

Localized Trichorrhexis Nodosa Arising From Habitual Rubbing

Duk-Kyu Chun, M.D., Sang-Man Park, M.D., Jae-Ju Jo, M.D.,
Ho-Chul Choi, M.D., Sang-Mee Seok, M.D.*

Department of Dermatology, College of Medicine, Inje University, Seoul, Korea
Department of Dermatology, College of Medicine, Hallym University, Seoul, Korea*

Trichorrhexis nodosa(TN) denotes small node-like swelling with a loss of cuticle of the hair shaft through which the hair readily fractures. The basic cause of TN is mechanical or chemical trauma, and a contributing factor is an inherent weakness of the hair shaft.

We report a case of localized TN in a 37-year-old male. He had an ovoid hair patch with multiple small white-gray dotted and stubby hairs localized to the right occipital scalp.

TN is known to be the commonest of all hair shaft anomalies (Price, 1975). However TN is rarely reported, and there have been only four reports in Korean dermatological literature, to our knowledge, which might be due to underdiagnosis of this disorder. We postulated that diagnostic difficulty lies in the discrepancy between terminology and gross morphological findings. (*Ann Dermatol* 11(4) 232~235, 1999).

Key Words : Localized trichorrhexis nodosa, Node, Hair shaft anomaly.

Trichorrhexis nodosa(TN) is a kind of hair shaft anomalies, with characteristic small white nodes. TN is known to be the commonest of all hair shaft anomalies (Price, 1975). However TN is rarely reported. Localized TN develops in patches of lichen simplex, trichotillomania, and other pruritic dermatoses. It is known to develop mostly as a consequence of scratching and frequently associated with pruritus and some author describes that it is considered as a consequence of pruritus(Francisco, 1989). But we experienced a case of localized TN developed from habitual rubbing of the scalp hairs.

CASE REPORT

In August of 1996, a 37-year-old, otherwise

healthy man visited our clinic with the complaint of whitish dots on his scalp hairs, which were coarse and easily broken. He had noticed the changes for the first time, about 10 days before. He was right handed and had a habit of rubbing his right occipital hairs, when he was emotionally unstable. He had washed his hair everyday with soap and shampoo. Family history and past medical history was non-contributory.

On physical examination, there was a well-circumscribed ovoid 4.5cm × 2.5cm sized patch with multiple small white-gray dotted and stubby hairs localized to the right occipital scalp. The multiple nodules on the hair were more prominent on the distal half on the hair shaft(Fig. 1, Fig. 2). Hairs in other areas of scalp were not affected. The scalp showed no abnormal findings such as lichenification. In light microscope, hair shafts showed a defect or "node-like" appearance, resembling the ends of two brushes pushed into one another(Fig. 2, inset). In some hairs, transverse fracture has occurred with typical "brush-like" appearance(Fig. 3). Under polarized light, affected hairs showed alternate light and black zones. Scanning electron microscopy demonstrated the characteristic nodular

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Reprint request to : Duk-Kyu Chun, M.D., Department of Dermatology, Inje University, Seoul Paik Hospital, 85, 2-ga, Jo-dong, Jung-ku, Seoul 100-032, Korea

Tel : 82(Korea)-2-2270-0076

Fax : 82(Korea)-2-2278-0792

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Fig. 1. Physical examination showed well-circumscribed oval patch with multiple hair abnormalities.

Fig. 2. Close-up view of defective hair shaft showed multiple small white gray dots.

Inset: Under light microscopy, node-like swelling was found, resembling the ends of two brushes pushed into one another ($\times 400$).

Fig. 3. Transverse fracture has occurred with typical "brush-like" appearance ($\times 400$).

Fig. 4. Scanning electron microscopy of hair showing longitudinal fissuring of the cuticle (SEM, $\times 700$).

swelling with longitudinal fissuring of the cuticle (Fig. 4), and the diagnosis of localized TN was made. No specific treatment was planned but, he was advised not to rub or wash his hair too often.

DISCUSSION

TN is a disorder of the hair shaft, with distinctive clinical and structural features. Hair shaft shows nodose swellings arranged at regular intervals. A typical defect or "node" appears in the light microscope as a hair shaft fracture in which individual spindle cells of the hair cortex splay out (Price, 1975). Electron microscopic examination shows longitudinal fissures and fractures of the cortex with loss of cuticular scale. These abnormalities produce bulges, explaining the node-swellings under light microscopy. Complete fracture and separa-

tion in one of these areas gives rise to the typical paint brush effect (Dawber and Comaish, 1970, Arnold et al, 1990). Scalp hairs are usually involved, but pubic hair, eyebrows, or eyelashes can occasionally be involved, also (Whiting, 1987).

The basic cause of TN is mechanical or chemical trauma, although several hereditary syndromes exist which predispose to weakness of the hair shaft (Owens et al., 1966; Chernosky et al., 1966). The supposed pathogenesis of TN is a localized loss of cuticular cells. The exposed cortical fibers later separate and fray, causing a nodular swelling of the hair shaft. Individual cortical fibers start to fracture, producing the appearance of two paintbrushes thrust into one another (David et al, 1987). Sources of chemical trauma include excessive salt water bathing, shampooing, setting, "perming", and dyeing of hair (David, 1987). Chernosty et

al.(1966) reported patients with genitoinguinocrural involvement, and suggested that the hair changes were brought about by scratch-induced damage, because all of them complained of itching on the affected areas..

TN is classified into congenital TN and acquired TN. Acquired TN is further classified into three groups, acquired proximal TN, acquired distal TN, and acquired localized TN(Whiting, 1987). Acquired proximal TN is common in blacks, usually after years of hair straightening with hot combs or permanent waves. The TN and breakage of hair develop abruptly in the proximal hair shaft, resulting in alopecia in areas subject to friction from trauma. Acquired distal TN is common in white and oriental persons. The nodes appear on the distal few inches of hair, which look dull and uneven and show drying, thinning, and splitting. A history of excessive brushing, back combing, and other hair styling is common. Acquired localized TN can occur in patches of lichen simplex, trichotillomania, and other pruritic dermatoses. It rarely appears spontaneously in circumscribed patches 3 to 4 cm across in the scalp, beard, or mustache. Our case appears to be induced by habitual rubbing of the hair, resulting in localized patches corresponding to the rubbed areas. We think acquired localized TN is the most likely diagnosis.

Francisco(1989) described that localized TN occurs most often as a consequence of scratching and frequently associated with lichenification, and should be considered as a cutaneous marker of pruritus. However, Yoo *et al.*(1995) reported a case of localized TN arising from repeated trauma by a helmet, without pruritus. We also experienced that localized TN could develop from habitual rubbing of the hair, without any pruritus or lichenification. These cases demonstrate that localized TN is not always a marker of pruritus.

TN is known to be the commonest of all hair abnormalities, but is rarely reported, which might be due to under-diagnosis of this disorder. The terminology of TN represents "nodose tearing of the hair" without any mention of hair colors. But in clinical practice, the gross morphology shows regularly spaced "whitish small dots or specks". These clinical features even resemble dandruff, nit of pediculosis capitis, pityriasis amiantacea, or hair casts, and could be misdiagnosed as such. Our patient's chief complaint was brittle and coarse

hairs. Physical examination showed whitish dots on the hairs, and pediculosis capitis was initially suspected, and TN was not suspected or diagnosed until light microscopic examination revealed "nodose tearing" of hairs. We speculated that the diagnostic difficulties in clinical practice lies in the discrepancy between terminology and clinical findings.

The treatment for patients with TN is to minimize trauma. Mild detergent shampoos should be used very gently. All affected hairs should be cut short. Back combing, tight ponytails, and hairbrushes should be avoided and then a cure may occur after 2 to 4 years, perhaps depending on the formation of new anagen hairs(Whiting, 1987 ; Whiting, 1994).

TN is a rarely reported, but probably more common disorder(Smith, 1994).

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