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BRIEF REPORT

Circumferential scouting punch biopsies to delineate surgical margin for dermatofibrosarcoma protuberans

Tsung-Mao Huang [1], Shyh-Jou Shieh [2], J. Yu-Yun Lee [1], Tak-Wah Wong [1,3,4,*]

[1] Department of Dermatology, National Cheng Kung University Medical College and Hospital, Tainan, Taiwan
[2] Department of Plastic and Reconstructive Surgery, National Cheng Kung University Medical College and Hospital, Tainan, Taiwan
[3] Department of Biochemistry and Molecular Biology, National Cheng Kung University Medical College, Tainan, Taiwan
[4] Institute of Clinical Medicine, National Cheng Kung University Medical College, Tainan, Taiwan

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ABSTRACT

Dermatofibrosarcoma protuberans (DFSP) is an uncommon soft-tissue tumor involving the dermis and subcutaneous tissue with a high local recurrence rate after standard excision. Mohs micrographic surgery offers a lower recurrence rate. However, the procedure requires multiple stages of excision with intraoperative histopathological mapping, which is time consuming and expensive. We report our experience of using circumferential scouting punch biopsy technique in five patients to determine in advance the resection margins for DFSP prior to wide excision. Multiple 4 mm punches, usually eight in number, were performed 1–2.5 cm around the palpable borders of DFSP to delineate the resection margins in five consecutive patients. Tumors were excised at a later date along the margin defined by these biopsies and the wounds were repaired with skin graft. The operation was completed in 2 hours in all cases excluding one that required frozen sections for deep margin. No recurrence was noted 2–10 years after the operations. The results suggest that circumferential scouting punch biopsies before wide excision may be an alternative method to define the resection margins for DFSP when Mohs surgery is not available.

Introduction

Dermatofibrosarcoma protuberans (DFSP) is an uncommon cutaneous soft tissue tumor of intermediate malignancy.[1] It is characterized by progressive local growth and a propensity for local recurrence, but rarely metastasizes. Surgical excision can be challenging due to the invasive nature that results in high local recurrence rates.[2] Recurrence rates of DFSP range from 30% to 60% with surgical margins less than 3 cm, but reduce to a mean of 18% with resection margins greater than 3 cm.[3] However, wide margins may be difficult to obtain for lesions on the head and neck due to potential tissue loss equals loss of critical structures. Mohs surgery is a technique of controlled skin cancer removal by mapping and serial frozen sections of resection margins. Each stage of tissue removal and microscopic examination is repeated until all margins are clear of cancer.[4–6] Removal of DFSP by Mohs surgery provides maximal tissue conservation with a lower recurrence rate (0–6%).[3–6] However, Mohs surgeons are not available in many medical facilities. Moreover, it may require several hours to complete a large resection by Mohs surgery.[7,8] Longer operation time may increase medical expense.[7,8]

Without Mohs surgeons in our region, we tried a different approach by performing multiple punch biopsies around the tumor in the clinics to determine the resection margins first and then performed wide excision at a later date. We treated five consecutive DFSP patients with this approach.

Patients and methods

During a 10-year period (1999–2009), five patients with DFSP (Table 1) underwent circumferential punch biopsies in the clinic several days before wide excision. We first outlined the tumor border by palpation, and then performed multiple 4 mm punches, usually eight in number, at a distance 1–2.5 cm around the palpable border. For the tumor located near the nipple, two to three rows of punches were carried out in order to preserve more normal areolar tissue. The punch specimens were processed for routine histopathology examination. The whole tumor was then excised in a few days in the

* Corresponding author. Tak-Wah Wong, Department of Dermatology, National Cheng Kung University Hospital, 138 Sheng-Li Road, Tainan 704, Taiwan. Tel.: +886 6 2353535x5352, 5417; fax: +886 6 2766180.
E-mail addresses: Dr.kentwwong@gmail.com, twwong@mail.ncku.edu.tw (T.-W. Wong).

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Table 1 Demographic data of 5 patients with dermatofibrosarcoma protuberans.

Patient/Sex/Age	Location	Size	Numbers of punch	Resection margin to tumor: shortest distance/longest distance	Operation time	Outcome
1/F/34	Right upper chest near axilla	7.3cm × 6.2 cm	8	2 cm/2 cm	2 hours 5 minutes	No recurrence at 10 years
2/M/37	Left thigh	4.5cm × 3cm	8	2 cm/2 cm	1 hour 50 minutes	No recurrence at 9 years
3/F/30	Right breast	2.8cm × 1.5 cm	17	1 cm/2 cm	30 minutes	No recurrence at 9 years
4/F/22	Right breast	3.5cm × 4.2 cm	8	1.2 cm/2 cm	2 hours 4 minutes	No recurrence at 3 years
5/M/48	Scalp	5.5cm × 4.5 cm	8	2.5 cm/2.5 cm	4 hours 28 minutes*	No recurrence at 2 years
Mean ± standard deviation Age: 34 ± 10		4.7 ± 1.8 cm × 3.9 ± 1.8 cm	10 ± 4	1.7 ± 0.6 cm/2.1 ± 0.2 cm	2 hours 11 minutes ±1 hour 26 minutes	6.4 ± 3.6 years

* Including 2 hours waiting for frozen section results during operation.

operating room along the lines drawn by connecting the tumor-free dots determined by punch biopsy. Frozen sections were completed during operation to check the deep margin when necessary.

Patient 1 was an otherwise healthy 34-year-old woman who presented with a small scar-like nodule that had been enlarging slowly for 17 years on her right upper chest near the axilla (Figure 1A). Histopathologically, the tumor showed a diffuse, extensive proliferation of spindle cells throughout the dermis with invasion to the subcutaneous tissue (Figure 1B). The findings were consistent with DFSP. In this case, we tried photodynamic diagnosis, a technique that utilizes the preferential accumulation of photosensitizer in tumor cells with a 6-hour occlusion of 2% 5-aminolevulinic acid (Merck, Darmstadt, Germany) to define the tumor margin.[9] It was based on the fact that tumor cells tend to accumulate more protoporphyrin IX, the active metabolic product of 5-aminolevulinic acid, and emits red fluorescence under Wood's light excitation.[10] However, no visible fluorescence was detected. The negative results might be attributed to insufficient transepidermal delivery of photosensitizer through an intact stratum corneum[10] or the deep location of the tumor. Eight circumferential

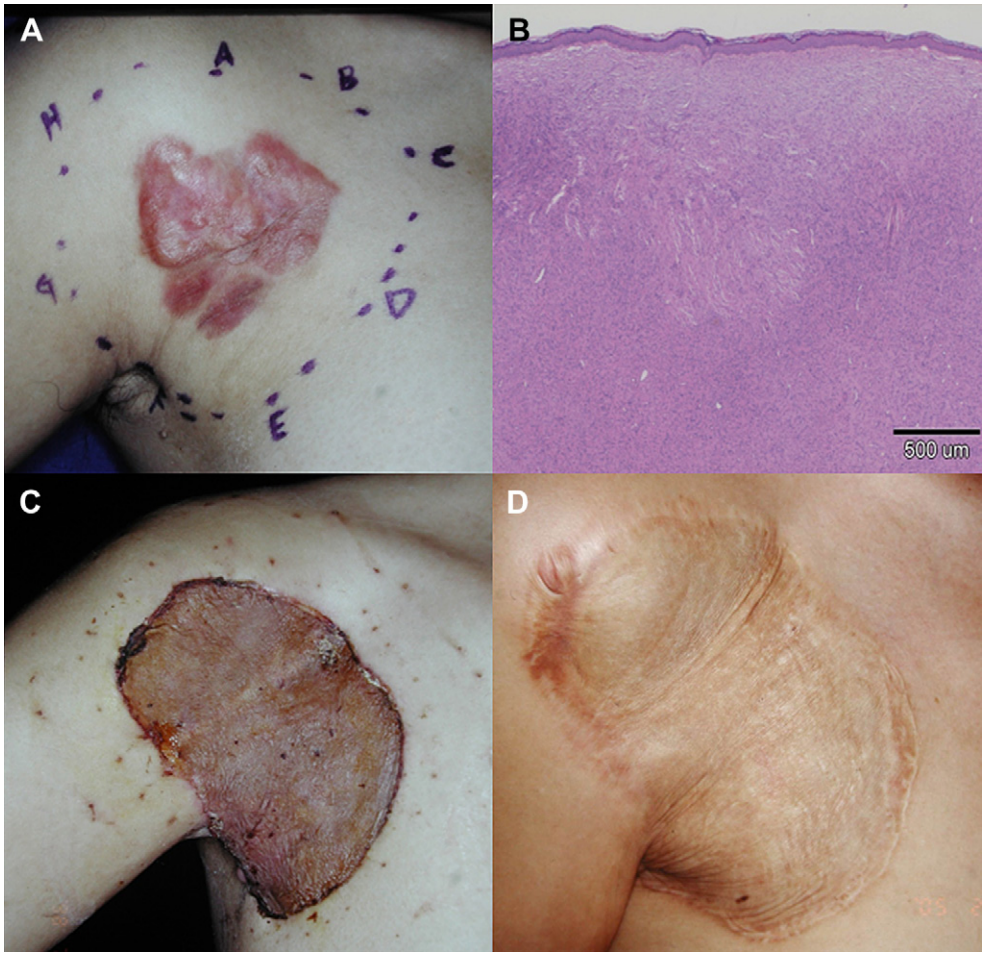

Figure 1 (A) A 7.3 cm × 6.2 cm tumor presented on right upper chest near axilla in Patient 1. The surgical margin was defined by eight punch biopsies (marked as A to H on skin) 2 cm beyond the tumor. (B) Histopathologic examination revealed extensive proliferation of spindle cells throughout the dermis and the subcutaneous tissue. The spindle cells were monomorphous with relatively uniform, elongated or S-shaped nuclei and had a tendency to arrange in a radiating storiform pattern. The findings were consistent with dermatofibrosarcoma protuberans. (C) The skin defect was repaired with skin graft. (D) One week after operation. No tumor recurrence was noted 10 years after operation.