**A Clinicohistopathological Analysis of Cutaneous Fibrous Histiocytomas of the Finger**

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**Abstract**

**Background:** Cutaneous fibrous histiocytoma (CFH) is a common, benign skin tumor predominantly occurring on the extremities or trunk. However, CFH on the finger is rare. **Objective:** This study was undertaken to examine the clinicohistopathological features of CFH of the finger. **Materials and Methods:** This is a retrospective study of 12 CFHs located on fingers in a tertiary hospital in Korea. All case slides were retrieved from saved files. **Results:** Ages of the CFH of the finger affected individuals ranged from 9 to 48 years with a male-to-female ratio of 1.4:1. Picker’s nodule or wart was the most common clinical diagnosis. In only 2 out of the 12 cases was the pre-biopsy diagnosis of CFH ventured. Fibrocollagenous type was the most common histological type. Majority of the cases were mitotically inactive, exhibiting only 0–1 mitoses per high-power field and there was no recurrence. Tumor cells were uniformly CD34 negative. **Conclusion:** Because CFH can resemble malignancies including dermatofibrosarcoma protubera, a lack of familiarity with the occurrence of CFH of the finger may lead to more aggressive treatment. Dermatologists should include CFH in their differential diagnosis of circumscribed nodules on the fingers to ensure proper management.

**Key Words:** Benign fibrous histiocytoma, dermatofibroma, finger

**Introduction**

Cutaneous fibrous histiocytomas (CFH) (dermatofibroma) are dermal nodules that usually appear on the lower extremities during early to mid-adult life. They are relatively common and account for approximately 3% of the skin lesion specimens received by one dermatopathology laboratory. Although any surface of the skin may be affected, the fingers, palms and soles, the scalp, and the face are considered as rare sites of involvement. Presentation on the finger, in particular, is uncommon and is not frequently reported in the literature.

Herein, we analyzed 12 patients with histopathologically proven CFH of the finger at Chonbuk National University Hospital (CNUH). The goal of this study was to evaluate the clinical and histopathological characteristics of CFHs on the fingers.

**Materials and Methods**

Between January 2001 and June 2017, 12 patients were diagnosed with CFH of the finger at CNUH. Their medical records and clinical data were reviewed and all pathologic slides were retrieved from saved files for diagnostic verification. The following clinical data were obtained: age, gender, finger and precise location, duration, tumor size, trauma history, clinical impression, treatment, follow-up period, and recurrence. Our histopathological review mainly focused on the degree of depth of invasion, epidermal changes, dominant histological types, and the number of mitosis (in ten high-power fields). In all cases, sections from paraffin blocks were subjected to appropriately controlled immunohistochemical reactions employing CD34 (Dako, Denmark), factor XIIIa (Calbiochem, Germany), CD68 (Dako, Denmark), desmin (Dako, Denmark), S 100 protein (Dako, Denmark), and α-smooth muscle actin (Dako, Denmark).

The present study protocol was reviewed and approved by the Institutional Review Board of CNUH (IRB No. 2017-09-024-001). Informed consent was
obtained from all participants before they were enrolled in the study.

Results

Of the 12 patients, four were identified as involving middle and ring finger, respectively, three as involving index finger, and one as involving the thumb. The mean age at presentation was 30.7 ± 12.7 years. CFH of the finger occurred most commonly in the fourth decade. CFH of the finger had a slight male preponderance (7/12, 58.3%) [Table 1]. The clinical data for all 12 cases are shown in Table 2. Mean duration of the disease was 11.2 months. Clinically, lesions presented as well-defined firm nodules [Figure 1a]. The dorsal location (6/12, 50%) was the most common. The fingers most frequently affected were the left second and right third and fourth. Of the 12 patients, only 4 (33.3%) had history of trauma on the finger. Seven were right-handed, 2 left-handed, and 2 ambidextrous. Picker's nodule (5/12, 41.7%) or wart (5/12, 41.7%) was the most common clinical diagnosis [Figure 1b and c]. Only two cases (16.7%) were correctly predicted as CFH. The tumors were resected via excisional biopsy (5/12, 41.7%) and further excision after incisional biopsy (7/12, 58.3%). During the follow-up period, there was no recurrence.

Details of the main histological features are shown in Table 3. The most common type was a fibrocollagenous variant (9/12, 75.0%) [Figure 2a]. The other types included cellular (2/12, 16.7%) and angiomatous (1/12, 8.3%) [Figure 2b and c]. The triad of epidermal changes included hyperkeratosis, acanthosis, and basal layer hyperpigmentation [Figure 2d]. Hyperkeratosis, acanthosis, and basal layer pigmentation were noted in 9 (75.0%), 10 (83.3%), and 8 (66.7%) of the samples, respectively. The depth of invasion of the tumor was up to the dermis in 10 (83.3%), and superficial subcutaneous fat tissue in 2 cases (16.7%) [Figure 2e]. One cellular (1/2, 50.0%) and one fibrocollagenous types of CFH (1/9, 11.1%) had invaded the subcutaneous tissue. The number of mitosis in ten high-power fields was counted at areas of each slide. Only one mitosis was found in three cases (two fibrocollagenous and one cellular types, respectively).

Details of immunohistochemical findings are given in Table 4. Tumor cells in all cases were negative for CD34, desmin, and S-100 protein. Tumor cells stained positively for factor XIIIa in 10 out of 12 cases (83.3%), and a focal immunopositivity for CD68 was noted in 8 out of 12 cases (66.7%) [Figure 2f and g]. Interestingly, spindle-shaped tumor cells in all neoplasms stained at least focally positive for α-smooth muscle actin [Figure 2h].

Discussion

CFHs' exact line of differentiation and their tumoral and reactive nature have been widely discussed.[4,5] The fact that they can develop after minor trauma or an insect bite suggests a reactive origin, while the demonstration of cytogenetic abnormalities and clonality and the possibility of metastasis to the lymph nodes and distant organs support the theory that CFH is a truly neoplastic disease.[6,7] CFHs of the finger are expected to be reactive, rather than true neoplasms, because the fingers

| Age | Male (%) | Female (%) | Total (%) |
|-----|----------|------------|-----------|
| 0-9 | 0 (0)    | 1 (8.3)    | 1 (8.3)   |
| 10-19 | 0 (0)   | 2 (16.7)   | 2 (16.7)  |
| 20-29 | 0 (0)   | 1 (8.3)    | 1 (8.3)   |
| 30-39 | 4 (33.3)| 1 (8.3)    | 5 (41.7)  |
| 40-49 | 3 (25.0)| 0 (0)      | 3 (25.0)  |
| Total | 7 (58.3)| 5 (41.7)   | 12 (100)  |
are susceptible to mechanical stimuli.⁹ In our study, 33.3% of total cases had a history of trauma. Moreover, 10 patients (83.3%) showed that the locations of lesion were in concordance with their handedness. We, thus, suggest that our results strongly support a reactive or traumatic theory on the finger at least.

While there have been many studies elucidating the clinicopathologic features of various types of CFHs, presentation of CFHs on the digits is very seldom discussed in the literature. A six-case series of CFHs on digits conducted by Yamamoto et al. is significant for its clinical photographic documentation of CFHs located on dorsal, medial, and interdigital aspects of the digits.⁹ As in that series, the present study found the frequency of CFHs on the fingers to be higher in males than in females in a 1.4:1 ratio. All three cases of CFH analyzed by Gencoglan et al. were male.¹⁰ In another series of 26 digital dermatofibroma cases, it also showed a 2.25:1 male-to-female ratio.⁹ On the contrary to this, CFH generally has a slight female predominance.

Only two cases of CFH of the finger in this study were suspected clinically. This is consistent with a report in the literature, where the pre-biopsy diagnosis accuracy of digital CFHs was low.⁹ The clinical differential diagnosis includes wart, neurofibroma, fibroma, and acquired fibrokeratoma.⁸,⁹ As in our study, it can be difficult to differentiate it from picker’s nodule and wart on finger. It is helpful to make a differential diagnosis by careful history taking and physical examination. Picker’s nodule is characterized by multiple, pruritic, firm nodules, and wart characteristically has punctate black dots representing hemorrhage into the stratum corneum. A biopsy can clarify the diagnosis.

Histologically, CFH is composed of a variable mixture of fibroblast-like cells, histiocytes, and blood vessels. The fibrocollagenous, histiocytic, and aneurysmal variants reflect the difference in composition.¹¹ In addition, numerous other variants, such as cellular, angiomatous, sclerotic, and so on have been described. The most common variant in our study was a fibrocollagenous type. Fibrocollagenous type in our study was more common than in another study from Korea.¹² CFH sometimes extends into the subcutis, and the results of the current study showed that 16.7% of the cases invaded the subcutis. CFHs may be associated with acanthosis or hyperplasia of the overlying epidermis and hyperpigmentation of the basal layer.¹³ It has been suggested that epidermal growth factor may play a role in the pathogenesis of the epidermal hyperplasia.¹⁴

CFHs are most often confused with dermatofibrosarcoma protuberans (DFSP), histopathologically. DFSP has a tighter storiform pattern, lacks epidermal changes and cytological pleomorphism, has discoid nuclei rather than elliptical, and has scant pale-staining poorly defined cytoplasm, extensively involved in the subcutaneous tissue in classic “honey comb” pattern rather than along interlobular fat septa.¹⁵ It shows diffuse positivity for CD34 rather than factor XIIIa.¹⁶ In this study, results of immunohistochemistry

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Table 2: Clinical characteristics of 12 cases with cutaneous fibrous histiocytoma of the finger

| Case number | Age/gender | Location | D (mon) | Di (mm) | Trauma Hx | Handed-ness | Clinical Dx | Treatment | Recurrence |
|-------------|------------|----------|---------|---------|-----------|-------------|-------------|-----------|------------|
| 1           | 48/male    | R3⁴ dor  | 7       | 7       | -         | Right       | Picker’s nodule | Excision after incisional bx | Follow-up loss |
| 2           | 33/male    | L4⁴ dor  | 1       | 5       | -         | ND          | Wart        | Excisional bx | -          |
| 3           | 23/female  | R4⁴ dor  | 2       | 4       | -         | Right       | DF          | Excisional bx | ND         |
| 4           | 31/female  | R4⁴ lat  | 24      | 9       | +         | Right       | Picker’s nodule | Excision after incisional bx | -          |
| 5           | 38/male    | R3⁴ med  | 12      | 8       | -         | Ambidextrous| Wart        | Excision after incisional bx | ND         |
| 6           | 47/male    | L2⁴ dor  | 12      | 7       | -         | Ambidextrous| Wart        | Excisional bx | -          |
| 7           | 9/female   | R4⁴ lat  | 5       | 8       | +         | Right       | Picker’s nodule | Excisional bx | -          |
| 8           | 32/male    | L2⁴ dor  | 6       | 5       | +         | Ambidextrous| Picker’s nodule | Excisional bx | -          |
| 9           | 15/female  | L1⁴ lat  | 24      | 3       | -         | Left        | DF          | Excisional bx | -          |
| 10          | 16/female  | L2⁴ dor  | 36      | 5       | -         | Right       | Wart        | Excisional bx | -          |
| 11          | 43/male    | L3⁴ med  | 2       | 8       | +         | Left        | Picker’s nodule | Excisional bx | -          |
| 12          | 33/male    | R3⁴ pal  | 3       | 4       | +         | Right       | Wart        | Excisional bx | -          |

ND: Not documented, bx: Biopsy, Hx: History, Dx: Diagnosis, +: Present, -: Absent
showed the expression of factor XIIIa and \( \alpha \)-smooth muscle actin in the CFH lesion. Factor XIIIa has been proposed to react with dendritic cells and is intensely expressed in cutaneous histiocytomas.\(^{17}\) In our study, the majority (83.3\%) of cases stained for factor XIIIa, as previously reported.\(^{17,18}\) \( \alpha \)-Smooth muscle actin expression is associated with myofibroblasts, as well as muscle differentiation. Myofibroblastic differentiation occurs in fibrotic processes, wound healing, or several tumors. Our results showed a partial immunoreactivity for \( \alpha \)-smooth muscle actin, consistent with an earlier report,\(^{19}\) suggesting myofibrogenic differentiation. CD34 is reported to be negative for CFHs, suggesting a useful marker for differentiation from DFSP.\(^{20}\) The combination of staining patterns for factor XIIIa and CD34 made the diagnosis of CFH in our study. CFH should be included in the differential diagnosis of circumscribed lesions on the fingers to ensure proper diagnosis and treatment.

The possible aggressive nature of CFH has been linked to deeper infiltration, a moderate mitotic rate, and cellular atypia.\(^{21}\) Fernandez-Florez et al. argued that 2\% cases of CFHs (4 of 200 cases) corresponded to atypical type.\(^{22}\) There was very low mitotic rate and no recurrence during the follow-up period in the present study. Therefore, this shows that CFHs on the fingers have good prognosis. Local excision is considered adequate treatment, with most lesions tending to regress even if only partially removed.\(^{23}\)

### Conclusion

The limitation of our study is that it is a retrospective study with a relatively small number of patients. We

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**Table 3: Histopathological characteristics of 12 cases with cutaneous fibrous histiocytoma of the finger**

| Case number | Depth     | Epidermal change | Mitosis | Dominant type          |
|-------------|-----------|-------------------|---------|------------------------|
|             |           | Hyperkeratosis    | Acanthosis | Basal hyperpigmentation |       |
| 1           | Dermis    | +                 | +       | +                      | 0      | Fibrocollagenous        |
| 2           | Dermis    | +                 | +       | -                      | 0      | Fibrocollagenous        |
| 3           | Dermis    | -                 | +       | +                      | 0      | Fibrocollagenous        |
| 4           | SF        | +                 | +       | +                      | 0      | Fibrocollagenous        |
| 5           | Dermis    | +                 | +       | -                      | 0      | Cellular               |
| 6           | Dermis    | -                 | -       | -                      | 1      | Fibrocollagenous        |
| 7           | Dermis    | +                 | +       | +                      | 0      | Fibrocollagenous        |
| 8           | Dermis    | +                 | +       | -                      | 0      | Fibrocollagenous        |
| 9           | Dermis    | -                 | -       | -                      | 1      | Cellular               |
| 10          | SF        | +                 | +       | +                      | 0      | Fibrocollagenous        |
| 11          | Dermis    | +                 | -       | +                      | 0      | Angiomatous             |
| 12          | Dermis    | +                 | -       | -                      | 1      | Fibrocollagenous        |

SF: Subcutaneous fat layer, +: Positive findings, -: No findings

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**Figure 2:** Histopathological view. (a) The fibrocollagenous type shows a predominance of collagen bundles and spindle cells in a storiform and fascicular pattern (case 10) (H and E, x100). (b) The cellular type shows a predominance of histiocyte-like cells (case 9) (H and E, x100). (c) The angiomatous type shows numerous small vascular structures in a collagenous stroma (case 11) (H and E, x100). (d) The triad of epidermal changes such as hyperkeratosis, acanthosis, and basal layer hyperpigmentation is noted in case 12 (H and E, x100). (e) The tumor invades the subcutaneous tissues (case 4) (H and E, x100). (f) Factor XIIIa is expressed in some lesional cells (case 3) (x200). (g) CD68 is expressed in some of lesional cells (case 7) (x400). (h) \( \alpha \)-Smooth muscle actin is strongly expressed in histioid cells and spindle cells of the lesions (case 5) (x400)
expect this study to make a significant contribution to the diagnosis and management of CFH of the finger.

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Conflicts of interest
There are no conflicts of interest.

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