

Possibilities of Photodynamic Therapy in the Treatment of Multiple Cylindroma of the Scalp: The Clinical Case Study

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ABSTRACT

This article presents a clinical observation of successful treatment of a patient with multiple cylindroma of the scalp and trunk using photodynamic therapy (PDT) after radiotherapy. The first masses were found in 2008, at the same time they were surgically removed. There has been a progression of the process since 2019 - multiple masses on the scalp and trunk. There was another visit to doctors. After verification of diagnosis radiation therapy was received. However, soon after the treatment, the appearance of new and growth of existing foci has been noted. A multistage PDT with good clinical and cosmetic effect was carried out at Medical Centre Hospital of President's Affairs Administration of the Republic of Kazakhstan.

Keywords: cylindroma, radiation therapy, photodynamic therapy

INTRODUCTION

Cylindroma (Brook-Spiegler syndrome, turban tumour) is malignant tumour of the dermal appendages, a group of neoplasms that form from the cells of the sebaceous-hair and sweat glands of the skin [1-5]. Cylindroma most commonly affects the scalp. They occur as solitary lesions [6]. Cylindroma can also occur on the trunk and extremities in less than 10% of cases [7-8]. This neoplasm is usually asymptomatic, but some patients may experience pain [9-11]. Cases with multiple lesions tend to be hereditary [12-15] and clinically present as multiple, smooth, dense, pink to red nodules of various sizes [16]. In such cases, the tumours can grow for a long time. However, malignant transformation of a multiple or solitary cutaneous cylindroma is quite rare [17].

The histogenesis of skin cylindroma remains the subject of vigorous and controversial debate [18-21]. However, a previous immunodetection study showed that cylindroma probably originated from an epithelial hair follicle [22]. A recent immunohistochemical study with CD200 and other stem cell markers also showed that the hair follicle may also be the source of the cylindroma [23]. Although Brook-Spiegler syndrome (BSS), familial cylindromatosis (FC) and multiple familial trichoepic lyoma (MFT) were originally described as separate nosological diseases, these pathologies show overlapping phenotypic manifestations. At the same time, different manifestations of each disease have been reported in the same family. Thus, these three disorders are considered to represent the phenotypic spectrum of a single disease.

The sex ratio, according to different authors, ranges from 1:1 (female predominance) to 3:2 and 9:1. In 80% of cases they are patients over the age of 40.

The main treatment is surgical removal and high-dose radiation [24-27]. At the same time, dermal cylindroma has a high recurrence rate due to the technical difficulties of surgical and/or radiation treatment. In addition to the radicalism of tumour removal, it is known that the indicators of efficacy of treatment are the achievement of functional and cosmetic results and the reduction of the complication and recurrence index [28]. Photodynamic therapy (PDT) is considered to be the most relevant to the above requirements.

PDT is a two-component treatment. The photosensitizer (PS), which is the first component, accumulates and is retained in tumour tissues longer than in healthy tissues. The second component is light (laser) exposure. By locally irradiating the tumour with light of a certain wavelength corresponding to the absorption peak of the photosensitizer, a photochemical reaction starts in the tumour, producing singlet oxygen and oxygen radicals, which have a toxic effect on the tumour cells. Hence, the tumor is resorbed and gradually being replaced by connective tissue [29]. PDT for skin cancer and its appendages will be used in the next cases: the presence of a tumor occurs in places that are "inconvenient" for the traditional method of treatment (face, head, per auricular area), a high risk of complications during therapy in elderly and somatically burdened patients, and the refusal of other methods of treatment, as well as in the form of palliative care [30-33].



Figure 1. Photo before radiotherapy

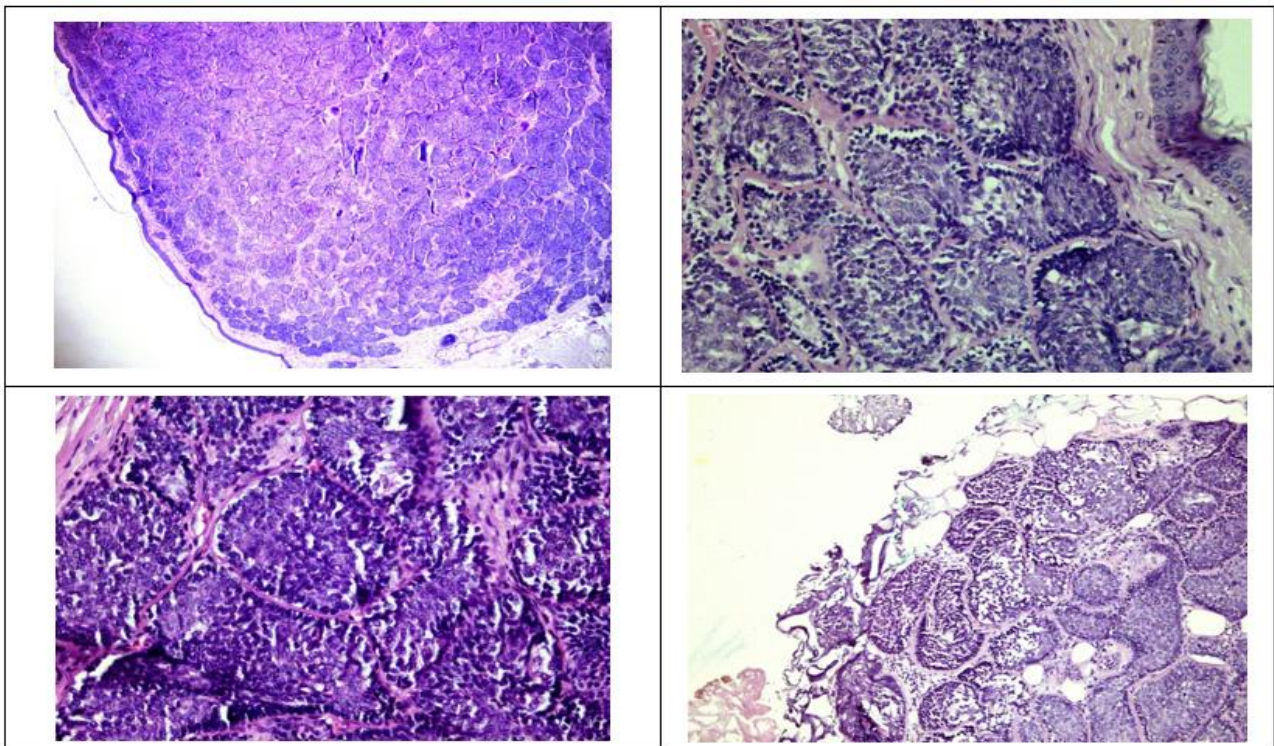


Figure 2. Histological picture before radiotherapy

MATERIALS AND METHODS

Patient R. is a 44-year-old Asian woman. She first discovered a single, pale pink, dense-elastic mass on her scalp in 2008. She had no genetic history - no family history of similar masses. These masses had been surgically removed by a surgeon on referral. She has not had any further growths for over 10 years. In 2019, the tumour recurred - multiple masses appeared on the scalp, occipital region, anterior chest wall (**Figure 1**). A biopsy was performed and the histological conclusion was that the skin cylindroma was malignant (**Figure 2**). A palliative course of conformal radiation therapy with intensity modulation (fluence) within the beam during irradiation (RapidArc), image-guided radiotherapy (IGRT) was performed in the oncological clinic on the scalp tumours with SFD 3 Gr, TFD 51 Gr. The therapy resulted in reduction of

masses up to 50%, complete remission was not achieved. However, after 3 months, the process has progressed with continued growth of existing masses and the appearance of new lesions. She has been recommended photodynamic therapy (PDT).

At the time of examination, multiple skin tumour-like masses of predominantly circular shape, ranging in size from 0.3 to 2.0 cm by 0.1-0.3 cm protruding above skin level, light pink color, softly elastic consistency was identified on the scalp. Some of the masses were confluent (**Figure 3**). Similar masses were detected on the skin of the anterior abdominal wall, skin of the back with sizes ranging from 2×4 to 3×6 cm (total number of masses on the scalp and torso-64). In view of the continued growth after radiation therapy, a repeat biopsy was performed. Histological report: eccrine skin cylindroma with signs of grade III curative pathomorphosis (**Figure 4**).

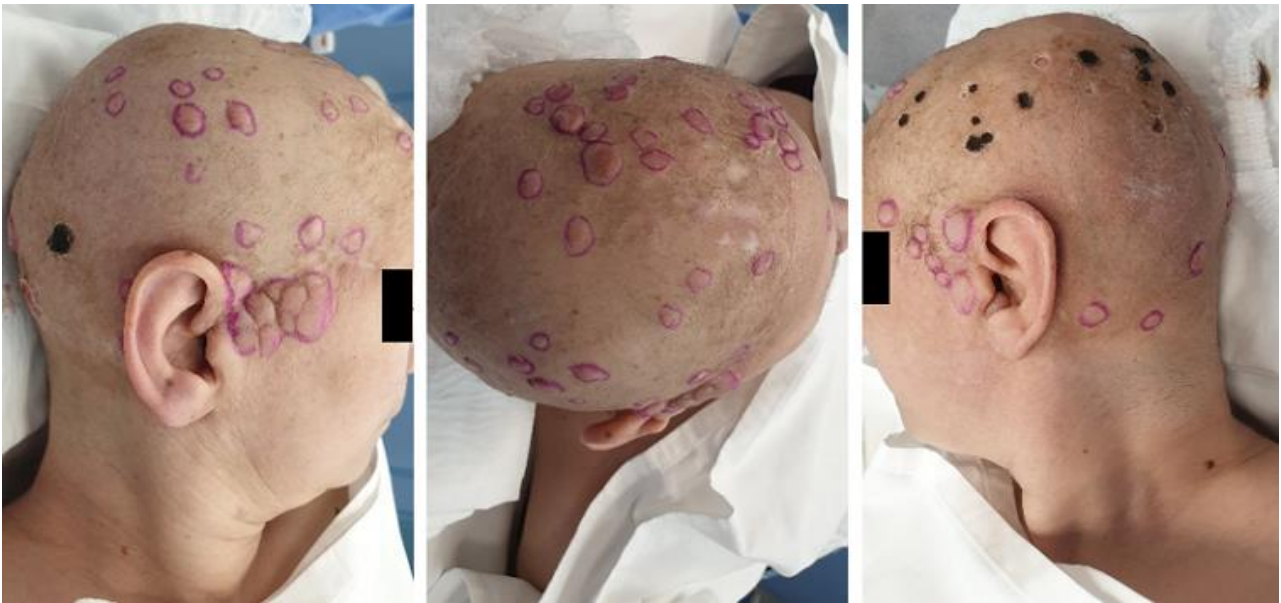


Figure 3. Photo before PDT

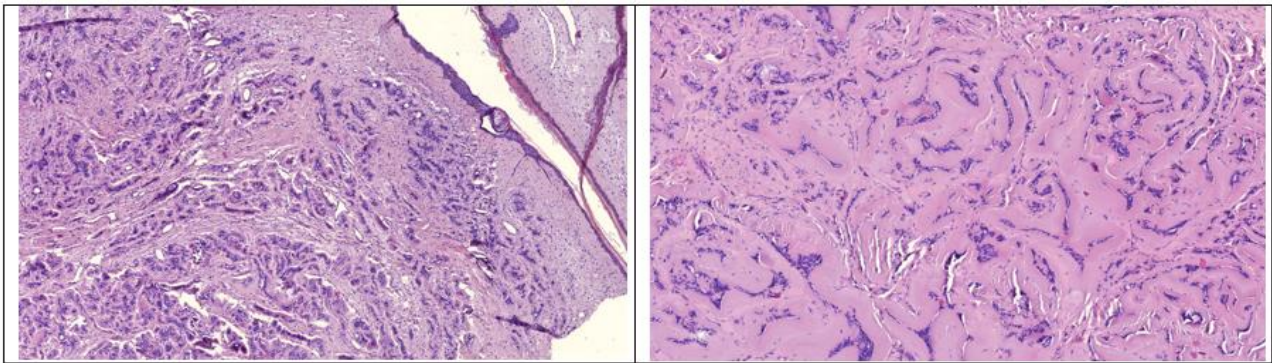


Figure 4. Histological picture after radiotherapy

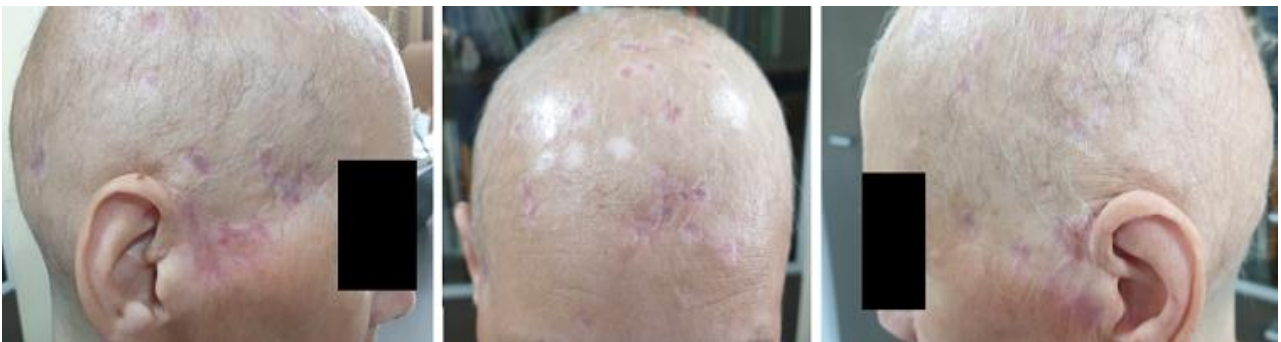


Figure 5. Photo 2 months after PDT

Multistage PDT was performed. The first stage involved the laser treatment of 25 small lesions-up to 1 cm in size-under local anesthesia. After 3 weeks, the remaining 39 were treated under general anesthesia.

As a photosensitizer, Photolon was administered to the patient at a dose of 2 mg/kg weight 2 hours before the PDT session. Photolone is a second-generation photosensitizer and is a chlorine E6 derivative with an absorption peak in the long-wavelength region of the spectrum equal to 662nm. This wavelength in the absorption spectrum allows light, excitatory photo activity of the drug, to penetrate deep into tissues by 0.5-1 cm. Laser treatment was performed with Lahta-Milon laser

light guide, 3W output power, wavelength 662nm. Each lesion was treated for 1 to 3 minutes. Total laser exposure time was 135 minutes.

Thereafter, the patient was examined regularly, the growth of old and new masses was not observed. The necrotic lesions in the area of the masses were gradually replaced by scar tissue. Complete scarring was seen after 2 months (**Figure 5**). Written informed consent was obtained from the patient for publication of this case and any accompanying images. This case was conducted in compliance with the principles of the Declaration of Helsinki.

CONCLUSIONS

Cylindroma is a benign tumour of the dermal appendages, a group of neoplasms that form from the cells of the oil and hair apparatus, the sweat glands of the skin, and in some cases, especially in multinodular forms, can become malignant. Cylindroma mostly affects the scalp. Surgical excision is the main method of treatment for a cylindroma. However, this method of treatment is ineffective in the node form. In our case, PDT has been demonstrated to be highly effective, organ-preserving and gentle, with no local or general complications, and is well tolerated. It is also possible to perform the procedure on an outpatient basis.

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