Plica Polonica in a Patient on Chemotherapy: A Case Report with Review of Literature

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ABSTRACT

Plica polonica (plica neuropathica) is an uncommon entity characterized by irreversible twisting and matting of hair resulting in a hard impermeable mass of keratin. Although the exact mechanism is not fully understood, it has been attributed to longitudinal splitting or weathering of hair shaft due to vigorous friction and frequent use of harsh shampoos and harsh cleansers and/or due to keeping long hair with poor hair care or neglect, parasitic infection. We describe an unusual case of plica polonica occurring in a patient of lung adenocarcinoma on chemotherapy and review the literature. Anagen effluvium due to chemotherapy (paclitaxel and carboplatin) and use of an uncustomary shampoo by the patient are the causative factors for matting of the hair.

Key words: Chemotherapy, neuropathica, plica, polonica, shampoo

INTRODUCTION

Plica polonica (plica neuropathica or trichoma) is an uncommon entity characterized by irreversible twisting and matting of hair resulting in a hard impermeable mass of keratin. Although mild matting can be normally seen in those with the long hair, the absolute uncombable condition is termed as plica polonica. Herein, we describe a case of a middle-aged female patient, a known case of lung adenocarcinoma on chemotherapy, presenting with plica polonica and review the literature.

CASE REPORT

A 48-year-old female presented to our department with matting of the hair for the past 2 days. The patient was a diagnosed case of lung adenocarcinoma and was on chemotherapy (paclitaxel and carboplatin) for the past 3 weeks. Two weeks after receiving the first cycle of chemotherapy, patient noticed sudden onset of hair loss from the scalp, especially from the front and the sides. This was accompanied with hair entanglement which led to difficulty in combing hair. As the hair loss and difficulty in combing increased over the next 2 days, the anxious patient purchased and used a new shampoo. Following this, the hair got severely matted together. There was no associated itching, pain, or foul odor. Her regular hair cleansing agent for more than the past 10 years was fuller’s earth (“multani mitti”) and there is no history of any kind of chemical treatment of hair such as dying or straightening.

On examination of the scalp, there was diffuse nonscarring alopecia in the frontal and bilateral temporal areas along with a firm to hard mass of matted hair over the vertex and occiput and extending down for a length of 20 cm [Figures 1 and 2]. Separation of hair strands was not possible. There were no signs of inflammation or infestation. Rest of the dermatological and systemic examination including psychiatric assessment was normal. On pull test, the hair came out easily with roots and light microscopy examination showed...
anagen hair with focal areas of shaft damage. Dermoscopy of the matted hair revealed irregular arrangement of intertwining hair shafts resembling a bird’s nest [Figure 3]. Intact follicular ostia were visible on dermoscopy of the temporal and frontal areas [Figure 4]. The potassium hydroxide preparation was negative for fungal elements.

Her routine investigations showed anemia (hemoglobin 8.8), normal total (4200) and differential leukocyte count, and decreased platelet count (88,000). Based on history and examination findings, anagen effluvium following chemotherapy and use of an uncustomary shampoo could be attributed as etiological factors of plica polonica in our patient. Cutting of the matted hair was advised and counseling regarding chemotherapy-associated hair loss and proper hair care measure was done.

**DISCUSSION**

Le page coined the term plica neuropathica in 1984 when he described a young female with sudden onset of tangled scalp hair. He named so as he believed that certain “nerve force” was responsible for matting of hair. It is comparable to felting of wool fibers which is a phenomenon of compaction of fibers when exposed to friction and compression.[2] Matting of hair is of multifactorial etiology [Table 1]. The predisposing factors are long unkempt hair, excessive trauma, and use of harsh shampoo. These cause degeneration of the hair cuticle which is formed by sulfur-rich flat cells arranged in tile-like imbricated pattern. Rubbing of the hair toward the scalp produces positive charge and rubbing toward the tip produces negative charge. This potential of hair shafts to become dielectrically charged could develop electrostatic attraction between adjacent hair shafts and result in matting. Cases of plica polonica after the use of herbal shampoo have been described.[3] Moreover, it can be commonly seen among religious Sadhus in the form of dreadlocks.[4] Recently, however, some interesting cases have been reported, include plica polonica associated with chemotherapeutic drugs (azathioprine,[5‑7] methotrexate,[7] rupoid psoriasis,[8] and pediatric patient[9‑10] presenting with matting of the hair. Uncombable hair syndrome forms a differential diagnosis of plica polonica. Its description and clarification of synonymously used terms such as plica polonica, plica neuropathica, and dreadlocks are shown in Table 2.

The case presented here is unusual as plica polonica which is caused by two factors – anagen effluvium caused by chemotherapy and use of a new shampoo by the patient. The cytotoxic agents (paclitaxel and carboplatin in our case) act...
Hairdressing (hydrogen peroxide, ammonium thioglycolate, sodium hydroxide)
Excessive combing and backcombing
Excessive hair massage

Table 2: Differential diagnosis of matting of the hair

| Clinical variants | Description |
|-------------------|-------------|
| Plica polonica     | Irregular and irreversible twisting and intertwining of hair due to Polish custom of wearing tight fur caps. Moreover, it refers to a hairstyle based on the superstitious belief that neglected matted hair would act as catchment for illness leaving the body and thereby symbolize health. |
| Plica neuropathica | It is similar to plica polonica but is seen in psychologically disturbed individuals. |
| Dreadlocks         | The evidence of intentional formation of evenly sized dreadlocks with matted hair can be found in Indian holy scriptures and is even seen in contemporary “Sadhus” and “yogis.” It can be produced using certain herbs and tar. It represents more than just a hairstyle. It is believed to be a way to connect with the divine and represents free spirit. Contrary to the popular belief, the hair should be washed regularly so as to maintain these dreadlocks. |
| Uncombable hair syndrome | A rare autosomal dominant hair shaft disorder in which premature keratinization of inner root sheath results in disorganized unruly hair that cannot be combed flat. The characteristic longitudinal grooves along the hair shaft, along with the triangular or kidney-shaped cross-section are seen microscopically. There is no definitive treatment, and most cases improve with the onset of puberty. |

Table 1: Etiological factors for matting of the hair

| Factors            | Description                                                                 |
|--------------------|-----------------------------------------------------------------------------|
| Behavioral         | Neglect of hair (not combing, cutting, or washing hair)                     |
|                    | Psychiatric disturbances (schizophrenia)                                    |
|                    | Intentional hair styling                                                    |
|                    | Religious reasons                                                           |
| Physical           | Excessive combing and backcombing                                            |
|                    | Excessive hair massage                                                      |
|                    | Exposure to high temperature (steam therapy, hair straightening)            |
|                    | Electrostatic forces                                                        |
| Chemical           | Hairdressing (hydrogen peroxide, ammonium thioglycolate, sodium hydroxide)  |
|                    | Shampoo (herbal or nonherbal)                                               |
|                    | Cationic detergents (form micelles and damage hair cuticle)                 |
| Medical            | Infestation (lice)                                                          |
|                    | Infection                                                                  |
|                    | Chronic illness                                                            |
|                    | Febrile illness                                                            |
| Socioeconomic      | Remote rural/hilly areas                                                    |
|                    | Unavailability of water                                                     |
|                    | Inaccessibility to hair care products                                       |

*Sweating associated with concurrent febrile illness may moisten the hair. This when combined with the common practice of covering the head may produce sufficient frictional forces to allow matting of hair.

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