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PITFALLS IN DIAGNOSIS OF PILOMATRIXOMA BY FNA AND SCRAPING CYTOLOGY – REPORT OF SEVEN CASES

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Summary

Background: Pilomatrixoma is a benign tumor with differentiation toward hair cells. It is a rare, benign, slow-growing skin tumor firstly described by Malhebre and Chenantais in 1880. It usually occurs as a solitary lesion mostly located in the head and neck as a firm, deep-seated nodule covered by normal skin.

Case: Our study evaluate retrospectively the clinical and cytomorphologic features of seven cases of pilomatrixoma.

In the smears stained with MGG malignancy was excluded. The diagnosis of pilomatrixoma was confirmed by pathologist. A semiquantitative method was used in evaluation of the following features: basaloid cells, shadow cells, inflammatory cells, giant cells, naked nuclei, and debris (0 absent, 1+ mild amount, 2+ moderate, 3+ abundant).

The maximum score obtained in FNA was for basaloid cells 13/21, shadow cells 14/21 and giant cells 11/21 while in the histological sections, the maximum score for basaloid cells was 20/21 and for shadow cells 17/21.

Conclusion: The presence of basaloid cells, ghost cells and giant cells in cytological smears and also clinical information as a localization in the head and neck region, then a slowly growing tumor of the skin or subcutaneous tissue will allow a conclusive diagnosis of pilomatrixoma by FNA.

KEY WORDS: *pilomatrixoma, FNA cytology, skin adnexa*

ZAMKE U POSTAVLJANJU DIJAGNOZE PILOMATRIKSOMA PRIMJENOM ASPIRACIJSKE CITODIJAGNOSTIKE – PRIKAZ SEDAM SLUČAJEVA

Sažetak

Pilomatriksom je benigni tumor porijekla stanica dlačnog folikula. On je rijetki, benigni, sporo rastući kožni tumor kojeg su prvi puta opisali Malhebre i Chenantais 1880. godine. Pojavljuje se obično kao pojedinačna lezija, najčešće na glavi i vratu kao tvrdi, dublje smješten čvor prekriven normalnom kožom.

Naša studija retrospektivno evaluira kliničke i citomorfološke značajke sedam slučajeva pilomatriksoma.

U razmazima koji su bili bojeni MGGom isključen je malignitet. Dijagnoza pilomatriksoma potvrđena je histološki. Upotrebljena je semikvantitativna metoda u analizi sljedećih karakteristika: bazaloidne stanice, anuklerane stanice, upalne stanice, divovske stanice, gole jezgre, i detritus (O negativno, 1+ mala zastupljenost, 2+ srednja zastupljenost, 3+ obilno).

Maksimalan rezultat dobiven aspiracijskom citodijagnostikom iznosio je za bazaloidne stanice 13/21, anuklearne stanice 14/21 i divovske stanice 11/21, dok su histološkom analizom dobiveni rezultati za bazaloidne stanice 20/21 i za anuklearne stanice 17/21.

Prisutnost bazaloidnih stanica, anuklearnih stanica i divovskih stanica u citološkim razmazima kao i kliničke informacije o lokalizaciji u području glave i vrata, te o sporo rastućem tumoru kože i potkožnog tkiva upućivat će u citodijagnostici na zaključnu dijagnozu pilomatriksoma.

KLJUČNE RIJEČI: *pilomatriksom, aspiracijska citodijagnostika, kožna adneksa*

INTRODUCTION

Pilomatrixoma (pilomatrixoma, epithelioma of Malhebre) is a benign tumor with differentiation toward hair cells, particularly hair cortex cells (1). As a rare, benign, slow growing skin tumor it was first described by Malhebre and Chenantais in 1880 (2). The tumors may arise at any age, but children and young adults are more often affected than elderly people (1,3).

It usually occurs as a solitary lesion and is mostly located in the head and neck as a firm, deep-seated nodule that is covered by normal skin. Occasionally, the tumor is more superficially located, causing a blue-red discoloration of the overlying skin, and it rarely protrudes as a sharply demarcated, dark red nodule.

The aim of the study was to evaluate retrospectively clinical, cytomorphologic features of seven cases of pilomatrixoma and the main reasons for pitfalls in diagnosing by FNA and the scraping method.

CASE REPORT

The series included seven patients with pilomatrixoma diagnosed in the Department of Cytology and Pathology, University Hospital for Tumors, Zagreb, Croatia in a five-year period (Table 1). In a case with a facial skin lesion and an exulcerated mass on the neck (Figure 1), cytologic scraping was done by a cytopathologist using a sterile scalpel. In other cases, usual FNA with a 23G needle attached to a 20 ml disposable syringe mounted on a holder was performed by the cytopathologist.

Table 1.

CLINICAL FINDINGS IN 7 CASES OF PILOMATRIXOMA

Case no.	Sex/age (years)	Location	Clinical diagnosis
1	F/74	Face	Basalioma
2	F/8	Neck	Lymphadenitis
3	M/40	Parotid region	Parotid gland tumor
4	M/19	Neck	Lymphadenitis
5	F/62	Shoulder region	Tumor
6	M/45	Neck	Tumor, Sarcoma
7	F/61	Head	Atheroma

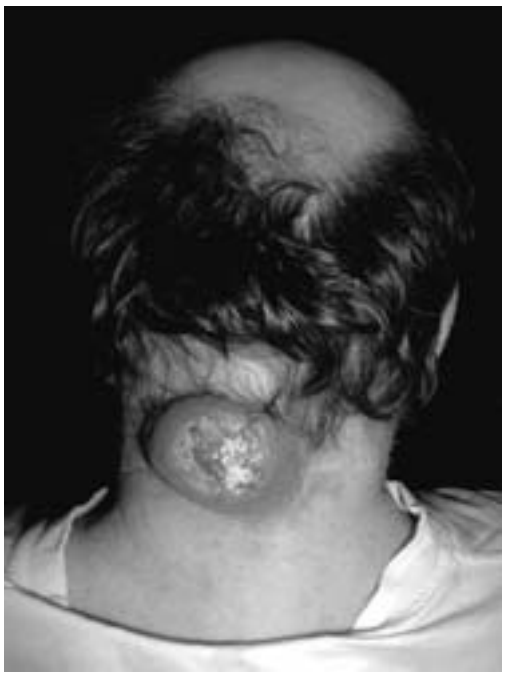

Figure 1. Case 6. Exulcerated mass on the neck

The smears were air-dried and stained with May-Grünwald-Giemsa (MGG). Malignancy was excluded in all seven cases by FNA, but the diagnosis of pilomatrixoma wasn't confirmed.

The majority of the smears showed high cellularity, with the presence of basaloid cells, giant cells, and shadow cells (Figures 2, 3), with additional elements such as debris, naked nuclei and inflammatory cells usually present (Figure 4). An exception was case 4, in which basaloid cells were absent but smears showed cells with abundant cytoplasms and excentrically placed oval nuclei referred to transitional (intermediate) cells (Figure 5). In case 2, there were plenty of giant cells which led us to the diagnosis of giant cell tumor by FNA (Figure 6).

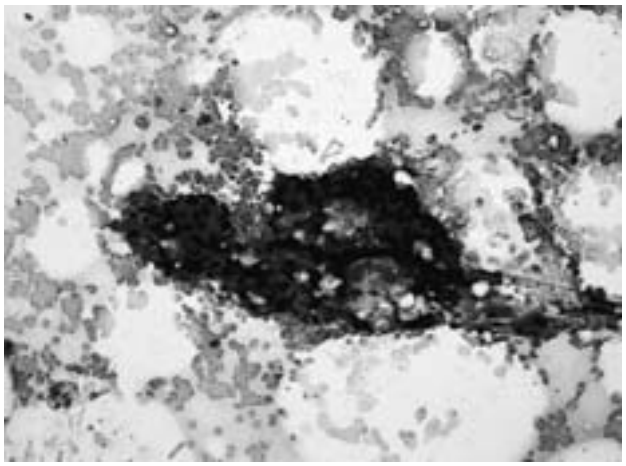

Figure 2. FNA, basaloid cells (May-Grünwald-Giemsa stain, x 200)

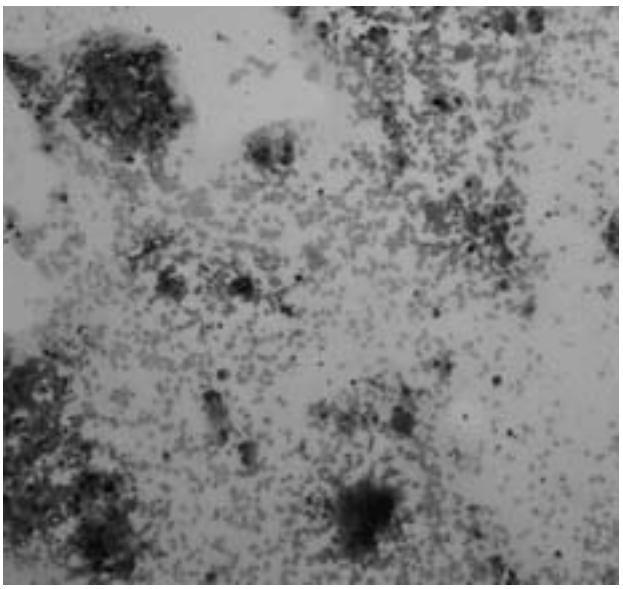

Figure 3. FNA, ghost cells (May-Grünwald-Giemsa stain, x 100)

Pathohistological analysis was performed in 3 μm paraffin sections stained with H&E, and the diagnosis of pilomatrixoma was established in all cases (Figures 7, 8).

A semiquantitative method was used to compare morphologic features of cytologic smears and histologic biopsies. Basaloid cells, shadow cells, inflammatory cells, giant cells, naked nuclei, and debris were semiquantified from 0 to 3 (0 absent, 1+ mild, 2+ moderate, 3+ abundant) (Table 2). The maximum score was 21.

All cellular elements were at least scantly present in each of the examined cytological

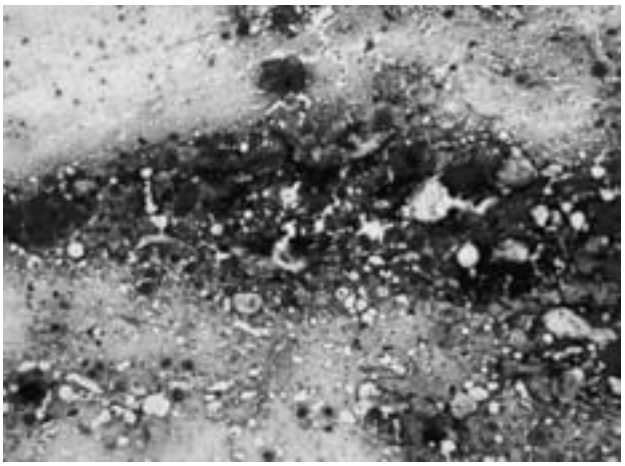

Figure 4. FNA, debris, basaloid cells, naked nuclei (May-Grünwald-Giemsa stain, x 200)

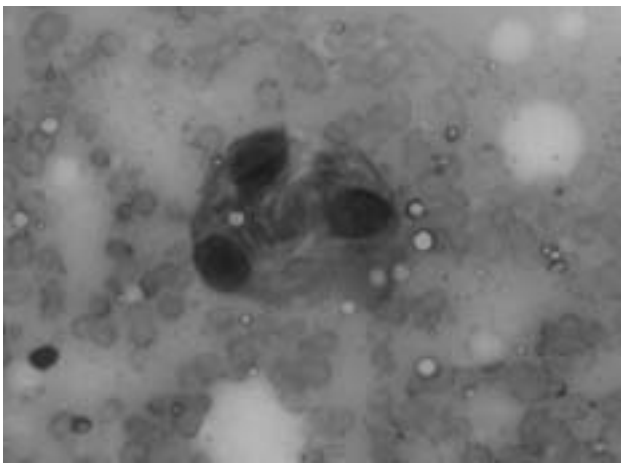

Figure 5. FNA, transitional (intermediate) cells (May-Grünwald-Giemsa stain, x 400)

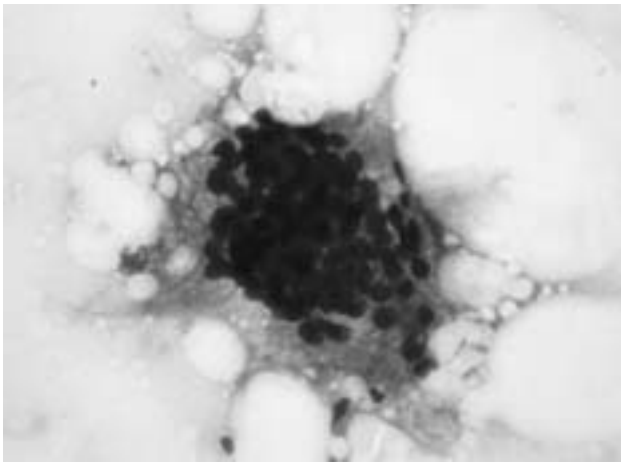

Figure 6. FNA, giant cell (May-Grünwald-Giemsa stain, x 400)

Table 2.

COMPARATIVE ANALYSIS

Case		Basaloid cells	"Shadow cells"	Inflamm. cells	Giant cells	Debris	Naked nuclei
1	Cyto	+++	++	0	+	++	+
	PHD	+++	++	+	0	+	+
2	Cyto	+	++	+	+++	0	+
	PHD	+++	+++	++	0	++	+
3	Cyto	++	+	+	0	+	++
	PHD	+++	0	0	++	+	++
4	Cyto	0	++	+	+++	+	+
	PHD	+++	+++	+	++	+++	+
5	Cyto	+++	++	++	++	+	+
	PHD	+++	+++	++	+	++	++
6	Cyto	+++	+++	++	+	+	+
	PHD	++	++	++	+	+	+
7	Cyto	++	+++	+	+	+++	0
	PHD	++	+++	0	+	+	+

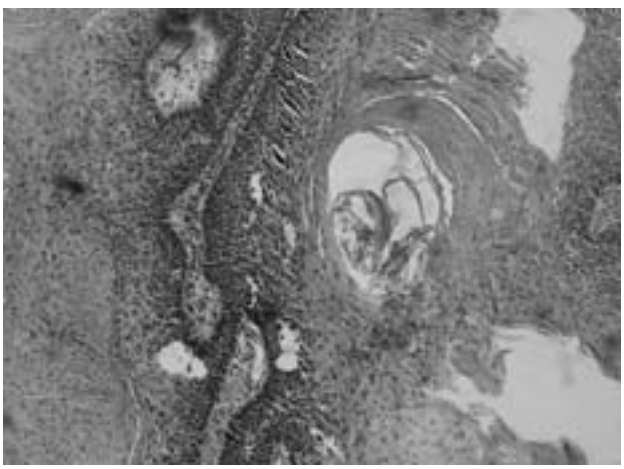

Figure 7. Histologic section of pilomatrixoma (H&Ex100)

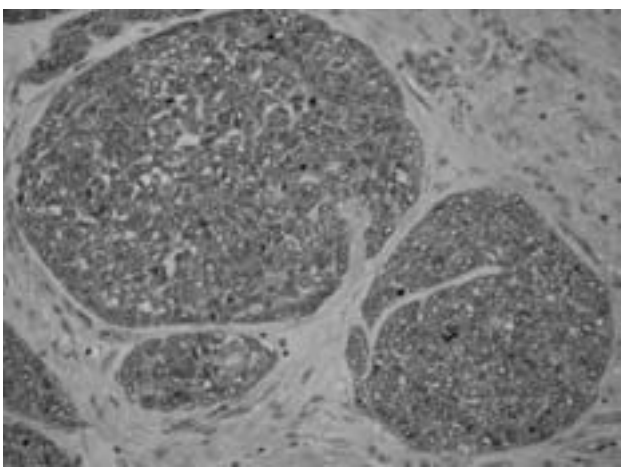

Figure 8. Basaloid cells (H&Ex400)

Table 3.

SEMIQUANTITATIVE ANALYSIS

	CYTOLOGY	PHD
Basaloid cells	13/21	20/21
Shadow cells	14/21	17/21
Inflammatory cells	7/21	14/21
Giant cells	11/21	7/21
Debris	7/21	12/21
Naked nuclei	8/21	8/21

smears; however, the maximum score was obtained for basaloid cells , "shadow" cells and giant cells (Table 3). The maximum score obtained in histological sections was for basaloid cells and shadow cells (Table 3).

DISCUSSION

FNA cytology findings of pilomatrixoma were first described by Wojke et al. in 1982. They emphasized the presentation of basaloid and squamous ghost cells, calcium deposits and foreign body giant cell reaction to make a correct diagnosis of pilomatrixoma and avoid a diagnosis of carcinoma (2).

In histopathology, two types of cells, basophilic cells and shadow cells compose the islands. The basophilic cells possess round or elongated, deeply basophilic nuclei and scanty cytoplasm. In some areas, the transition of basophilic cells into shadow cells is abrupt, whereas in others the transition is gradual. In many tumors, small, round, eosinophilic cells of keratinization

are seen within areas of basophilic cells or within aggregates of shadow cells (1).

Depending on the existence of basaloid and transitional cells, cytologic diagnosis could lead in two directions. Depending on the depth of puncture we could see transitional (intermediate) cells in cytologic smears (case 4). Because they are rarely found in smears, we didn't consider them as a diagnostic factor in our case of pilomatrixoma and we suggested a diagnosis of the benign soft tissue tumor (Table 2). These cells appear through maturation of the basaloid cells toward superficial squamous cells, and they develop progressively more eosinophilic cytoplasm with pycnotic nuclei (3). In cytologic smears, they look like soft tissue cells (Figure 5).

If the puncture is deeper, basaloid cells could be seen arranged in numerous clusters of cells with hyperchromatic nuclei and scant cytoplasms, which features could lead to the diagnosis of basaloid carcinoma (4,5).

Shadow cells (squamous cells without nuclei) are very often present in cytologic (FNA) smears (6,7), and because of that, we diminished their appearance as an important element in diagnosing pilomatrixoma. Kumar stated that the main reasons for erroneous diagnosis could be lack of awareness of cytological features, predominance of one component over the others, and non-representative smears (6).

Semiquantitative analysis of cytologic and pathohistologic morphologic features showed the most important diagnostic factors when diagnosing pilomatrixoma; basaloid cells, shadow cells, and giant cells they all had the highest scores in both cytologic smears and pathohistologic biopsies.

In many studies of pilomatrixoma, comparative analysis of cytologic and pathohistologic features are still of great interest, and many authors emphasize difficulties in diagnosing pilomatrixoma by FNA. Viero, Skoog et al. found out that diagnostic accuracy of FNA was 39% and in 25% of the cases malignancy was suspected (2).

The presence of basaloid cells, ''ghost cells'' and giant cells in cytological smears and clinical information about a slowly growing tumor of the skin or subcutaneous tissue in the head and neck region, and also in the cases with a nevoid or exulcerated mass will allow a conclusive diagnosis of pilomatrixoma by FNA and scraping method.

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