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## Case Report

Plastic Surgery



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**ABSTRACT:** Rippled-pattern is a rare histologic subtype of basal cell carcinoma (BCC). The risk of recurrence associated with this lesion has not been well characterized. This case report discusses a patient with rippled-pattern BCC that occurred in the location where a lesion was previously excised five years earlier suggesting recurrence. Pathology revealed invasive BCC and rippled-pattern histology. Rippled-pattern should be considered a high-risk histologic subtype, and wide surgical margins should be obtained to decrease the risk of recurrence.

**KEY WORDS:** Rippled-Pattern, Carcinoma, Histologic Subtype

## Introduction

Rippled-pattern histology describes a growth pattern of alternating epithelioid cords with stromal matrix. This resembles the central nuclear palisading classically described in schwannomas. It was first noted in cutaneous neoplasms in 1989 by Hashimoto, and prior to this had been exclusively associated with schwannomas [1]. Basal cell carcinoma (BCC) with rippled-pattern is exceedingly rare, described in only a few series and accounting for <1% of BCC [2-5]. Histopathologic criteria described by Misago includes nodular subtype, mucinous spaces between epithelial cords, and lack of differentiated folliculosebaceous-apocrine units [5]. Other cutaneous neoplasms with similar architecture should be considered in the differential to avoid delayed diagnosis and initiate proper management [4,6]. When the rippled-pattern is encountered in BCC, surgeons should be aware of its high-risk for recurrence. Wider surgical margins should be achieved to decrease recurrence of this rare histologic subtype.

## Case Report

A 63-year-old man presented to the plastic surgery clinic with ulcerated basal cell carcinoma (BCC) of the upper lip. The patient noticed this growth over several months and had associated bleeding and pain. The lesion was located at the area of a previous excision five years earlier detailed in the record as “non-melanocytic skin cancer”; further details were

absent from his medical records. BCC recurrence was highly speculated. He had a smoking history of 22.5 pack years but quit three months prior to presentation. He had no family history of skin cancer or head and neck cancer. His medical history was remarkable only for psychiatric comorbidities. On physical exam there was a 4 by 3 cm ulcerated lesion of the left upper lip extending midline to the region of the philtrum with involvement of the nasal sill and base of the columella (**Figure 1**). Facial sensation and motor function were intact. No lymphadenopathy was appreciated on exam.

Excisional biopsy revealed infiltrative basal cell carcinoma with positive lateral and deep margins. The specimen described by the pathologist contained neoplastic aggregates in mucinous reticulated or adenoid pattern and alternating bands of basaloid cells (**Figure 2**). The growth pattern was determined consistent with histological criteria described by Misago et al for diagnosis of rippled-pattern basal cell carcinoma [5]. Computed tomography imaging of the head and neck with contrast showed enhancement of the lesion into surrounding fat without bony involvement, perineural invasion, or lymphadenopathy. Surgical resection of the aggressively growing BCC was recommended based on these pathologic findings.

The patient underwent radical resection with one cm margins. The dimensions of the lip resection were 8 by 5 cm and included a deep resection of the nasal sill, columella, and cutaneous and mucosal upper lip. Orbicularis oris and intraoral mucosa were spared.

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**Figure 1.** Clinical findings. Ulcerated lesion of left upper lip extending to the philtrum and involving the nasal sill and base of columella.

Intraoperative margins were obtained from the periphery and deep surfaces of the resection and were negative for carcinoma. Reconstruction was performed with a fasciocutaneous radial forearm free flap.

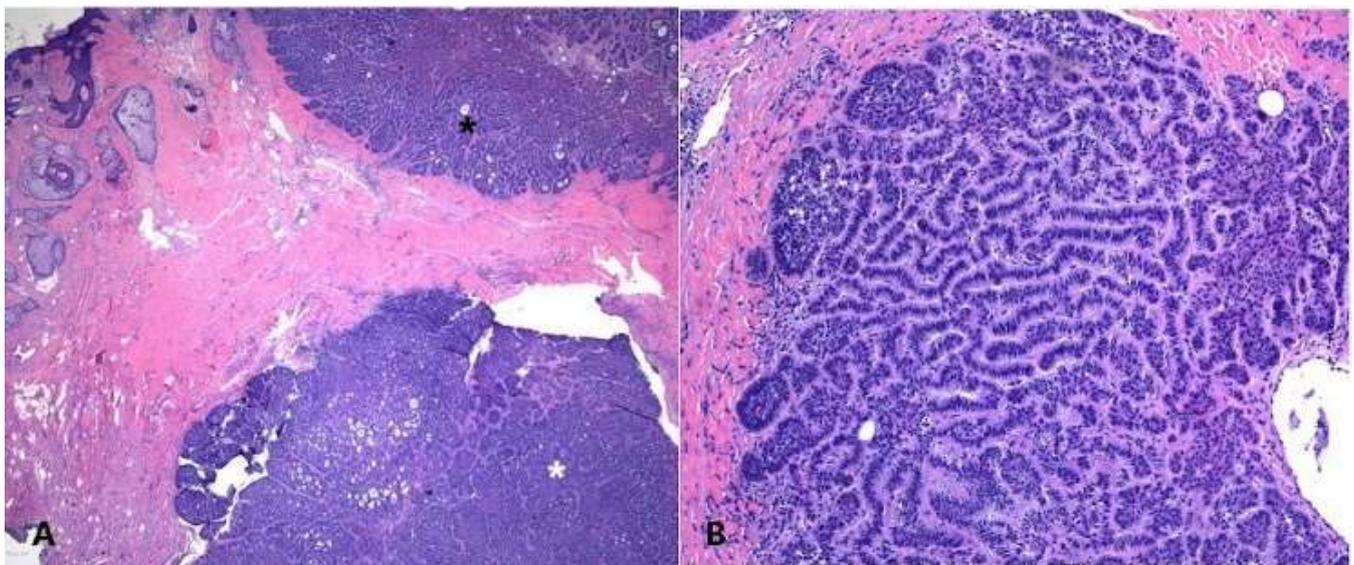
### Discussion

The differential of rippled-pattern histology must be considered carefully when diagnosing a BCC as various cutaneous neoplasms can display similar histology. Misdiagnosis of a rippled-pattern BCC as a different benign lesion can result in tumor growth or recurrence from incomplete resection and increased procedural intervention and morbidity. This is highlighted in one case where ripple-pattern BCC was misdiagnosed as trichoblastoma and required additional staged surgery in order to achieve wider margins.<sup>12</sup> In other cases, early and correct diagnosis can be lifesaving. For example, sebaceous carcinoma may also display rippled-pattern histology and is an aggressive cancer where diagnostic accuracy can help expedite appropriate treatment [7,8,13].

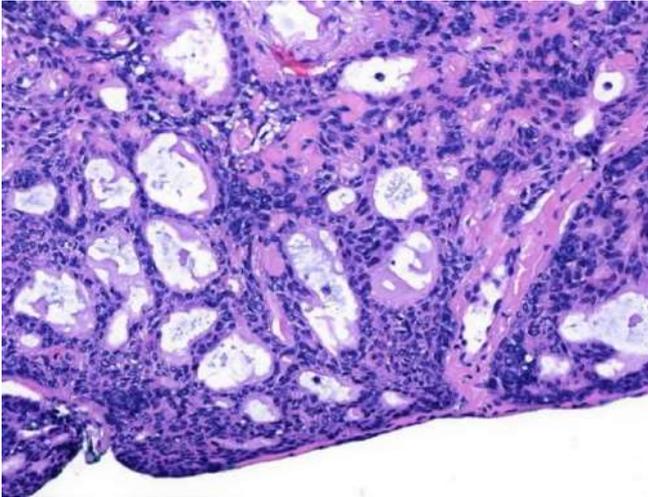
Biswas et al describes unique histologic features to aid in the differential diagnosis of cutaneous neoplasms displaying rippled-pattern [6]. This is especially helpful for neoplasms that share a common epidermal precursor making it difficult to distinguish by immunohistochemistry. These include BCC and the adnexal tumors trichoblastoma and sebaceoma [4,7]. The morphology of BCC consistently appears with mucinous spaces (**Figure 3**) compared to trichogenic or sebaceous keratin spaces in adnexal tumors [2,3,5,8]. Further distinguishing features of BCC include the absence of differentiated structures such as folliculosebaceous or apocrine elements (**Figure 4**) which is commonly seen in adnexal tumors [8]. Abundant mitotic figures and apoptotic bodies are classic features of BCC compared to rare mitotic figures and apoptotic bodies in trichoblastoma and sebaceomas (**Figure 5**).

Once the diagnosis of BCC is made, decisions regarding appropriate management are made. Surgical excision is the mainstay of treatment. Adequate margins must be obtained to remove microscopic disease with proliferative potential in adjacent tissue and to decrease the risk of recurrence. The appropriate margin is guided by the size, depth, location and histology of the skin lesion which helps to stratify it as high or low-risk as described in the National Comprehensive Cancer Network (NCCN) guidelines [9,11]. However, the final margin that is chosen is also guided by clinical judgement that takes into account the patient's anatomy, prior history and cancer risk.

Failure to obtain appropriate margins can lead to recurrence resulting in the need for wide resections, repeated procedures, and additional morbidity [10,11].



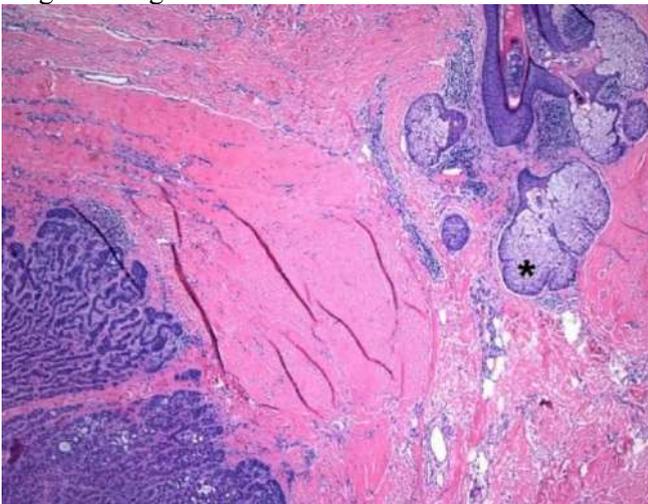
**Figure 2.** Biopsy specimen. **A)** Rippled BCC (black asterisk), a subtype of nodular BCC, is seen above the more classic nodular pattern (white asterisk). H&E, 20x. **B)** Rippled BCC, consisting of alternating bands of spindled basal cell cords and mucinous spaces. H&E, 100x.



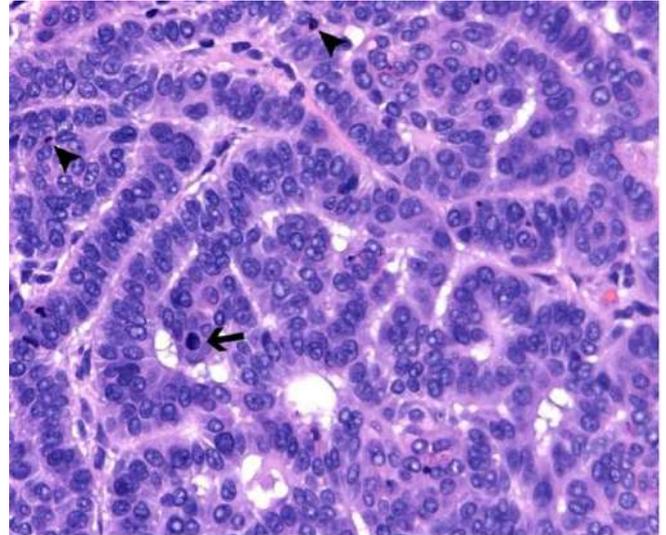
**Figure 3.** Biopsy specimen. The BCC lesion contains peripherally located mucinous cystic spaces, a finding associated with rippled BCC. H&E, 200x.

Wide resection of recurrent disease in the face can be deforming and require complex reconstruction as described in the case we have presented. This patient, who developed BCC at the exact spot of his primary excision, may have had residual microscopic disease at the site of his original resection five years earlier due to inadequate margins, and it is possible that the recurrence could have been avoided with wider initial margins.

The ripple-pattern is a rare histologic subtype described in only a handful of cases. This case highlights the aggressive nature of this rare growth pattern not yet described in the literature. This patient likely suffered recurrent disease of rippled-pattern BCC and consequently underwent a wide resection and complex microvascular reconstruction. Rippled-pattern should be considered a high-risk histologic subtype and the authors recommend obtaining wide surgical margins when encountered.



**Figure 4.** Biopsy specimen. Rippled BCC and adjacent, uninvolved sebaceous gland (asterisk). Bland-appearing sebaceous cells intermixed in a large population of basaloid cells is a characteristic finding of sebaceomas that is absent in BCC. H&E, 40x.



**Figure 5.** Biopsy specimen. Classically, BCC is composed of abundant mitotic figures (arrow) and apoptotic bodies (arrowheads). These key features distinguish rippled BCC from benign ripple-patterned entities, such as trichoblastoma and sebaceoma, that contain rare mitotic figures and apoptotic bodies. H&E, 400x.

### Conclusion

Ripple-pattern is a rare histologic subtype of BCC. Its unique histology shows epithelial cords arranged in a mucinous background. This case describes the risk of recurrence of a rippled-pattern BCC. Surgeons should consider this a high-risk histologic subtype and obtain wide surgical margins at the primary excision.

### Conflicts of Interests

The authors declare no conflict of interest.

### Acknowledgements

None.

### References

1. Hashimoto K, Prince C, Kato I, et al. Rippled-pattern trichomatricoma. Histological, immunohistochemical and ultrastructural studies of an immature hair matrix tumor. *J Cutan Pathol* 1989;16:19-30. PMID: 2466064.
2. Kadono T, Okada H, Okuno T, Ohara K. Basal cell carcinoma with neuroid type nuclear palisading: a report of three cases. *Br J Dermatol* 1998;138:1064-6. PMID: 9747376.
3. San Juan J, Monteagudo C, Navarro P, Terrádez JJ. Basal cell carcinoma with prominent central palisading of epithelial cells mimicking schwannoma. *J Cutan Pathol* 1999;26:528-32. PMID: 10599946.
4. Moneghini L, Falleni M, Romagnoli S, Bombonato C, Gualandri L. Central nuclear palisading in nodular basal cell carcinoma: Morphological and immunohistochemical concerns. *Acta Derm Venereol* 2011;91:76-7. PMID: 21088810.

5. Misago N, Tsuruta N, Narisawa Y. Rippled-pattern basal cell carcinoma. *J Dermatol* 2012;39:632-5. PMID: 22211777.
6. Biswas A, Setia N, Bhawan J. Cutaneous neoplasms with prominent Verocay body-like structures: the so-called "rippled pattern". *Am J Dermatopathol* 2011;33:539-48; quiz 49-50. PMID: 21778831.
7. Takahashi M, Arima M, Iwata Y, et al. A Patient with Giant Rippled-Pattern Sebaceoma in the Occipital Region. *Case Rep Dermatol* 2016;8:107-11. PMID: 27462217.
8. K A, S V, S NS. Rippled pattern extraocular sebaceous carcinoma: a rare case report with brief review of literature. *J Clin Diagn Res* 2013;7:2280-1. PMID: 24298500.
9. Bichakjian CK, Olencki T, Aasi SZ, et al. Basal Cell Skin Cancer, Version 1.2016, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw* 2016;14:574-97. PMID: 27160235.
10. Kim JYS, Kozlow JH, Mittal B, Moyer J, Olencki T, Rodgers P. Guidelines of care for the management of basal cell carcinoma. *J Am Acad Dermatol* 2018;78:540-59. PMID: 29331385.
11. Codazzi D, Van Der Velden J, Carminati M, et al. Positive compared with negative margins in a single-centre retrospective study on 3957 consecutive excisions of basal cell carcinomas. Associated risk factors and preferred surgical management. *J Plast Surg Hand Surg* 2014;48:38-43. PMID: 23731130.
12. Demant M, Saltvig I, Trøstrup H, Schmidt VJ, Hesselheldt J. Don't Judge a Tumor by Its Biopsy! *Case Rep Dermatol* 2020;12:266-74. PMID: 33442353.
13. Dowd MB, Kumar RJ, Sharma R, Murali R. Diagnosis and management of sebaceous carcinoma: an Australian experience. *ANZ J Surg* 2008;78:158-63. PMID: 18269479.

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