

## A case of epidermal cyst with pilomatrical differentiation

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**A 20-year-old Japanese woman with an epidermal cyst on the back is described. Physical examination revealed a deep blue and round shaped cystic lesion measuring 10 mm in diameter. A comedo-like keratotic plug also could be seen at the center. Histologically, the inner surface of the cyst was clearly separated of two types of the cells. The one was layers of epidermal keratinocytes and the other looked like a basal layer of epidermis, which immunohistochemically stained by S-100, HMB-45, cytokeratin (CK19) and Fontana-Masson staining. We diagnosed this case as epidermal cyst with pilomatrical differentiation.**

**Key words : epidermal cyst, pilomatrical differentiation**

### INTRODUCTION

Epidermal cyst is lined by stratified squamous epithelium showing epidermal keratinization, that is characterized by the formation of keratohyaline granules and flattened surface epithelium [1]. Several histological variations in the epidermal lining have been reported [2]. We report a case of epidermal cyst with pilomatrical differentiation which has a peculiar histopathological examination.

### CLINICAL SUMMARY

A 20-year-old Japanese female visited our clinic on November 11, 2002, with a tumor on her back. She had noticed it for one month having pressure pain and bluish appearance. Physical examination revealed a deep blue and round shaped cystic lesion measuring 10 mm in a diameter. A comedo-like keratotic plug was identified at the center (Fig. 1). Epidermal cyst was considered as the clinical diagnosis. The tumor was resected under local anesthesia.

### MATERIALS AND METHODS

The excised tissue specimen was fixed in

10 % formalin, embedded in paraffin and routinely processed. Four micrometer sections were used for hematoxylin-eosin and immunohistochemical stains. Immunohistochemical analysis was performed using the standard indirect immunoperoxidase technique [3-5]. The sections were deparaffinized, and endogenous peroxidase activity was blocked by incubation in 0.3 % H<sub>2</sub>O<sub>2</sub> in methanol for 30 min. Non-specific binding was blocked with normal rabbit serum in 0.1 M phosphate-buffered saline. The sections were incubated at room temperature for 1 hour with the various primary antibodies listed in Table 1. The amplified products were visualized by the 3,3'-diaminobenzidine hydrochloride reaction.

### PATHOLOGICAL FINDINGS

#### Macroscopic findings

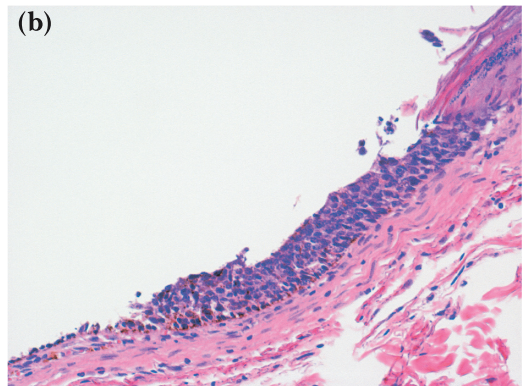
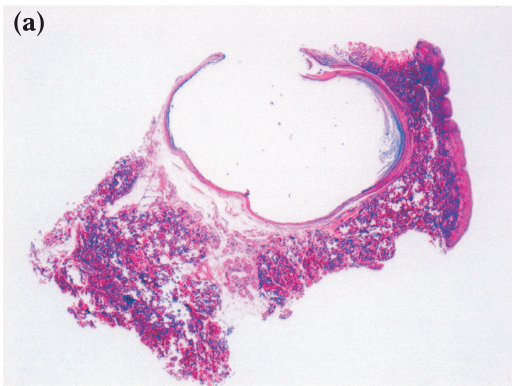
The submitted material was black in color with a dome-like elevation. The cut surface exhibited a cystic cavity, the inner surface of which was black in color. The size of the cyst was 10 mm in diameter. The adjacent epidermis was almost preserved.



**Fig. 1** Gross appearance  
A deep blue cystic lesion is situated in the back

**Table 1** Used antibodies

Antigen	Dilution	Antigen retrieval	Source
Cytokeratin (WSS)	1 : 200	+	Dako
S-100 protein	1 : 200	-	Dako
HMB-45	1 : 20	-	Dako
Cytokeratin (CK19)	1 : 10	+	Progen
Cytoeratin (CAM5.2)	1 : 1	+	Becton Dickinson
Cytokeratin (CK7)	1 : 25	+	Dako

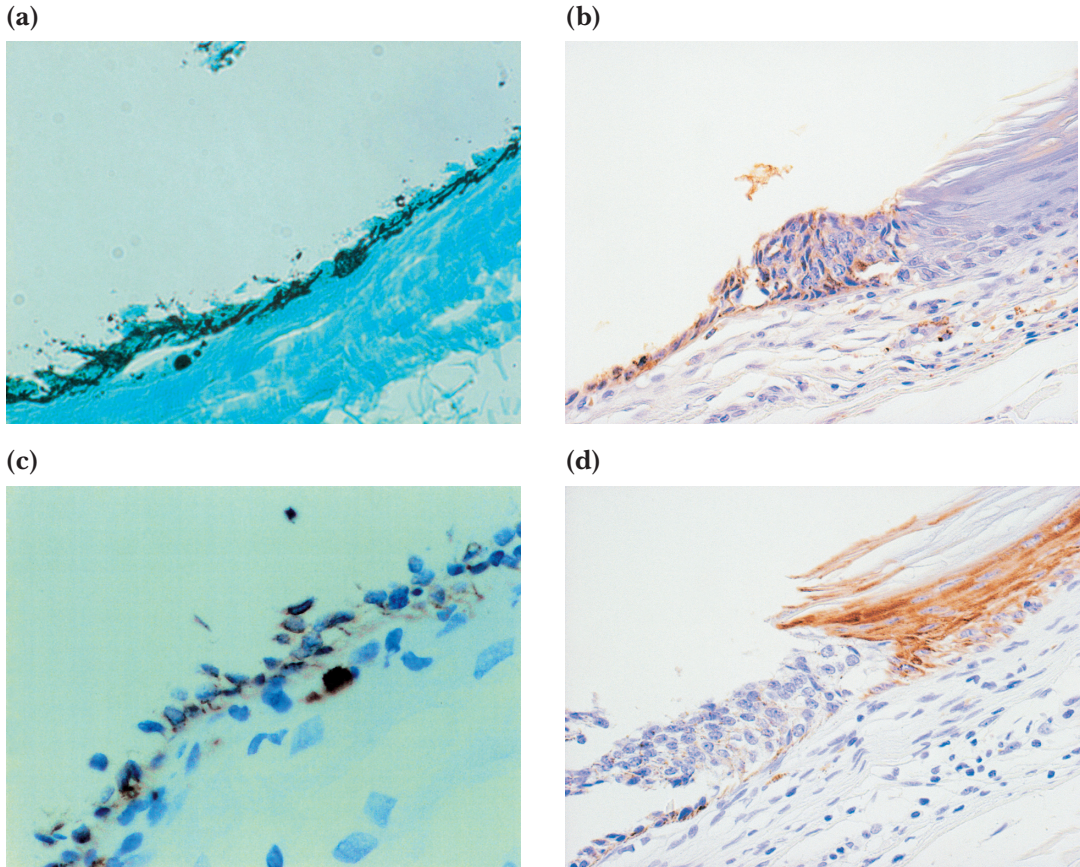


**Fig. 2** Histological appearance (H-E stain)  
**a:** A dermal cyst, the wall of which is connected to the overlying epidermis  
**b:** The inner wall is clearly separated of two types of the cells.

**Histological and immunohistochemical findings**

Histologically, the cyst was located in the dermis and contained fragments of horny materials (Fig. 2a). The cyst wall was connected to the overlying epidermis. No remarkable inflammation was associated in the

adjacent dermis and the subcutaneous tissue. The inner surface of the cyst was clearly separated of two types of the cells (Fig. 2b). The one was maturing epidermal keratinocytes and the other was the hair-germ like cells. The boundary between the former and the later was observed and possessed aggre-



**Fig. 3** Histological appearance (special stainings)  
**a:** The cytoplasm of the basaloid cells and hair germ like cells are stained by Fontana-Masson staining.  
**b and c:** The basaloid cells and hair germ like cells showed positive immunoreactivity of S-100 (**b**) and cytokeratin (CK19) (**c**).  
**d:** The lining epidermal keratinocytes are positive for keratin (WSS). The basaloid cells and hair germ like cells are negative.

gates of basaloid cells. Fontana-Masson staining revealed silver grains in the cytoplasm of the basaloid cells and the hair-germ like cells (Fig. 3a). Immunohistochemically the basaloid cells and the monolayer hair-germ like cells showed diffuse positive reactivity of S-100 (Fig. 3b) and cytokeratin (CK19) (Fig. 3c) and occasional positive reactivity of HMG-45 after demelanization. The cells showed negative immunoreactivity of cytokeratin (WSS) (Fig. 3d) [6]. Immunostaining with cytokeratin (CAM 5.2) and cytokeratin (CK7) revealed no further information [6].

### DISCUSSION

Epidermal cysts are thought to be derived from the infundibulum of hair follicle. A

few layers of the keratinocytes contain melanin granules, as does the normal epidermis, so the clinical appearance of the cyst ranges from normal skin color to blue-gray [1]. The distribution of melanocytes is similar to that of the adjacent epidermis. However basal hyperpigmentation is sometimes noted [7]. Several histological variations in the lining cells of the cyst have been reported [2].

Our case had two types of lining cells which are clearly separated. The one was maturing epidermal keratinocytes and the other was the hair germ like cells of the single layer and basaloid cells, which were stained by S-100, HMB-45 after demelanization. Fontana-Masson stain was also positive for the cells. These results suggest the

existence of melanocytic cells producing melanin pigment [8-9]. And, the hair-germ like cells were immunopositive for CK19 and morphologically appeared to be root sheath cells in the normal hair follicle. These results suggested the basaloid cells in the boundary could be referred as immature epithelial germ cells in bulge which were differentiated in root sheath cells [6, 10].

This case can be a good case of to find out the differentiation of epithelial germ cell to hair bulb. We finally diagnosed this lesion as epidermal cyst with pilomatrical differentiation.

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