

CASE REPORT

Porocarcinoma *in situ* showing follicular differentiation: A case reportChia-Lan Ou¹, Chien-Jui Cheng², Kuo-Hsien Wang^{1,*}¹ Department of Dermatology, Taipei Medical University Hospital, Taipei, Taiwan² Department of Pathology, Taipei Medical University Hospital, Taipei, Taiwan

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ABSTRACT

Poroid neoplasm is a skin appendage tumor that has both benign and malignant counterparts. It has traditionally been regarded as of eccrine origin and has four types: intraepidermal poroma (hidroacanthoma simplex), poroma, dermal duct tumor, and poroid hidradenoma. Here we describe the case of a 64-year-old woman who had a verrucous, erythematous to brownish tumor on her left buttock for many years. Histopathology revealed an intra-epidermal poroid tumor with both benign and malignant parts. The benign part had intra-epidermal nests of poroid cells, which were smaller, monomorphic and sharply margined from adjacent keratinocytes. The malignant part showed similar cell types, but had a higher nuclear/cytoplasmic ratio, pleomorphism, and prominent mitoses. Ductal structures were noted in neoplastic cells and an epithelial membrane antigen stain was strongly positive. Interestingly, peripheral palisading and primitive follicular germ formation were also observed in the neoplasm, which suggests follicular differentiation. We made a final diagnosis of porocarcinoma *in situ* with follicular differentiation, which may support the folliculosebaceous–apocrine unit theory, but a tumor with such a combination has not been described before.

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Introduction

Poroid neoplasms have traditionally been regarded as having eccrine differentiation. Nevertheless, the existence of cases with sebaceous, follicular, and apocrine differentiation has been reported at least in some,^{1–3} and described as apocrine poroma by Requena and colleagues.⁴ Some porocarcinomas with a connection to the infundibulum have also been described as apocrine in character.

Hidroacanthoma simplex (HAS), first described by Smith and Coburn in 1956, is an intra-epidermal poroma.⁵ Malignant variants of HAS are rare and have been reported under different names, such as malignant HAS, intraepidermal hidradenocarcinoma, and porocarcinoma *in situ*. Here we report a case of porocarcinoma *in situ* with follicular differentiation. Although poromas with apocrine or sebaceous differentiation have been described in the literature,^{1–3,6–8} to the best of our knowledge, the combination of porocarcinoma *in situ* with follicular differentiation has not been previously reported.

Case presentation

A 64-year-old woman presented at our outpatient clinic with an asymptomatic, slowly enlarging tumor over her left buttock first noted many years previously. Physical examination revealed a well-circumscribed, sessile, erythematous to brownish, verrucous tumor measuring 3 cm × 3 cm over her left buttock (Figure 1). No superficial lymph node was palpable and other physical examinations were unremarkable. Initial differential diagnoses included verruca, verrucous carcinoma, seborrheic keratosis, Bowen's disease, and squamous cell carcinoma. Total excision with primary closure was performed and there was no recurrence in the 12-month follow-up period.

Histopathologic examination of the verrucous tumor with hematoxylin and eosin (H&E) staining revealed an intra-epidermal tumor comprising two different parts (Figure 2A): (1) malignant neoplastic cells arranged in rounded nests or occupying the whole layer of epidermis (Figure 2B); and (2) benign, well-demarcated intra-epidermal nests composed of smaller, cuboidal neoplastic cells with vesicular, oval and more monomorphic nuclei and less cytoplasm compared to adjacent keratinocytes (Figure 2C). There was a transition from the benign part to the malignant part. Both the benign and malignant intra-epidermal nests showed features consistent with Borst–Jadassohn phenomenon.

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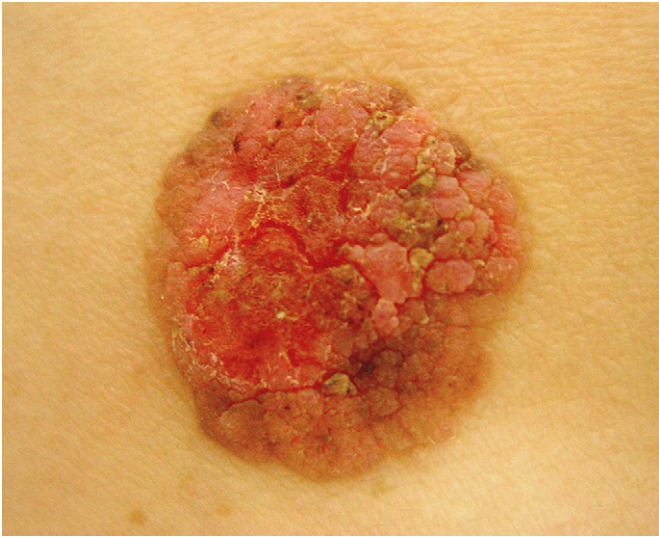


Figure 1 A well-circumscribed, sessile, erythematous to brownish and verrucous tumor measuring 3 cm × 3 cm on the left buttock. The lesion is apparently composed of two sides: on its left side, the lesion is more flattened, while on the right side the surface is raised with papillomatous features.

The neoplastic cells in the malignant area showed hyperchromatism, pleomorphism, enlarged nuclei, prominent nucleoli and conspicuous mitoses (Figure 3A). Some ductal structures and intracytoplasmic lumina were noted (Figure 3B,C). There were

some horn cysts within the tumor. Follicular differentiation was evident because of the presence of follicular germ formation, prominent peripheral palisading, and focal surrounding fibromucinous stroma (Figure 4). Throughout the entire section, no dermal invasion of the neoplasm could be found.

The tumor cells strongly expressed epithelial membrane antigen (EMA; Figure 5A) but were negative for carcinoembryonic antigen, cytokeratin 7 and periodic acid Schiff's stain. Staining with Ki-67 antibodies revealed increased proliferative activity in the malignant part. Staining with CD1a antibodies revealed a decrease in Langerhans cells in the benign intra-epidermal nests (Figure 5B). The final diagnosis was porocarcinoma *in situ* arising from HAS with follicular differentiation.

Discussion

Histopathologic examination revealed extraordinary pictures of porocarcinoma *in situ* with follicular differentiation. In this case, porocarcinoma *in situ* may have arisen from benign HAS due to a transition from the benign to the malignant tumor part. Most reported porocarcinomas *in situ* have suggested an eccrine origin and have been characterized by aggregations of malignant poroma cells confined in the epidermis without peripheral palisading. Initially, we considered trichilemmal carcinoma because of the presence of peripheral palisading in this case. However, the presence of ductal structures, strong EMA staining, and negative cytoplasmic periodic acid Schiff's staining made this diagnosis unlikely. Peripheral palisading and hair germ formation noted in porocarcinoma *in situ* suggests dual differentiation of neoplastic cells

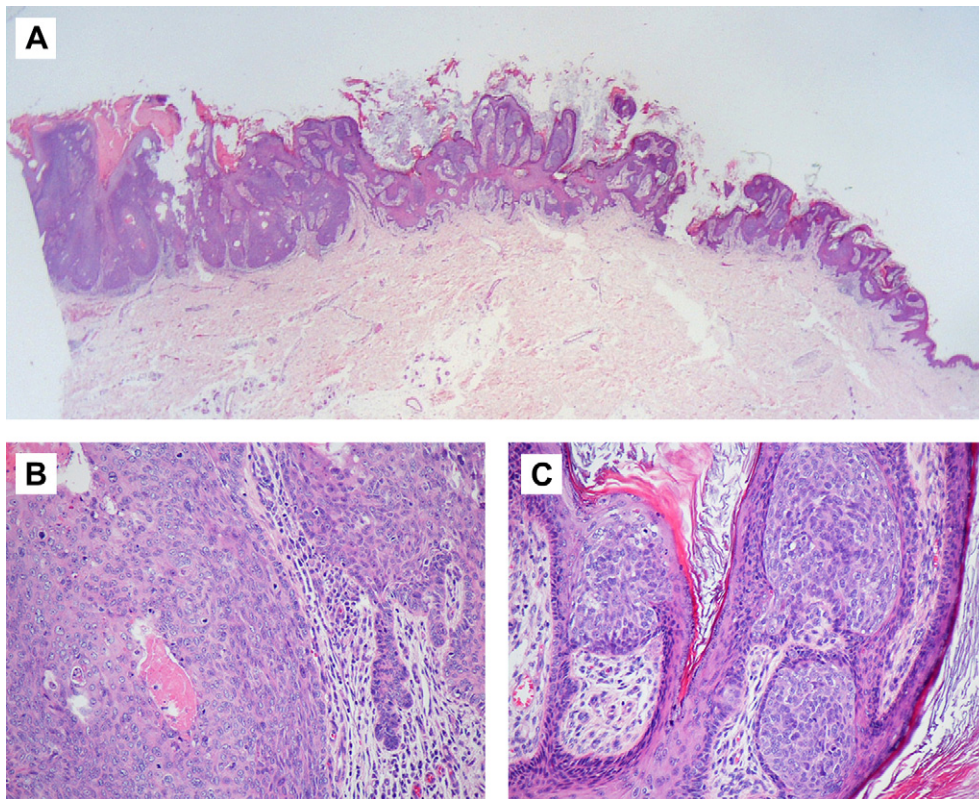


Figure 2 (A) Histopathology of the tumor shows an intra-epidermal neoplasm with two obvious parts. The left side is the malignant part, with densely basophilic cells and thicker tumor strands, and the right side is the benign part, with smaller and thinner tumor nests (H&E, original magnification ×10). (B) The malignant part comprises crowded cells with conspicuous mitoses involving the whole layer of the neoplasms. Foci of necrosis en masse are also evident (H&E, original magnification ×200). (C) The benign part comprises intra-epidermal nests of monomorphic cuboidal cells with vesicular nuclei and scanty cytoplasm. The tumor cells are smaller than and sharply margined from the adjacent keratinocytes (Borst–Jadassohn phenomenon). Some benign intra-epidermal nests show mild cellular atypia (H&E, original magnification ×200).

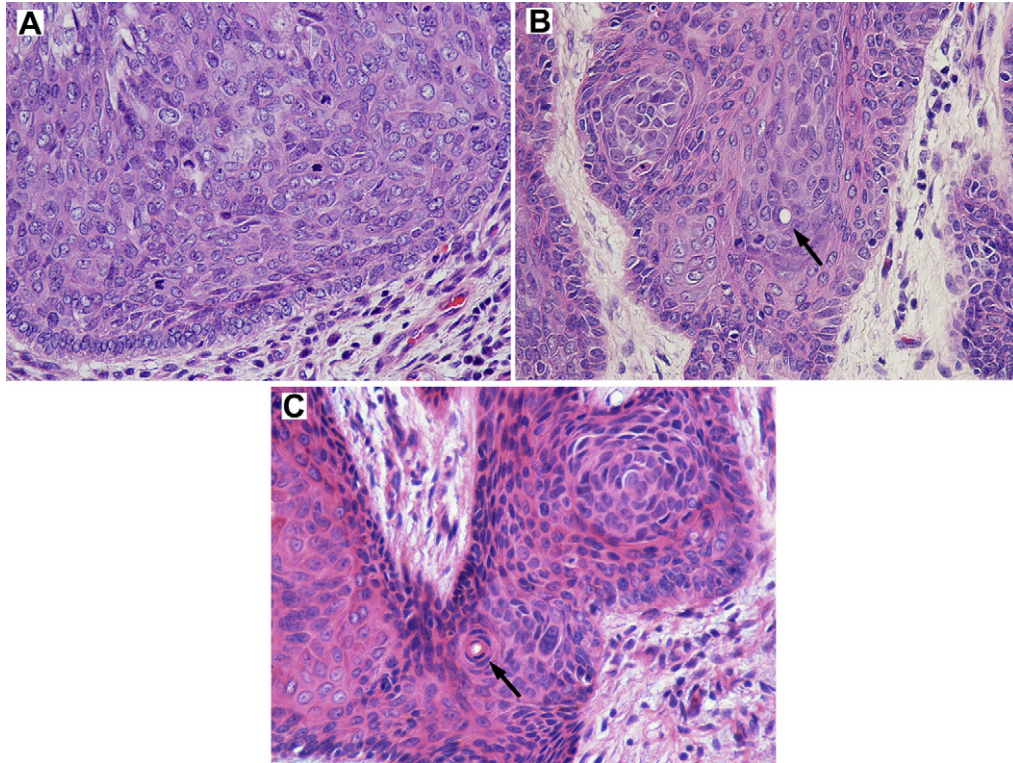


Figure 3 (A) Magnification of the malignant part highlighting nuclear pleomorphism, enlarged nuclei, hyperchromatism, and mitoses. Peripheral palisading is also apparent (H&E, original magnification $\times 400$). (B) Intracytoplasmic lumina and (C) a ductal structure were noted within the neoplasm (H&E, original magnification $\times 400$).

towards poroid and follicular characters. As reported in the literature,⁹ the cells of follicular germinative structures react negatively to periodic acid Schiff's stain.

In this case, histopathologic findings for the benign part indicate both HAS and clonal seborrheic keratosis, since they both show discrete intra-epidermal nests of neoplastic cells surrounded by normal keratinocytes, referred to as Borst–Jadassohn phenomenon.⁵ Most cells in HAS are poroid cells, and cuticular HAS cells are rare.¹⁰ Therefore, ductal structures can be minimal and careful examination of serial sections may be necessary to identify such ductal structures. Differentiation of HAS from clonal seborrheic keratosis may be difficult. However, Liu et al reported that HAS showed a very low density of Langerhans cells compared to clonal seborrheic keratosis.¹¹ Therefore, staining of Langerhans cells with CD1a antibodies may help in differentiating HAS from clonal seborrheic keratosis. HAS tumor cells sometimes express EMA, but

not the carcinoembryonic antigen; the latter is detected on the inner surface of ductal structures and luminal cells, but not in the periluminal cells of normal acrosyringium.^{11,12} In our case, we suggest that the benign area was HAS rather than clonal seborrheic keratosis because the neoplastic nests showed a decrease in Langerhans cells,¹¹ and strongly positive EMA staining.

Since apocrine glands, hair follicles, and sebaceous glands arise embryonically from a single epithelial bud, Requena et al have proposed that poromas with the following histopathologic features are of apocrine origin: (1) connection of neoplastic cell aggregates to preexisting infundibula; (2) elongated tubules lined by polygonal or columnar cuticular cells that sometimes exhibit hints of apocrine secretion along their luminal border and contain an eosinophilic, amorphous material in their lumina; (3) isolated sebocytes or sebocyte clusters within aggregations of neoplastic cells; and (4) features of follicular differentiation in the form of epithelial lobules,

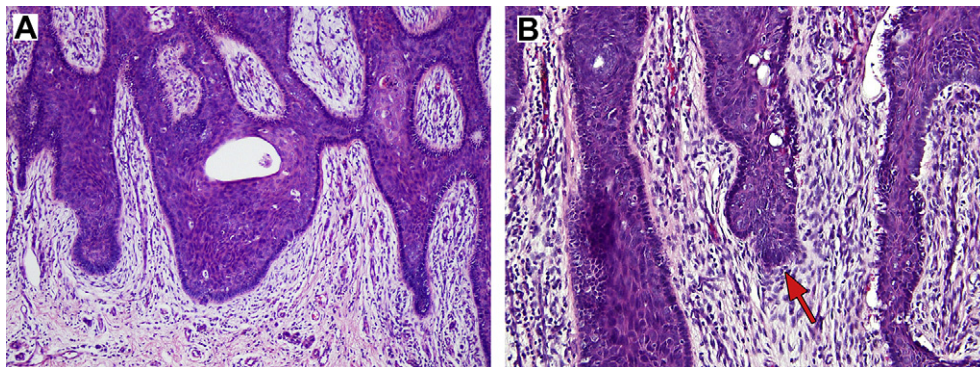


Figure 4 (A) The porocarcinoma *in situ* shows obvious peripheral palisading surrounded by a fibromucinous stroma (H&E, original magnification $\times 100$). (B) The arrow indicates a follicular germ, consisting of aggregates of basaloid cells with peripheral palisading and surrounded by condensed connective tissue sheath (papillary mesenchymal body) (H&E, original magnification $\times 200$).

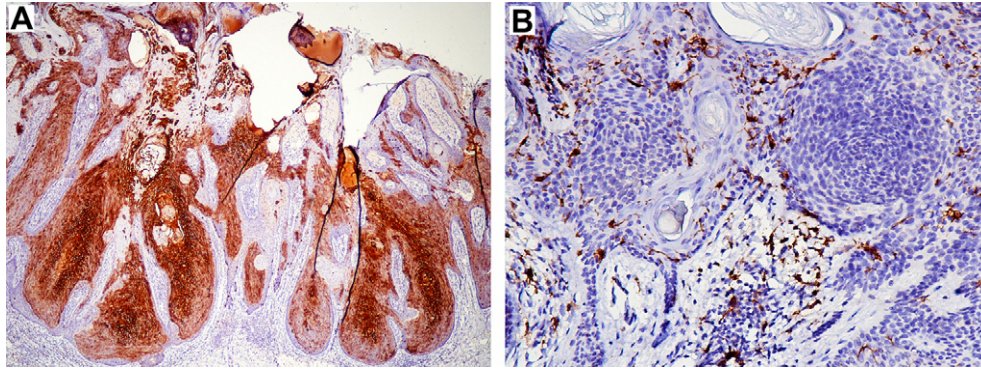


Figure 5 Immunohistochemical findings. (A) Tumor cells show strongly positive EMA immunostaining (original magnification $\times 40$). (B) There are almost no CD1a⁺ cells in the tumor nests, in contrast to the many CD1a⁺ cells in the surrounding normal epidermis (original magnification $\times 100$).

like those of trichoblastoma or tumor of the follicular infundibulum.^{4,6} To date, 37 cases of apocrine poroid neoplasms have been reported in the literature.^{8,13–18} Most of the patients were aged between 40 and 80 years, with a mean age of 58.5 years. In contrast to eccrine poromas, which tend to occur on palms and soles, apocrine poromas tend to occur more commonly on the head, trunk and lower extremities. Of the 37 cases reported in the literature, 33 had histological evidence of sebaceous differentiation, five of which had follicular differentiation. The apocrine poroid neoplasms reported were benign, except for one case of poroma with sebaceous differentiation and metaplastic sarcomatoid carcinoma.¹⁹ Our patient was diagnosed with apocrine porocarcinoma *in situ* with follicular differentiation, which has not been reported before.

In addition to poroid neoplasms with follicular or sebaceous differentiation, rare cases of follicular or sebaceous neoplasms with poroid differentiation have been reported.^{20,21} The concurrent folliculosebaceous–apocrine differentiation in these cases might be explained by multidirectional differentiation involving pluripotent cells in a folliculosebaceous–apocrine unit.²⁰

It has been reported that porocarcinoma *in situ* arises mostly from pre-existing HAS.^{5,22} Our case also suggests a malignant transformation from HAS to porocarcinoma *in situ*. Therefore, the risk of malignant change of HAS should not be overlooked and early complete excision may be prudent when a diagnosis of HAS is made.

In conclusion, we report a case of porocarcinoma *in situ* with prominent follicular differentiation. This case further supports apocrine origin in at least some poroid neoplasms. Careful examination of histological features and immunostaining should prevent misdiagnosis.

References

- Hanau D, Grosshans E, Laplanche G. A complex poroma-like adnexal adenoma. *Am J Dermatopathol* 1984;**6**:567–72.
- Zaim MT. Sebocrine adenoma. An adnexal adenoma with sebaceous and apocrine poroma-like differentiation. *Am J Dermatopathol* 1988;**10**:311–8.
- Harvell JD, Kerschmann RL, LeBoit PE. Eccrine or apocrine poroma? six poromas with divergent adnexal differentiation. *Am J Dermatopathol* 1996;**18**:1–9.
- Requena L, Kiryu H, Ackerman AB, Carter D. *Neoplasms with Apocrine differentiation*. Philadelphia: Lippincott Raven; 1998.
- Ueo T, Kashima K, Daa T, Kondoh Y, Yanagi T, Yokoyama S. Porocarcinoma arising in pigmented hidroacanthoma simplex. *Am J Dermatopathol* 2005;**27**:500–3.
- Kamiya H, Oyama Z, Kitajima Y. "Apocrine" poroma: review of the literature and case report. *J Cutan Pathol* 2001;**28**:101–4.
- Lee NH, Lee SH, Ahn SK. Apocrine poroma with sebaceous differentiation. *Am J Dermatopathol* 2000;**22**:261–3.
- Santos-Briz A, Rodriguez-Peralto JL, Miguelez A, Lopez-Rios F. Trichoblastoma arising within an apocrine poroma. *Am J Dermatopathol* 2002;**24**:59–62.
- Breathnach AS, Smith J. Fine structure of the early hair germ and dermal papilla in the human foetus. *J Anat* 1968;**102**:511–26.
- Chen CC, Chang YT, Liu HN. Clinical and histological characteristics of poroid neoplasms: a study of 25 cases in Taiwan. *Int J Dermatol* 2006;**45**:722–7.
- Liu HN, Chang YT, Chen CC. Differentiation of hidroacanthoma simplex from clonal seborrheic keratosis—an immunohistochemical study. *Am J Dermatopathol* 2004;**26**:188–93.
- McKee PH, Calonje E, Granter SR. *Pathology of the skin, with clinical correlations*. 3rd ed. Philadelphia, PA: Elsevier Mosby; 2005. p. 1617–1621.
- Kurashige Y, Yamamoto T, Okubo Y, Tsuboi R. Poroma with sebaceous differentiation: report of three cases. *Australas J Dermatol* 2010;**51**:131–4.
- Azma A, Tawfik O, Casparian JM. Apocrine poroma of the breast. *Breast J* 2001;**7**:195–8.
- Futagami A, Aoki M, Niimi Y, Ohnishi T, Watanabe S, Kawana S. Apocrine poroma with follicular differentiation: a case report and immunohistochemical study. *Br J Dermatol* 2002;**147**:825–7.
- Suzuki T, Ikeda H, Hamasaki Y, Hatamochi A, Yamazaki S. Syringocystadenoma papilliferum associated with apocrine poroma. *J Dermatol* 2006;**33**:249–51.
- Groben PA, Hitchcock MG, Leshin B, White WL. Apocrine poroma: a distinctive case in a patient with nevoid basal cell carcinoma syndrome. *Am J Dermatopathol* 1999;**21**:31–3.
- Gianotti R, Coggi A, Alessi E. Poral neoplasm with combined sebaceous and apocrine differentiation. *Am J Dermatopathol* 1998;**20**:491–4.
- Kazakov DV, Kutzner H, Spagnolo DV, et al. Sebaceous differentiation in poroid neoplasms: report of 11 cases, including a case of metaplastic carcinoma associated with apocrine poroma (sarcomatoid apocrine porocarcinoma). *Am J Dermatopathol* 2008;**30**:21–6.
- Yu DK, Joo YH, Cho KH. Trichoblastoma with apocrine and sebaceous differentiation. *Am J Dermatopathol* 2005;**27**:6–8.
- Kazakov DV, Calonje E, Rutten A, Glatz K, Michal M. Cutaneous sebaceous neoplasms with a focal glandular pattern (seboapocrine lesions): a clinicopathological study of three cases. *Am J Dermatopathol* 2007;**29**:359–64.
- Lee JB, Oh CK, Jang HS, Kim MB, Jang BS, Kwon KS. A case of porocarcinoma from pre-existing hidroacanthoma simplex: need of early excision for hidroacanthoma simplex? *Dermatol Surg* 2003;**29**:772–4.