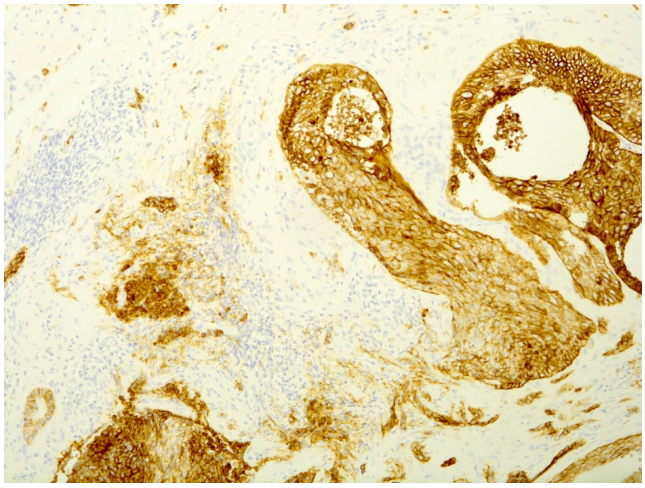

Figure 3: BerEP4 immunostain confirming basal cell carcinoma within vessels (arrowed) 677x903mm (72 x 72 DPI). The BerEP4 antibody stains the tumour brown but does not react within the vessels.

Discussion

The main clinical features of a basal cell carcinoma include:

- A slow-growing, raised, solid skin lesion (plaque or nodule)
- Similar colour to normal skin, or pinkish due to increased blood supply
- Size varies from millimetres to centimetres in diameter
- The lesion may bleed or ulcerate (11)

As there are no clinical features that can differentiate a BCC with vascular invasion from an un-invasive lesion, biopsy and subsequent histology are of great importance. Until recently, there has been little literature on the vascular invasion of BCC. In 1984, Von Domarus and Stephens published a report of five metastatic BCC case studies. Two of these cases had histology suspicious of vascular invasion. (9) In 2012, Machan et al., document the first recorded case of primary cutaneous BCC with histopathologically documented venous invasion. They presented the case of a 51-year-old male with a lesion on his upper chest. Histology showed an infiltrative and micronodular BCC, which widely invaded the reticular dermis. It was also identified within a muscular venule. Intravascular tumour was confirmed with dual immunohistochemistry. Further excision of the scar showed no further disease. (5) Three more case reports of BCC with vascular invasion were published in 2016: a 96-year-old female with intravascular BCC on the right posterior helix; (6) a 75-year-old male with a lesion on his left nasal sidewall; (7) an 81-year-old female with an enlarging lesion on the right nasal tip. (8) The first two cases underwent Mohs micrographic surgery, the third was surgically excised with clinical margins of 3 mm. (6–8) Another case was reported in late 2018: a 61-year-old male with a lesion on the vertex of his scalp showed both intravascular and perineural invasion during Mohs micrographic surgery. Despite post-operative radiotherapy, the patient presented with skin graft breakdown 4.5 years after surgery and biopsy showed recurrent BCC in the bone marrow. (10) Excluding this last case, the longest follow up period reported is only four months, therefore long-term recurrences or metastases cannot reliably be commented on. (5–8) Table 1 provides a summary of all known cases of primary BCC with intravascular invasion.

In view of the rarity of vascular invasion of BCCs, there are no guidelines to dictate appropriate adjuvant treatment or prognosis. The British Association of Dermatologists (Britain) and the National Comprehensive Cancer Network (USA) recommend adjuvant radiotherapy for "high-risk BCCs", but are no more specific regarding intravascular invasion. (3,12) Without available guidelines, the decision to treat is left to clinical judgement and the local multi-disciplinary team. Although the cases summarised appear to have minimal vascular invasion and no cases of metastases since 1984, the rarity of this condition results in a poor understanding of the disease process, its potential to metastasize and therefore the appropriate treatment plan.

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Report	Age / sex	Clinical Features	Location	Histology	Treatment	Follow up
Machan et al., 2012 (5)	51 ♂	0.9X0.4 cm pearly papule	Upper chest	Infiltrative, micronodular BCC; identified within muscular venule and confirmed with immunohistochemistry.	Excision biopsy followed by further surgical excision of scar.	Clinical follow up every three months. No adverse features detected. Time period unknown.
Shea, Weinberger and Cook, 2016 (6)	96 ♀	1.6X1.0 cm pearly, ulcerated nodule	Right posterior helix	BCC with irregular islands of basaloid cells; CD31 immunohistochemistry confirmed intravascular invasion.	Mohs micrographic surgery.	No follow up due to age of patient.
Milam, Bogart and Manolson, 2016 (7)	75 ♂	2.0X1.1 cm erythematous plaque	Left nasal sidewall	Nodular and morpheic; vascular invasion confirmed by CD31 immunohistochemistry.	Mohs micrographic surgery.	Frequent clinical follow up. No adverse features detected. Time period unknown.
Lonie, Niumsawatt and Castley, 2016 (8)	81 ♀	0.8X0.8cm enlarging lesion	Right nasal tip	Invasive sclerosing BCC; intraluminal invasion confirmed with immunohistochemistry.	Excision biopsy followed by adjuvant radiotherapy.	Clinical follow up. No sign of recurrence at four months.
Mazloom, Rich and Grider et al., 2018 (10)	61 ♂	5cm scar	Vertex of scalp	Infiltrative BCC with both intravascular and perineural invasion.	Mohs micrographic surgery followed by adjuvant radiotherapy.	PET CT scan negative at one year. Local recurrence at 4.5 years.
Jones, Patel, Mudaliar et al., 2019	59 ♂	1.5X1.5cm pearly papule	Right temple	Infiltrative BCC. CD31 immunohistochemistry confirmed invasion into local vasculature.	Excision biopsy followed by further surgical excision of scar.	Frequent clinical follow up. No adverse features at 2 years.

Table 1: A summary of all known cases of BCC with intravascular invasion.

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