

CASE REPORT: REMOVAL OF A PROLIFERATING PILOMATRICOMA WITH A CO₂ LASERGaydina TA , Dvornikov AS, Skripkina PA

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Tumors of the skin/skin adnexa are astonishingly diverse. The diagnostic algorithms for skin neoplasms includes history taking, the assessment of clinical data, dermoscopy and a histopathological examination. Literature descriptions of a histologically confirmed pilomatricoma are scarce. If the lesion is localized to an esthetically sensitive body area, it is important to minimize the postoperative cosmetic defect. In the case described below, we were able to achieve a positive esthetic outcome in a patient with a facial pilomatricoma sized < 2 cm using a CO₂ laser.

Keywords: pilomatricoma, benign skin tumor, removal, CO₂ laser, diagnostic methods for skin neoplasms, artificial intelligence

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Compliance with ethical standards: the patient gave informed consent to the surgical intervention and publication of her personal data.

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КЛИНИЧЕСКИЙ СЛУЧАЙ: УДАЛЕНИЕ ПРОЛИФЕРИРУЮЩЕЙ ПИЛОМАТРИКОМЫ СО₂-ЛАЗЕРОМТ. А. Гайдина , А. С. Дворников, П. А. Скрипкина

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В клинической практике врачи разных специальностей наблюдают большое разнообразие новообразований кожи (НК) и ее придатков. Алгоритм диагностики включает оценку анамнестических и клинических данных, дерматоскопическое и гистологическое исследования. Описание пиломатриксомы с гистологическим подтверждением диагноза представляет собой редкий клинический случай. При локализации пиломатриксомы на эстетически значимом участке кожного покрова задача врача минимизировать косметический дефект после удаления. Мы получили положительный косметический результат после удаления пиломатриксомы диаметром менее 2 см² на коже лица методом СО₂-лазерной деструкции.

Ключевые слова: пиломатриксма, доброкачественные новообразования кожи, удаление, СО₂-лазер, методы диагностики новообразований кожи, искусственный интеллект

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Соблюдение этических стандартов: пациентка подписала добровольное информированное согласие на проведение оперативного лечения.

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The diversity of clinical presentations of skin neoplasms (SN) seen on physical examination and the ensuing difficulty in their differential diagnosis necessitate the use of additional diagnostic techniques. The initial examination of SN includes dermoscopy [1]; ultrasonography, siascopy, confocal laser scanning microscopy, [2] and near-infrared multispectral imaging [3] can also facilitate the diagnosis, if available. However, the application of these tools does not eliminate the possibility of misdiagnosis; even the findings of a histopathological examination, the gold standard of modern medicine, can be subject to misinterpretation [4]. Dermoscopy is a widespread technique for diagnosing melanocytic skin tumors in the first place [5]. Dermoscopy images of rare SN, such as pilomatricoma, are underrepresented in the literature.

Pilomatricoma, also known as benign calcifying epithelioma, necrotizing epithelioma, calcifying epithelioma of Malherbe, and pilomatrixoma, is a rare benign skin neoplasm with follicular differentiation. In 1880, A. Malherbe and J. Chenantais hypothesized that the tumor derived from sebaceous glands [6]. In 1961, R. Forbis and E. Helwig coined the term “pilomatricoma” because they found that the tumor arose from the outer sheath cells of the hair follicle root [6]. F. Moehlenbeck reported that pilomatricoma accounted for 0.12% of 140,000 SN he had analyzed [6]. Today, it is known that pilomatricoma originates

from the hair follicle matrix [7]. It is usually localized to the head or neck and is more often seen in children, especially girls, although adults are also affected [8]. Its clinical manifestations are diverse. The tumor can present as a small, barely noticeable subcutaneous lesion, as well as a bigger, more aggressive and locally invasive growth [9]. Due to its varying clinical presentations, pilomatricoma can be mistaken for a malignancy. Unattractive postoperative scars can cause emotional distress in patients with facial pilomatricomas. Therefore, the size and location of the lesion, the risk of developing a hypertrophic or keloid scar, comorbidities, and the patient's age should all be taken into account when deciding on the best treatment option. It is important to minimize the postoperative cosmetic defect and achieve an esthetically acceptable result.

Clinical case

Female patient K., aged 52, presented with a skin lesion on her left cheek (Fig.1). She had first spotted the lesion 20 years before but never sought medical advice. The patient had tried to squeeze it on repeated occasions before she noticed the mass was growing.

Status localis: the patient's skin color was normal; her Fitzpatrick skin type was III. On the left cheek, there was

a nodular pink-pale mass sized 10.0 × 10.0 × 0.5 mm with a heterogenous lobular structure and yellow inclusions. The mass was soft and non-tender on palpation. The surrounding skin was intact.

Dermoscopy allowed a 20x magnification. The examination revealed a mass with clear margins and a lobular structure, symmetrical on two axes; the mass had homogenous yellow and pale pink inclusions, tortuous blood vessels and skin flakes (Fig. 2).

The analysis of the dermoscopy image by a convolution neural network suggested a benign tumor.

Clinical diagnosis: a benign skin neoplasm of the face (D23.3).

Differential diagnosis: basal cell carcinoma, epidermoid cyst, atheroma, xanthogranuloma, dermal cylindroma, dermatofibroma.

Considering the location of the neoplasm and its size (up to 2 cm²), it was decided to remove it under local anesthesia using a CO₂ laser; the procedure was preceded by a scalpel biopsy.

Histopathology: D17.0 Proliferating pilomatricoma (necrotizing epithelioma of Malherbe) (Fig. 3). ICD-O code: 8110/0.

The follow-up examination conducted 2 weeks after surgery revealed formation of a neat scar (Fig. 4, 5)

Discussion

Patients with SN seek medical advice from both cancer specialists and non-oncologists. According to the literature, skin malignancies are the most common cancer type reported in the Russian Federation, amounting to 12.6% (excluding melanoma) or 14.2% (including melanoma) [10]. It is critical that the patient should be immediately referred to an oncologist if clinical examination is suspicious of a skin/skin adnexa malignancy in order to make a timely diagnosis and decide on an adequate treatment strategy [11]. Pilomatricoma is a rare skin lesion, and physical examination alone does not provide the accurate diagnosis. In the case described in this article, we performed dermoscopy and carried out a histopathological study of the excised mass. With rare SN, there is always a risk that dermoscopy findings can be misinterpreted. In this regard, the use of artificial intelligence (AI) for the initial screening for SN is a promising approach [12]. At present, AI is employed to analyze digital microphotographs; it demonstrates high sensitivity in detecting malignancies. A convolutional neural network (CNN) is trained on over 100,000 microphotographs



Fig. 1. A pale-pink skin nodule with yellow inclusions on the left cheek



Fig. 2. Dermoscopy: a mass with a clear lobular structure, showing homogenous areas of yellow and pale pink, tortuous blood vessels and skin flakes (magnification: ×20)

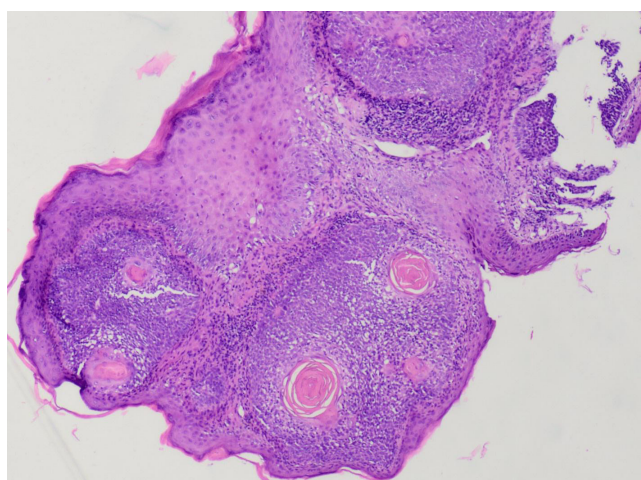


Fig. 3. A skin fragment with a nodule consisting of proliferating epithelial cells in a garland-resembling arrangement. Some of the cells are necrotic (the so-called shadow cells). Inflammatory cell infiltrate is seen around the layers of the epithelium (staining: hematoxylin and eosin; magnification ×40)

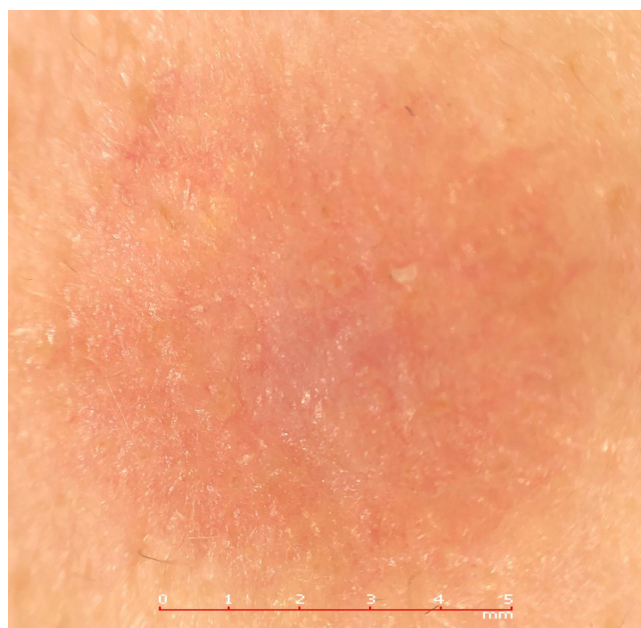


Fig. 4. Dermoscopy: a well-demarcated symmetrical pale pink area (magnification: ×20)

of SN with a histologically confirmed diagnosis [13]. It can build its own algorithms for decision making during the analysis. A trained CNN demonstrates better specificity and sensitivity in comparison with dermatologists who have little (<2 years) or moderate (>5 years) experience in dermoscopy [13]. Of course, AI cannot replace humans in diagnosing SN, but it can assist fledgling doctors in decision making. In the nearest future CNNs will continue to develop and will be trained on real clinical data; this will improve the diagnostic accuracy for such rare SN as pilomatricoma.

Due to the risk of postoperative hypertrophic scarring, facial surgery can be a stressful factor for the affected patients. The arsenal of techniques for pilomatricoma removal is broad and includes surgical excision, curettage, cauterization, cryosurgery, photodynamic therapy, and laser ablation. It is reported that the use of a CO₂ laser for removing various SN and appendageal tumors of the face produces a good esthetic result [14, 15]. A CO₂ laser reduces the rate of pilomatricoma recurrence, the time needed for the surgical wound to epithelize, the incidence of intraoperative and postoperative complications, and increases the positive feedback rate. A CO₂ laser is highly effective in removing small (<2 cm²) pilomatricomas, providing a good esthetic result.

CONCLUSIONS

Physical examination alone is not enough to diagnose a pilomatricoma; additional noninvasive diagnostic tools should be employed. Dermoscopy is the most common technique in dermatology; however, the literature shows a lack of dermoscopy images of rare skin neoplasms, such as pilomatricoma. There is

a need for a dermoscopy images database of rare skin tumors for the subsequent computer-assisted analysis in order to improve the accuracy of diagnostic screening. Pilomatricomas less than 2 cm² in size, especially those located on esthetically sensitive body areas, should be removed using a CO₂ laser. This technique produces a good esthetic result and minimizes cosmetic defects.



Fig. 5. A neat postoperative scar is starting to form

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