Subepidermal Calcified Nodule

Seung Hye Paek, M.D., Yong Hyun Kim, M.D., Do Won Kim, M.D.,
Jae Bok Jun, M.D., Sang Lip Chung, M.D.

Department of Dermatology, Kyungpook National University School of Medicine, Taegu, Korea

Subepidermal calcified nodule(SCN) is a form of calcinosis cutis which is usually present as a single small, raised, hard nodule with verrucous surface.

A 13-year-old girl presented with a 10-month history of a ricegrain-sized, hard, yellowish white papule on both upper eyelids. The lesions were asymptomatic and had increased slowly in size. An excisional biopsy specimen of the left upper eyelid showed acanthosis and narrow pointed rete ridges of the epidermis, and closely aggregated deposition of basophilic material in the uppermost dermis. The material in the dermis did not stain with von Kossa. It was confirmed as calcium deposition by staining with alizarin red S which is far more specific for calcium than the von Kossa stain. (Ann Dermatol 8:(4)269~271, 1996).

Key Words : Subepidermal calcified nodule, Von Kossa stain, Alizarin red S stain

Subepidermal calcified nodule(SCN) is a form of calcinosis cutis which is not associated with biochemical abnormalities, other dermatologic disorders, or with systemic illness and recognized as a definite entity with a characteristic histopathology[1,2]. It usually presents as a single small, raised, hard nodule with verrucous surface and histologically there is extensive deposition of calcium in the dermis which stains with PAS, von Kossa and alizarin red S[1,3,4]. We present herein an unusual case in which clinical and histopathological features were characteristic and the calcific nature of the material in the dermis was confirmed by staining with alizarin red S and not with von Kossa.

REPORT OF A CASE

A 13-year-old girl visited our Department because of a rice-grain-sized, hard, yellowish white papule on each of upper eyelids for 10 months(Fig. 1). An asymtomatic firm yellowish white papule developed on the medial side of the left upper eyelid 10 months ago, and then a similar lesion developed on the right upper eyelid 7 months later. Both lesions had increased slowly in size.

Past history was not contributory. She did not have any other dermatologic disorders or systemic illness and there was no history of injury to the eyelids. Family history was also not contributory. Physical examination was unremarkable except the skin lesion

The findings of laboratory evaluation including complete blood count, urinalysis, stool examination, VDRL, liver function test, serum lipid profile, serum calcium and phosphorus, alkaline phosphatase, creatinine and blood urea nitrogen were all within normal limits.

An excisional biopsy specimen of the lesion on the left upper eyelid showed hyperkeratosis, marked irregular acanthosis and narrow pointed rete ridges in the epidermis and closely aggregated deposition of basophilic material in the uppermost dermis(Fig. 2). The material in the dermis was PAS-positive but did not stain with von Kossa. The same results were obtained in other university laboratories. It was confirmed as calcium by staining with alizarin red S at pH 4.2(Fig. 3).

The papule of the left upper eyelid was treated

Received April 30, 1996.
Accepted for publication July 4, 1996.
Reprint request to : Seung Hye Paek, M.D., Department of Dermatology, Kyungpook National University School of Medicine, Taegu, Korea
This case was presented at the 47th Annual Meeting of the Korean Dermatological Association on October 14, 1995.

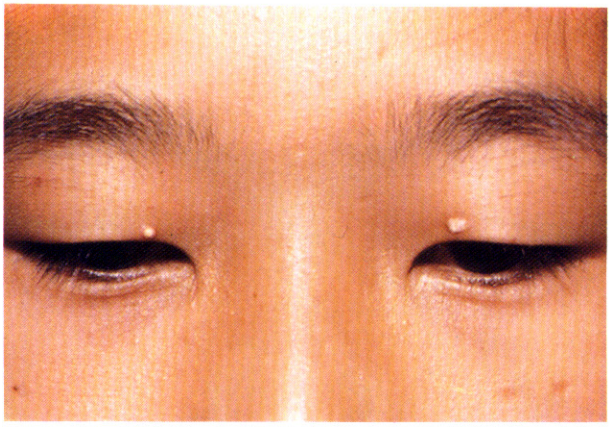

Fig. 1. A rice-grain-sized yellowish white papule on each of upper eyelids.

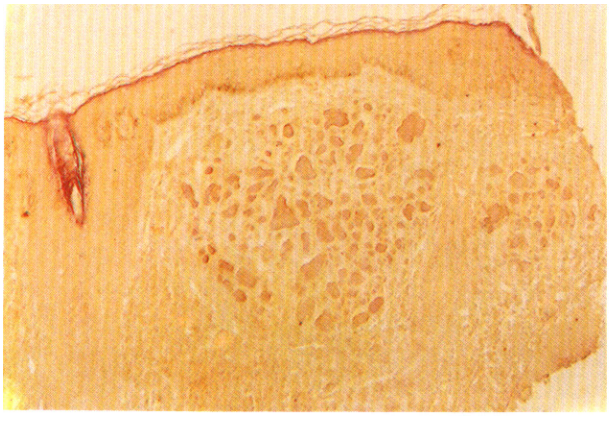

Fig. 3. Reddish orange deposition in the uppermost dermis confirmed as calcium(Alizarin red S stain at pH 4.2, ×100).

with excisional biopsy and the other was treated with CO_2 laser. During 15 months of follow-up, there was no recurrence.

DISCUSSION

There are several varieties of calcium deposition in skin. Calcinosis cutis is classified by Lever and Schaumburg-Lever into metastatic calcinosis which develops as the result of hypercalcemia or hyperphosphatemia; dystrophic calcinosis in which the calcium is deposited in previously damaged tissue; idiopathic calcinosis which shows no underlying disease; and subepidermal calcified nodule

Although subepidermal calcified nodule was described as cutaneous calculi in 1877 by Duhring, it was not defined as an entity until Winer[5] classified it as a special form of calcinosis circumscripta in 1952, and named by Woods and Kellaway in

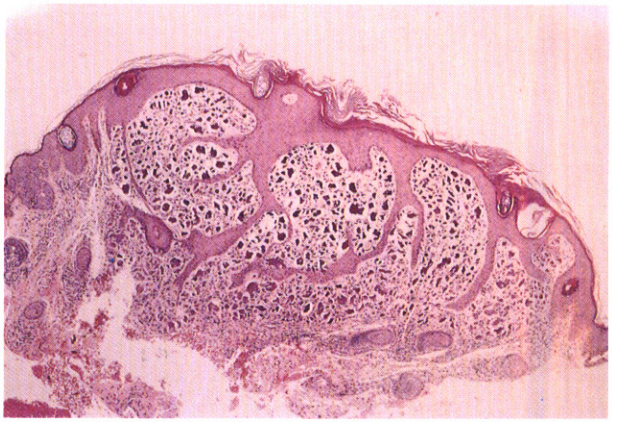

Fig. 2. Marked irregular acanthosis and narrow pointed rete ridges in the epidermis and deposition of basophilic material in the uppermost dermis(H & E stain, ×40).

1963[3].

The lesion is usually a single small, raised, hard nodule, but there may be multiple nodules[2]. Most of the nodules are white or white-yellow, and the surfaces of them are verrucous or mammillated[6]. It tends to involve the exposed skin, most often occurring on the face[1,6]. Most patients are children, and it is not associated with biochemical abnormalities, other dermatologic disorders, or with systemic illness[2].

Pathogenesis of the disease is still unexplained. Origins that have been suggested for the lesion include the following: hamartoma of sweat duct origin[5], calcification secondary to traumatic fat cell necrosis[7], nests of calcified nevus cells[8].

Histopathologically, the calcified material in the uppermost dermis is characteristic. In large nodules, it may extend into the deep layers of the dermis but never into the subcutaneous tissue[1,3]. The calcium is present as granules, globules or large masses, which occasionally contain well-preserved nuclei. Macrophages and foreign-body giant cells may be seen around the large homogeneous masses[3]. Calcium granules may be seen within the epidermis, indicative of transepidermal elimination[7]. The epidermis is verrucous and often thickened, with acanthosis, hyperkeratosis and sometimes considerable patchy parakeratosis. Deep keratin-filled pits and narrow pointed rete ridges commonly extend far into the nodule[3].

The staining properties of the calcified material vary considerably and may depend on the treat-

ment of the tissue especially the length of decalcification. The calcified material is basophilic but sometimes eosinophilic in hematoxylin-eosin stain. It is usually PAS-positive, the granules stain more strongly than the masses. The material also stains with von Kossa and alizarin red S which are used for the demonstration of calcium, but it does not always stain with von Kossa[3].

In our case, the clinical and histopathologic features were compatible with subepidermal calcified nodule. Because the material in the dermis was von Kossa-negative, the diagnosis was confirmed with alizarin red S. The alizarin red S stain is more specific for calcium because it is based on the formation of a reddish-orange complex between calcium and the dye while the von Kossa stain is actually a silver reduction technique demonstrating anionic, mainly phosphate and carbonate, salts[4]. We wonder why our case was von Kossa-negative and what is the material in the dermis. Because the alizarin red S technique is particularly useful in the identification and detection of small quantities of calcium[9], there might be too small quantities of calcium in the specimen. The result could be due to variations in technique and the deposits might be calcium combined with anionic salt that is not demonstrable by von Kossa method. We suspect that the deposits of present case are calcium phosphate rather than calcium oxalate, which may have a negative reaction with von Kossa but stains with alizarin red S at pH 7.0 not at pH 4.2[10]. Moreover calcium phosphate is more popular than calcium carbonate in the calcium deposition of human bodies[10].

We report the case because it is thought to be rare and any case of subepidermal calcified nodule that was von Kossa-negative, to our knowledge, has not yet been described in Korea.

REFERENCES

1. Lever WF, Schaumburg-Lever G: Histopathology of the skin, 7th edition. JB Lippincott, Philadelphia, 1990, pp 466-469.
2. Shmunes E, Wood MG: Subepidermal calcified nodules. Arch Dermatol 105:593-597, 1972.
3. Woods B, Kellaway TD: Cutaneous calculi - subepidermal calcified nodules. Br J Dermatol 75:1-11, 1963.
4. Demis DJ: Clinical dermatology, 22nd revision. Lippincott-Raven publishers, Philadelphia New York, 1995, unit 12-12, pp 1-17.
5. Winer LH: Solitary congenital nodular calcification of the skin. Arch Dermatol 66:204-211, 1952.
6. Ferry AP: Subepidermal calcified nodules of the eyelid. Am J Ophthalmol 109:85-88, 1990.
7. Duperrat B, Goetschel G: Calcification nodulaire solitaire congenitale de la peau. Ann Dermatol Syph 90:283-287, 1963.
8. Steigleder GK, Elschner H: Lokalisierte calcinosis. Hautarzt 8:127-128, 1957.
9. Bancroft JD, Stevens A: Theory and practice of histological techniques, 3rd edition. Churchill Livingstone, New York, 1990, pp 245-267.
10. Ohtake N, Uchiyama H, Furue M, Tamaki K: Secondary cutaneous oxalosis: Cutaneous deposition of calcium oxalate dihydrate after long-term hemodialysis. J Am Acad Dermatol 31:368-372, 1994.