뜸 화상으로 발생한 피부석회증을 수술중 초음파를 이용하여 절제한 사례

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Excision of Calcinosis Cutis Caused by Moxibustion Burn Injury Using Intraoperative Ultrasonography Determining the Complete Resection Range

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A 46-year-old female presented a mass on her right lower leg where she had a burn injury due to moxibustion 10 years ago. Physical examination revealed a 3 cm sized firm nodule with tenderness. Plain radiograph was performed and it revealed well-defined calcifications. According to the history of moxibustion burn injury and the result of plain radiograph, dystrophic calcinosis cutis caused by burn injury was suspected. The patient underwent excisional biopsy using pre-, intra-, and post-operative ultrasonography (USG). There was no sign of recurrence. Herein, we report a case of a 46-year-old healthy woman who presented with single hard nodule on the right lower leg. Our case is worthwhile in two respects. First, It is first case report of dystrophic calcinosis cutis due to moxibustion burn injury. In east asian culture, moxibustion is a commonly conducted procedure and it often induces burn injury. Second, USG was used pre-, intra-, and post-operatively to assess the shape, location, and depth of the calcinosis cutis and to determine the surgical margin. (**J Korean Burn Soc 2021;24:34-37**)

Key Words: Moxibustion, Calcinosis cutis, Resection range, Ultrasonography

INTRODUCTION

Calcinosis cutis is a rare disorder characterized by the deposition of calcium in the skin and subcutaneous tissue. Calcinosis cutis can be classified into 4 variants: idiopathic, dystrophic, metastatic, and iatrogenic [1]. There are many causes of dystrophic calcinosis cutis and

burn is one of them. Diagnosis can be done with calcium, phosphorus levels in the blood, simple radiograph or sonography [2]. Surgical removal is a main treatment for calcinosis cutis. Before the surgery, resection margin has been set by simple radiograph [2,3]. Although this method has the advantage of being simple, there are disadvantages of being exposed to radiation, and when the shape of mass is complicated, it is difficult to determine the resection margin due to the difficulty of checking the exact shape and location. Ultrasonography (USG) has been widely used for nearly 30 years. USG allowed non-invasive investigations to determine the size, contour, structure and depth of cutaneous lesions. Also, USG is a noninvasive method allowing the real-time assessment of the cutaneous structure well [4].

Herein, we report a case of complete excision of a calcinosis cutis with better aesthetic outcome using intra-operative USG. The study was performed in accordance

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Fig. 1. 3 cm sized nodule located in the middle of the calf.

with the principles of the Declaration of Helsinki. The patient provided written informed consent for the publication and the use of her images.

CASE REPORT

A 46-year-old female presented a little painful and palpable mass on her right lower leg since more than 3 years ago. The patient had specific past history receiving repetitive moxibustion on the same site at the oriental clinic 10 years ago. Also, the patient had mild burn injury due to moxibustion. Physical examination revealed a 3 cm sized firm nodule with tenderness (Fig. 1). The laboratory investigations revealed within normal serum calcium (9.7 mg/dL, normal: 8.0~10.5 mg/dL), phosphorus (4.0 mg/dL, normal: 2.5~5.5 mg/dL). Biochemical examinations gave normal results for complete blood count, erythrocyte sedimentation rate, blood sugar, uric acid, electrolyte, liver function and kidney function tests. Plain radiograph was performed to discriminate calcinosis cutis and it revealed well-defined calcifications (Fig. 2). According to the history of moxibustion burn injury and the result of plain radiograph, dystrophic calcinosis cutis caused by burn injury was suspected. As she complained of pain, excisional biopsy was performed. Before surgery, Ultrasound imaging of the mass was performed using a scanner with a 12-5-MHz linear-array probe (Philips CX50; Philips Medical Systems, Bothell, WA) to set the resection margin consid-

Fig. 2. (A) Preoperative plain radiographs of the lower leg of the patient showing abnormal calcification in the lower leg on dorsal aspect. (B) Postoperative plain radiographs shows that nodule was completely removed.

Fig. 3. Ultrasound image of the lower leg on the dorsal aspect showing calcification as hyperechoic to other subcutaneous tissues, giving a distal acoustic shadow.

ering the shape, location, and depth of the mass. The probe was wrapped aseptically using probe cover. Ultrasound image of mass showed calcification as hyperechoic to other subcutaneous tissues, giving a distal acoustic shadow (Fig. 3). During surgery, the authors checked posterior shadowing of calcification using USG to minimize resection margin and confirm that it was completely removed without any remnant. Before skin repair, some sterile ultrasound gel in the dead space was filled and Minimizing dead space by gently compressing the skin with a probe was done to check remnant mass. By using USG, small defect size contributed to choosing an option of local flap coverage. Bilateral advancement flap was performed without skin tension. After surgery, the lesion was completely healed without complication such as infection or hematoma (Fig. 4). On histology, there were irregular deposits of intensely basophilic acellular material in the dermis and subcutaneous tissue. The calcified de-

Fig. 4. (A, B) Intraoperative photograph. 3×4 cm sized calcified mass was removed.

posits are well circumscribed with a rim of hyalinization (Fig. 5). There was no recurrence at 6-month follow-up. The patient underwent 3 sessions of fractional LASER for scar. The scar remained minimal.

DISCUSSION

There are several types of calcinosis cutis. The dystrophic type of calcinosis cutis is associated with infection, inflammation, burn injury, cutaneous neoplasm, or connective tissue diseases in which preexisting damage to the skin results in calcium deposits [1]. Among the causes, dystrophic calcinosis cutis on a previous burn site has rarely been reported. The most common diagnostic method of calcinosis cutis is simple radiograph which can easily check the presence of calcinosis cutis. However, it is difficult to determine the exact surgical range with simple radiograph alone since calcinosis cutis can be located at any depths and has various shapes such as reticular, nodular, linear, sheet-like and amorphous shapes. On the other hand, USG has a low risk of radiation and can appropriately set an accurate resection range. Considering the above-mentioned contents, our case is worthwhile in two respects.

First, it is noteworthy that our patients had contact burn history on the site of dystrophic calcinosis cutis due to moxibustion. Dystrophic calcinosis cutis in a burn scar

Fig. 5. Microscopic finding shows dark purple fractured deposits of calcium in subcutaneous tissue. The calcified deposits are well circumscribed with a rim of hyalinization. (Hematoxylin and eosin. ×40).

was first described in the previous report in 1964 as two cases of dystrophic calcinosis cutis in lower extremities that originated on burn scars [5]. It is presumed that an inflammatory process or infection occurred due to repetitive moxibustion burns of the legs, which may have led to gradual calcium deposition. According to previous literatures, the average duration from burn to calcification is 31 years. Mechanism of dystrophic calcinosis cutis from burn scar is not well understood. There are two hypotheses present. First, it is suspected that burn trauma may damage cell membrane elevating intracellular calcium level. It produces hydroxylapatite crystals that constitute calcium deposits. Another hypothesis is that the damaged cells release alkaline phosphatase resulting in alkalinity of the necrotic tissue and consequent calcium phosphate deposition [6].

In our case, calcinosis cutis occurred on the same burn site after 10 years. It is presumed that cell damage occurred due to moxibustion burns of the legs, which may have led to gradual calcium deposition.

This is noteworthy especially since moxibustion is a commonly practiced oriental treatment in the East Asian countries such as South Korea and China. Moxibustion often causes burns, and tissue damage due to burns can cause various skin changes. Calcinosis cutis is one of the rare skin changes, and according to our knowledge, our case is the first case of calcinosis cutis originated from previous moxibustion burn site.

Second, it is significant in that USG was used before and during operation to determine surgical margin and

confirm complete removal during surgery. In the past, Choi et al. reported that the use of C-arm fluoroscopy during surgery can effectively map heterotopic calcification. In that continuous imaging is performed from multiple angles, the depth and location can be more accurately identified, and it is useful in multiple lesions [7]. However, due to the risk of exposure to radiation, it has a disadvantage that it is difficult to safely use for pregnant women or children. USG is a useful substitute of radiography as it is a real-time operational tool reducing an unnecessary tissue removal and preventing recurrences. In addition, the postoperative defect size is minimized so that coverage is possible only with primary closure or local flap coverage. More invasive and difficult procedures such as free flap coverage can be avoided [8].

In our case, the location, depth, and shape were checked through USG before surgery, and the surgical range was set based on it. During the surgery, posterior shadowing was checked to ensure that there were no remnants, and the range of surgery was minimized. Also, considering that the defect size was not so large, the patient was able to undergo bilateral advancement flap coverage without skin tension. After surgery, follow-up USG was performed periodically and there was no evidence of a recurrence. In addition, the patient showed excellent results in terms of scar.

USG is easy to use and has the advantage when identifying multiple lesions with various shapes in real-time setting. The authors believe that USG is a very good option in that it attributes to set the accurate and minimal surgical margin even in children and pregnant women without radiation exposure. Therefore, we report a suc-

cessful treatment of dystrophic calcinosis cutis due to moxibustion using pre-, intra-, and post-operative USG. We recommend setting the resection range and minimizing scar by using USG, especially for children and pregnant women with calcinosis cutis.

In conclusion, we report the first case of moxibustion-induced dystrophic calcification treated with USG. It is considered to be a very educational case, especially in East Asian countries with moxibustion culture.

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