RESEARCH PAPER

DERMATOFIBROSARCOMA PROTUBERANS TREATED BY WIDE LOCAL EXCISION AND SITE-SPECIFIC RECONSTRUCTION: MARGIN STATUS AND RECURRENCE IN A TERTIARY-CARE CASE SERIES

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ABSTRACT

Background: Dermatofibrosarcoma protuberans (DFSP) is an uncommon dermal spindle-cell sarcoma characterized by deceptively indolent growth, irregular subclinical extension, and a clinically important tendency for local recurrence after inadequate excision. Although metastatic spread is rare, surgical morbidity may be considerable when tumors occur on the trunk, shoulder, or abdominal wall, where oncologic clearance creates large composite defects.

Methods: We present a retrospective, CARE-informed case series of six histopathologically confirmed DFSP cases treated in the Department of General Surgery, JSS Medical College and Hospital, Mysuru, from January to December 2025. Patient demographics, duration of disease, previous excision, site, diagnostic work-up, operative technique, reconstruction, margin status, postoperative recovery, and early outcomes were extracted from available clinical and histopathology records.

Results: A total of five men and one woman—all with a mean age of 63.3 years—constituted the cohort. Four tumors involved the anterior abdominal wall or lower chest wall; one arose over the right thigh; and one involved the right shoulder. Three had past excision. Patients were all treated by wide local excision with gross margins of 3–4 cm and deep clearance to the fascia, rectus sheath, skeletal muscle, or involved plane. Reconstruction was individualized: primary closure was adequate for the thigh lesion; mesh reinforcement or bridging was needed for abdominal-wall defects; and regional flap coverage with split-skin grafting was performed for shoulder and chest-wall defects. Histology reported spindle-cell proliferative DFSP with storiform, fascicular, sheet-like, or focally herringbone patterns and free margins where documented. No early wound, graft, flap, or mesh-related complication was recorded.

Conclusion: This series highlights that DFSP management is primarily surgical but often reconstructive in practice. Wide excision with disciplined margin planning achieved early local control; however, long-term surveillance is essential because recurrence may be delayed and is strongly related to prior incomplete excision.

Keywords: dermatofibrosarcoma protuberans; wide local excision; surgical margins; abdominal wall reconstruction; local recurrence; case series

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INTRODUCTION

Dermatofibrosarcoma protuberans (DFSP) is a rare cutaneous soft-tissue sarcoma of fibroblastic differentiation, accounting for a small proportion of skin and soft-tissue malignancies. Its clinical importance lies not in frequent distant dissemination, but in persistent local infiltration, delayed recognition, and recurrence after inadequate margins [1,2]. Classically, DFSP begins as a firm plaque, scar-like induration, or slowly enlarging nodule, later becoming protuberant or multinodular. The trunk and proximal extremities are the most frequent sites, a distribution reflected in large epidemiological and institutional series [1-3].

The classical DFSP model shows monomorphic spindle cells, storiformly ordered histologically with the usual infiltration into subcutaneous adipose tissue. CD34 expression and molecular confirmation of COL1A1-PDGFB fusion are also supportive in the case of recurrences, or spindle-cell tumors that cannot be characterised morphologically [4,5]. Preoperative assessment depends on size, depth, recurrence and anatomic location. Magnetic resonance imaging may be advantageous if the relationship to fascia, muscle or abdominal-wall structures is relevant for resection and reconstruction [6].

The main treatment is complete surgical excision with histologically negative margins. Wide local excision usually utilizes the peripheral margins of 2-4 cm, along with the deep fascia when anatomically feasible, while Mohs micrographic surgery and thorough circumferential peripheral and deep margin assessment achieve better control with reduced reported recurrence in selected settings [6,7]. Imatinib-directed treatment is reserved for unresectable, recurrent, metastatic, or anatomically challenging PDGFB-driven disease [8]. This case series presents six patients with DFSP managed at a tertiary-care surgical unit, with a focus on operative planning, reconstruction after margin-directed excision, and the implications of previous surgery for recurrence risk.

MATERIALS AND METHODS

We conducted this retrospective single-center CARE-informed case series report from JSS Medical College and Hospital, Mysuru, India, Department of General Surgery. Duration of study was from January to December 2025. Participants All patients with histopathologically confirmed dermatofibrosarcoma protuberans treated surgically in that time were eligible. Patients were excluded if clinical or histopathological records were insufficient to confirm diagnosis, operative treatment, or margin status.

All the data were obtained from hospital case records, operative notes, imaging reports, cytology reports, and histopathology reports. The following variables were extracted: age, sex, tumor location, duration of symptoms, history of previous excision, clinical features, available imaging, cytological impressions, operative approach, peripheral and deep margins, method of reconstruction, histopathological findings, postoperative complications, and documented follow-up outcomes. No statistical comparison was made due to a small sample size and a descriptive design.

Diagnostic pathways were customised. For some patients, fine-needle aspiration cytology was performed to determine spindle-cell morphology, imaging was utilized when depth, fascial involvement, recurrence, or reconstructive planning were clinically relevant. Histopathological studies performed on hematoxylin and eosin-stained excision specimens confirmed diagnosis. The available immunohistochemistry and molecular testing records are not uniform throughout our study and hence they are not presented as cohort-level diagnostic variables.

Optimal operative parameters included oncologic clearance with wide local excision, typically with a gross peripheral margin of 3–4 cm and deep removal to fascia, rectus sheath, skeletal muscle, or the involved anatomic plane. Reconstruction was determined by the defect that had developed as a result of excision rather than tumor size only. Abdominal-wall defects were corrected with mesh reinforcement or bridging when tension-free fascial closure was not possible, and shoulder and chest-wall defects were constructed using regional pedicled flaps and split-skin grafting. Descriptive outcomes were described as margin status, early postoperative morbidity, functional restoration, and clinically obvious recurrence during available follow-up.

CASE PRESENTATIONS

The following vignettes combine narrative clinical description with structured operative and pathological details to preserve both chronological clarity and case-level comparability.

Table 1. Case-level clinical and operative summary

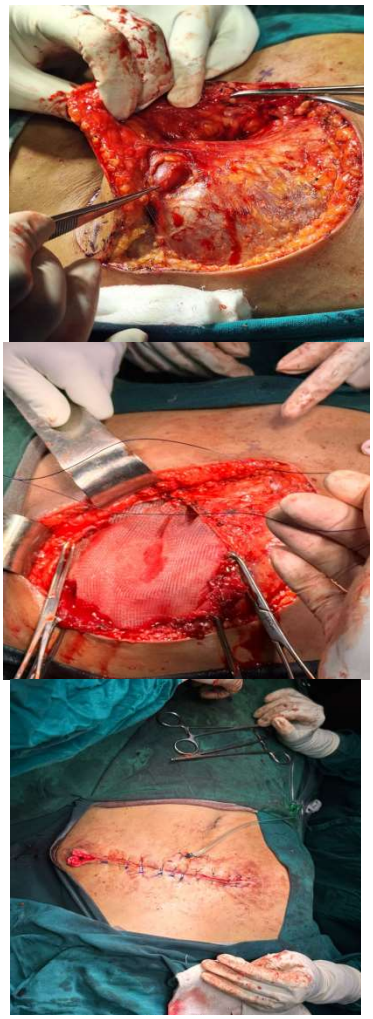
Case	Patient and site	Key clinical issue	Definitive treatment/outcome
1	69-year-old man; left hypochondrial anterior abdominal/lower chest wall	22-year mass; prior excision; large subcutaneous infiltrative lesion	Wide excision; preperitoneal bridge mesh; DFSP with fat infiltration; early recovery uneventful
2	40-year-old man; right thigh	Small but progressive firm lesion; spindle-cell cytology	Wide excision above fascia; primary closure with drain; no early recurrence
3	69-year-old man; left paraumbilical abdominal wall	Non-healing post-excision wound; revision surgery required	4 cm margin excision with omphalectomy; mesh reinforcement; margins free
4	60-year-old man; right paraumbilical abdominal wall	Recurrent DFSP after remote excision in 2006	3 cm margin excision to anterior rectus sheath; mesh reinforcement; margins free
5	76-year-old woman; right shoulder	Ulcerated, bleeding, pigmented exophytic tumor	4 cm margin excision; latissimus dorsi flap and SSG; margins free
6	66-year-old man; anterior chest wall	Second recurrence after two previous excisions and SSG	3 cm margin excision; PMMC flap and SSG; skeletal muscle infiltration; margins free

Case 1

A 69-year-old man presented to his physician with a long-standing, painless swelling of the left hypochondrial anterior abdominal wall, extending toward the lower chest wall. The lesion had been present for approximately 22 years, initially measuring about 2 x 2 cm and gradually enlarging to nearly 10 x 6 cm. He reported excision of a similar swelling 15 years earlier, making recurrent DFSP a major clinical consideration from the outset.

- **Clinical examination:** The overlying skin was normal. The swelling was well defined, smooth surfaced, and freely mobile over the abdominal wall on clinical assessment.
- **Diagnostic work-up:** Ultrasonography showed a well-defined heteroechoic subcutaneous lesion measuring approximately 3 x 9 x 6 cm. MRI demonstrated an enhancing subcutaneous lesion in the left hypochondrial anterior abdominal/lower chest-wall region with features suspicious for neoplasia and local infiltration. FNAC showed scant cellularity with spindle cells arranged singly and in clusters, consistent with a spindle-cell lesion.
- **Operative strategy:** Wide local excision was performed. Intraoperatively, the tumor was found to extend up to the fascial layer, leaving a large abdominal-wall defect after oncologic clearance.
- **Reconstruction:** Primary fascial closure was avoided because it would have been under tension. A preperitoneal bridge mesh repair was used to restore abdominal-wall continuity and strength without compromising the oncologic defect.
- **Histopathology and outcome:** Sections showed a dermal and subcutaneous spindle-cell tumor arranged in storiform sheets, with infiltration of adipose lobules, confirming DFSP. The postoperative course was uneventful, with no documented mesh-related morbidity or clinical recurrence during available follow-up.

This case illustrates the reconstructive burden of delayed or recurrent DFSP of the abdominal wall, where adequate margins can convert a superficial sarcoma into a complex abdominal-wall repair.

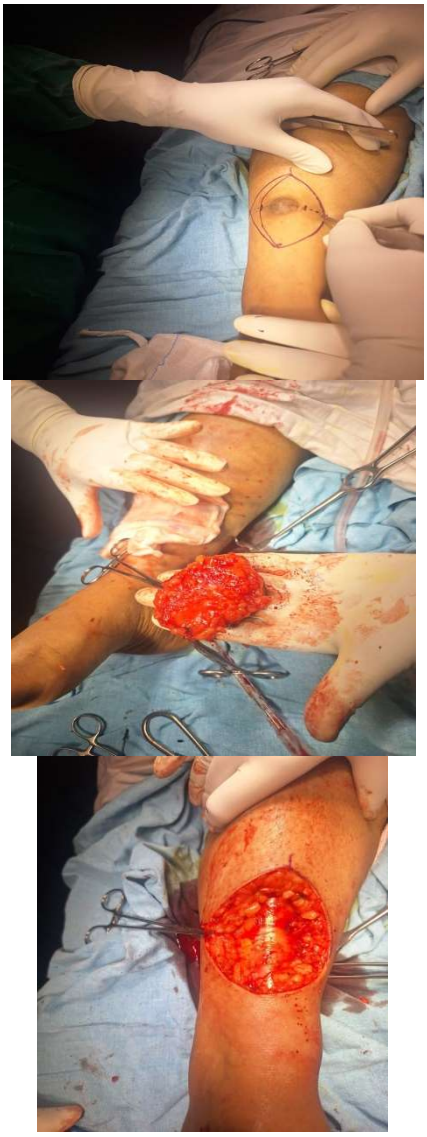


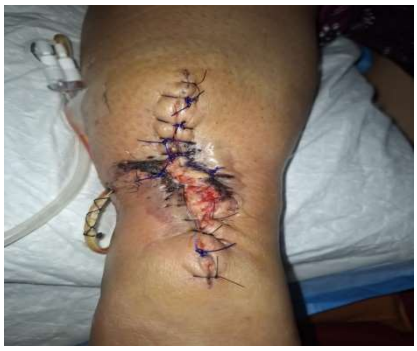
Case 2

A 40-year-old man presented with a painless swelling over the right lower extremity of one year duration. The lesion had increased from approximately 1 x 1 cm to 4 x 4 cm. Although clinically small compared with the trunk lesions, its progressive enlargement and firm consistency warranted evaluation for a spindle-cell neoplasm.

- **Clinical examination:** The skin over the swelling was normal. The lesion was well defined, hard in consistency, smooth surfaced, and freely mobile.
- **Cytology:** FNAC revealed a cellular spindle-cell tumor with cells arranged in storiform and fascicular patterns, thin-walled intervening vessels, and collagenous stroma.
- **Diagnosis:** The clinicocytological impression favored dermatofibrosarcoma protuberans of the right thigh.
- **Operative strategy:** Wide local excision was performed. The lesion was confined superficial to the fascial plane, allowing complete excision without complex reconstruction.
- **Closure and outcome:** The defect was closed primarily over a drain. The postoperative period was uneventful, and no wound-related complication or clinical recurrence was documented in early follow-up.

This case demonstrates that even relatively small DFSP lesions require deliberate margin planning, but timely presentation may permit definitive excision with straightforward closure.





Case 3

A 69-year-old man presented with a painful left paraumbilical anterior abdominal-wall lesion of one year duration. He reported a preceding history of trauma followed by development of a swelling, for which excision had been performed at a local hospital. He subsequently developed a persistent non-healing wound measuring approximately 3 cm at the previous excision site.

- **Clinical concern:** A non-healing wound at a previous excision site raised suspicion for residual or recurrent DFSP rather than a simple postoperative wound problem.
- **Cytology:** FNAC was scantily cellular and showed scattered benign-appearing spindle cells with occasional microstromal fragments, interpreted as a benign spindle-cell lesion; however, this did not adequately exclude DFSP in the clinical context.
- **Operative strategy:** Revision wide local excision was undertaken with a 4 cm margin around the prior DFSP excision field. Omphalectomy was performed to achieve an adequate circumferential margin.
- **Reconstruction:** Mesh was placed over the anterior rectus sheath to reinforce the abdominal wall and preserve structural integrity.
- **Histopathology and outcome:** Histology showed a dermal tumor extending into subcutaneous fat, arranged in fascicles and bundles. Tumor cells were spindle shaped with vesicular nuclei and moderate eosinophilic cytoplasm. Hemorrhage, fibrosis, and giant-cell reaction were compatible with previous surgery. No necrosis or lymphovascular invasion was identified, and all margins were tumor free. The postoperative course was uneventful, without documented abdominal-wall weakness or recurrence.

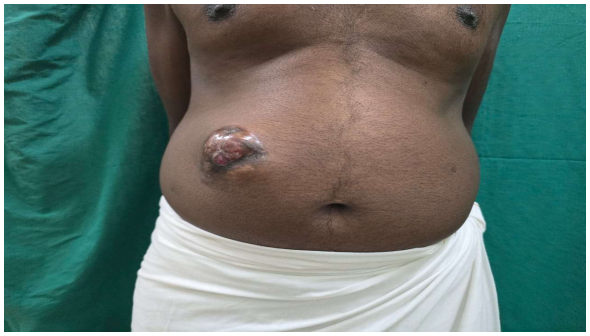
The case highlights the limited reliability of cytology in a previously operated spindle-cell lesion and reinforces the need to excise the scar and surrounding field when recurrent DFSP is suspected.

Case 4

A 60-year-old man presented with an eight-year history of swelling over the right paraumbilical anterior abdominal wall, currently measuring approximately 5 x 5 cm. He had undergone excision of a similar swelling in 2006, and the previous histopathology had been reported as dermatofibrosarcoma protuberans.

- **Clinical interpretation:** The prolonged interval after initial surgery and growth at the same region were consistent with delayed local recurrence.
- **Cytology:** FNAC demonstrated a cellular spindle-cell tumor with storiform and fascicular arrangement, thin-walled vessels, and collagenous stroma.
- **Operative strategy:** Wide local excision was performed with a 3 cm peripheral margin and deep extension up to the anterior rectus sheath.
- **Reconstruction:** Mesh reinforcement was used to maintain abdominal-wall strength after resection.
- **Histopathology and outcome:** Sections showed a dermal spindle-cell tumor arranged in fascicles and focally in a herringbone pattern, with increased vascularity, collagenous background, mild to moderate pleomorphism, and 10-12 mitoses per 10 high-power fields. Peripheral and deep margins were tumor free. Postoperative recovery was uneventful, without documented mesh-related complication or early recurrence.

The herringbone morphology and increased mitotic activity should prompt careful pathological review for higher-grade or fibrosarcomatous areas, particularly in a recurrent lesion.



Case 5

A 76-year-old woman presented with a five-year history of swelling over the right shoulder, with rapid enlargement and blackish discoloration over the preceding two months. The lesion had become clinically alarming because of ulceration, surface bleeding, and exophytic growth.

- **Clinical examination:** The mass was ovoid, dusky red, firm to hard, and protruded from the skin of the right shoulder. It extended into surrounding scar-

like irregular skin with blackish pigmentation, and bleeding was noted from the surface.

- **Diagnostic limitation:** FNAC was attempted but discontinued because of profuse bleeding, which was temporarily controlled by compression. The decision to proceed was therefore based on clinical suspicion, local behavior, and resectability.
- **Operative strategy:** Wide local excision was performed with a 4 cm margin to obtain oncological clearance.
- **Reconstruction:** Because primary closure was not appropriate for the post-excision shoulder defect, a right latissimus dorsi pedicled flap was used for coverage, with split-skin grafting at the donor site.
- **Histopathology and outcome:** Sections showed a dermal tumor extending into superficial subcutaneous tissue, composed of spindle-to-epithelioid cells in storiform sheets. Nuclear pleomorphism, prominent nucleoli, bizarre giant cells, ulceration, and atypical mitoses were present, while lymphovascular and perineural invasion were not identified. Margins were free. Early postoperative recovery was uneventful, with no documented flap or graft-related complication.

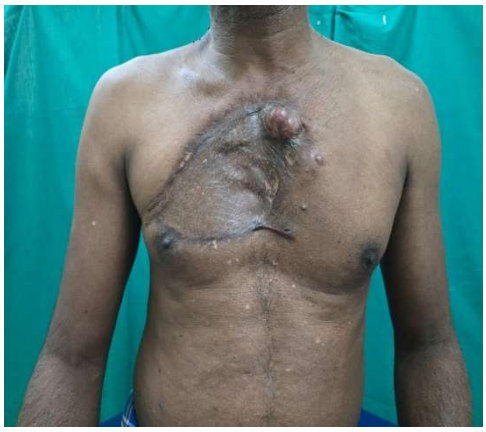
This case underscores that DFSP may present with ulceration and bleeding in advanced lesions, and that pedicled flap reconstruction can enable adequate excision in anatomically exposed regions such as the shoulder.

Case 6

A 66-year-old man presented with a two-year history of swelling over the anterior chest wall, measuring approximately 5 x 4 cm. He had undergone two previous excisions at the same site, first 20 years earlier and again 10 years earlier with split-skin grafting. The earlier biopsy report had confirmed DFSP, establishing this presentation as recurrent disease.

- **Clinical interpretation:** Repeated recurrence at the same site suggested persistent microscopic disease from earlier surgery and required definitive field excision rather than limited re-excision.
- **Preoperative diagnosis:** On the basis of clinical history, previous histopathology, and local recurrence, recurrent DFSP of the anterior chest wall was diagnosed.
- **Operative strategy:** Wide local excision was performed with a 3 cm margin, including the previously operated field and suspicious involved tissue.
- **Reconstruction:** The chest-wall defect was reconstructed using a pectoralis major myocutaneous flap, with split-skin grafting at the donor site.
- **Histopathology and outcome:** Histology showed a dermal storiform spindle-cell tumor with collagenous background and lymphoid aggregates. Tumor infiltration into subcutaneous tissue and skeletal muscle fibers was identified, with 3-5 mitoses per high-power field and atypical forms. The overlying dermis was ulcerated in places, and all margins were tumor free. The postoperative course was uneventful, without documented wound or reconstruction-related morbidity.

This case is clinically important because skeletal-muscle infiltration and repeated recurrence indicate the need for rigorous long-term surveillance despite negative margins after definitive excision.



RESULTS

Six patients were included. Mean age was 63.3 years and male to female ratio 5:1. The most frequent site was the anterior abdominal wall/lower chest wall, with 4 occurrences. One lesion developed over the right thigh and one over the right shoulder. The most common clinical pattern was a slowly enlarging painless mass, but pain, ulceration, bleeding, pigmentation, non-healing wound, and recurrence following previous excision were also noted.

The local excision in all patients was wide. The planned gross margin was approximately 3.5 cm on average. Reconstruction was necessary in five of six cases because of the anatomic distribution and size of post-excision defects as opposed to tumor diameter alone. Histopathology confirmed DFSP in all cases, and tumor-free margins were seen in cases where margin mapping was documented. No early postoperative wound, graft, flap, or mesh complication was documented in any of the patients. No clinical recurrence did emerge during the available follow-up, but the follow-up duration was not uniform and presents a limitation.

DISCUSSION

DFSP is most accurately viewed as a locally infiltrative sarcoma whose prognosis is largely influenced by the first definitive surgery performed, and this series corroborates this understanding. This type of tumour can slowly develop and looks like benign lesions, keloid, dermatofibroma, or postoperative scar. The deceptive clinical behaviour presented itself in the long-standing abdominal-wall lesion in Case 1 and the recurrent cases following previous excisions in Cases 3, 4, and 6. These cases are in agreement with published series of instances where recurrence has been proposed to be closely related to poor initial margins and to unrecognized subclinical extension [2,3,6].

Nevertheless, a careful approach to the diagnostic assessment of DFSP is warranted. Cytology can describe only spindle-cell morphology and cannot consistently delineate architectural infiltration, distinguish DFSP from all benign and malignant spindle-cell mimics, or assess fibrosarcomatous transformation. Cytology in this series included both benign spindle-cell impressions and more cellular storiform spindle-cell tumors. The disparity between cytology and final surgical pathology of a previously operated lesion was particularly instructive. For suspected DFSP, specifically in cases of recurrent, large, ulcerated, or anatomically complex lesions that will affect resection planning, core biopsy with immunohistochemistry is preferred. CD34 positivity and COL1A1-PDGFB fusion testing support diagnosis in challenging cases [4,5].

And surgical clearance remains the keystone of treatment. Common conventional wide local excision with 2−4 cm margins and deep fascial clearance is widely used; Mohs micrographic surgery or complete circumferential peripheral and deep margin assessment, on the other hand, offers lower recurrence in selected cases as it examines the entire margin rather than representative sections [6,7]. Mohs surgery is of interest in tissue-preserving locations like the head and neck, breast, genital region, hands, and feet. The primary obstacle in the current series, however, was not tissue conservation, but rather safe reconstruction after wide excision of trunk, shoulder, and chest-wall defects. Thus, a wide local excision was considered a pragmatic solution, provided that margins were clear.

Reconstructive is the emphasis and is critical. In abdominal-wall DFSP, oncologic resection may remove skin, subcutaneous tissue, fascia, and part of the musculoaponeurotic layer. Attempted primary closure under tension can compromise wound healing and predispose to hernia. Mesh bridging or reinforcement in abdominal-wall cases allowed restoration of abdominal-wall strength without reducing the oncologic margin. Similarly, regional flap reconstruction in the shoulder and chest-wall cases allowed durable coverage of large defects after adequate excision. In this context, reconstruction is not an aesthetic afterthought; it is what permits proper oncologic surgery.

Histological characteristics in this series are relevant. A typical storiform spindle cell pattern was found for all cases, however in some cases herringbone foci, increased mitotic activity, pleomorphism, atypical forms, ulceration, and skeletal muscle infiltration were reported. Because fibrosarcomatous DFSP is at higher risk of recurrence and metastasis compared to conventional DFSP [4,5], these features should be reconsidered for fibrosarcomatous transformation or higher-grade areas. Where such features are present, margin status, depth of invasion, and surveillance intensity become especially important.

No systemic therapy was implemented in this cohort given all tumors were surgically resectable with negative margins. Imatinib is indicated for unresectable, recurrent, metastatic, or neoadjuvant tumors with evidence of PDGFB pathway activation [8]. If margins are positive and re-excision cannot be made, or if there is unacceptable risk of morbidity [6], radiotherapy may be considered. If curative surgery is appropriate, these adjuvant avenues cannot replace total excision.

Strengths of this case series include the rigorous operative correlation, recurrent disease coverage, and the accounting of reconstructive decision-making. Limitations arise from an incomplete report of comorbidities and vital signs, non-standardized imaging, absence of routine immunohistochemistry or molecular testing, and limited follow-up duration. Early non-recurrence is welcome but not conclusive. DFSP surveillance has to be prolonged, with meticulous inspection and palpation of the operative field, as recurrence can happen several years post-treatment [6,7].

CONCLUSION

DFSP represents a rare but locally aggressive cutaneous sarcoma for which the combination of delayed diagnosis and prior incomplete excision adds further challenge to a definitive treatment [4]. This series was characterized by wide local excision with 3-4 cm margins and appropriate deep clearance, achieving tumor-free margins, while mesh reinforcement and regional flap reconstruction enabled closure of large trunk, shoulder, and chest-wall defects. Follow-up is required over time, especially for recurrent lesions and tumors with high-grade morphological features.

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