# SUBCUTANEOUS PANNICULITIS-LIKE T-CELL LYMPHOMA

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## ABSTRACT

Subcutaneous panniculitis-like T-cell lymphoma (SPTCL) is a rare form of cytotoxic T-cell lymphoma of the skin localized primarily in the subcutaneous adipose tissue. Clinically, the skin lesions mimic lipomas, but histologically resemble panniculitis, which is an inflammation of the subcutaneous fats. Most cases have an excellent prognosis and follow an indolent clinical course with a 5-year overall survival rate of 80%. So far, only a few cases have been reported in the pediatric age group. The diagnosis of SPTCL is based on the combination of clinical presentation, histopathologic examination of the skin lesion, immunohistochemical staining, and molecular analysis. Notably, data on treatment of pediatric SPTCL are even fewer in number, and very few patients undergoing effective treatment have been documented.

This is a case report of a 15-year-old female adolescent diagnosed with Subcutaneous panniculitis-like T-cell lymphoma who presented with multiple, non-tender, erythematous to violaceous deep dermal and subcutaneous nodules on the lower extremities associated with myalgia, intermittent moderate-grade fever, and weight loss over the past 7 months. She was initially managed as a case of "growing pain" and acute rheumatic fever, until histopathologic findings of the nodules showed inflammation of the subcutaneous fats, and immunohistochemistry revealed findings consistent with SPTCL. She is currently being treated with multi-agent combination chemotherapy which resulted in improvement of symptoms.


## INTRODUCTION

Subcutaneous panniculitis-like T-cell lymphoma (SPTCL) was first described by Gonzalez et al in 1991 and has been recognized as a rare type of peripheral T-cell lymphoma characterized by infiltration of the subcutaneous tissues by neoplastic cytotoxic T-cells with variable extensions into the dermis. Clinically, the skin lesions mimic lipomas, but histologically it resembles panniculitis, an inflammation of the subcutaneous fats. [1,2]

SPTCL accounts for less than 1% of all non-Hodgkin's lymphoma and most patients are adults, with the disease being extremely rare in children. Patients typically present with solitary or multiple subcutaneous nodules and plaques involving primarily the lower extremities and trunk, but in children and adolescents it may affect the head and neck. [3,7,11] In the pediatric population, constitutional symptoms are the presenting features in approximately 50% of the cases, including fever, chills, weight loss, myalgia, pancytopenia, and hepatosplenomegaly. [3,6,13]

Histologic features of SPTCL include rimming of adipocytes by atypical lymphocytes, fat necrosis, karyorrhectic debris, and large macrophages with

cytophagocytosis with distinct sparing of the interlobular septa, epidermis, and dermis.[1,3] By immunohistochemistry, the atypical lymphoid cells are positive for CD2, CD3, CD7, CD8, beta F1, and cytotoxic T-cell markers including T-cell intracellular antigen (TIA-1), granzyme B (GzB), and perforin; while negative for CD4, CD56 and CD30. Epstein-Barr Virus (EBV) is generally absent in most cases of sporadic SPTL but can rarely be detected in some variants especially in Asian population where EBV infection is common. The overall 5-year median survival is approximately 80%, although the prognosis is poor if associated with a hemophagocytic syndrome.[5]

## CASE REPORT

A 15-year-old female first presented seven months prior to consultation with a sudden myalgia on the back, thighs, and the calves of both legs with no associated trauma or precipitating events. She self-medicated with Diclofenac once daily with temporary relief of symptoms. She remained relatively well until six months prior to consultation, when she had recurrence of myalgia. The patient consulted with a private pediatrician through telemedicine, who initially assessed her to have "growing pains." The mother was apprised that the nature of the pain is self-limiting and is common in children of her age who have increased physical activities. There were no laboratory examinations done or medications prescribed. At the same time, the patient had intermittent fever with a maximum body temperature of 38.8 °C, occurring during the night. Due to the associated febrile episode, the patient's mother sought another consultation with the same pediatrician through telemedicine and was advised admission. A complete blood count showed anemia and additional laboratory examinations revealed elevated Antistreptolysin O (ASO) titer and lactate dehydrogenase (LDH) levels. Two-dimensional echocardiography was done, which showed mild tricuspid and pulmonary regurgitation with thickened anterior mitral valve leaflets. She was then treated as a case of Acute Rheumatic Fever versus Viral Myocarditis. She was given an intramuscular dose of Benzathine Penicillin G at 1.2 million units per dose. The patient was then discharged afebrile after 7 days. Following discharge, the patient received a single intramuscular dose of Benzathine Penicillin G every 21 days. In the interim, despite treatment with antibiotics, the patient continued to experience intermittent moderate-grade fever with a maximum body temperature at 39 °C.

Five months prior to consultation, the patient's mother started to note the appearance of non-tender, twenty-five-centavo-coin-sized, erythematous to violaceous nodules on the popliteal area of both legs (**Figure 1 A-D**). She was brought for consultation to the same physician and there were noted multiple, firm, non-tender, non-moveable, erythematous to violaceous deep dermal and subcutaneous nodules approximately 5 cm in diameter on the popliteal area of both legs and thighs. Due to this finding, she was readmitted for work-up. A complete blood count taken showed anemia and leukopenia with neutrophil predominance, and an elevated Erythrocyte

Sedimentation Rate (ESR). Intramuscular dose of Benzathine Penicillin G was continued, and the patient was started on oral prednisone (2 mg/kg/day) for the impression of carditis secondary to rheumatic fever. She was discharged afebrile after 5 days.

In the interim, the patient continued the monthly dose of intramuscular Benzathine Penicillin G and oral Prednisone with gradual tapering. There was no recurrence of fever; however, the previously described subcutaneous nodules persisted. At the same time, the patient's mother also noted that she had gradual weight loss described as loosening of the patient's clothes despite no change in appetite and activities of daily living.

One month prior to consultation, the patient had a recurrence of fever with a maximum body temperature at 40 °C occurring at night. The subcutaneous nodules became slightly larger than previously described, from a twenty-five-centavo coin to the size of a five-peso coin and became more extensive in distribution covering approximately 40% of the body surface area of the bilateral thighs and legs, now involving the upper limbs (**Figure 1 A-E**). She was then advised to seek consultation with a Pediatric Hematologist-Oncologist for workup of an underlying malignancy due to the persistence of febrile episodes and subcutaneous nodules despite treatment with antibiotic and corticosteroid.

On the day of consultation, the patient was seen by a Pediatric Hematologist-Oncologist in a tertiary hospital and was advised admission for further workup and management, but the parents did not consent due to fear of being exposed to the coronavirus. Instead, she was managed on an outpatient basis. On physical examination, there were noted multiple, non-tender, erythematous to violaceous colored subcutaneous nodules on the bilateral thighs, legs, and upper extremities ranging in size from 5 to 10 cm in diameter (**Figure 1 A-E**). The patient had neither lymphadenopathies nor hepatosplenomegaly. Workups done revealed normocytic and normochromic anemia, leukopenia, elevated levels of ferritin, LDH, and uric acid. Other workups which include serum glutamic pyruvic transaminase (SGPT), antinuclear antibody (ANA) titer, prothrombin time (PT), partial thromboplastin time (PTT), and creatinine were within normal range. Oral prednisone was tapered off and the patient was referred to a dermatologist for excision biopsy of the left thigh mass. Histopathologic examination stained with hematoxylin and eosin showed a lobular, panniculitic infiltration pattern of the lymphocytes. The infiltrate is composed of atypical lymphocytes with irregular, hyperchromatic nuclei, some of which form a ring around adipocytes. The atypical lymphocytes spared the epidermis, dermis and fibrous septae, and showed neither angioinvasive nor angiodestructive features (**Figure 2-4**). Immunohistochemistry involved the use of antibodies against T-, B-, and Natural Killer-cell differentiation antigens including cluster of differentiation (CD) 3, CD4, CD5, CD8, CD20, and CD56. On the other hand, in situ hybridization for the detection of Epstein– Barr virus (EBV)-

encoded RNAs (EBERs) was performed. It revealed that atypical lymphocytes expressed CD3, CD8, and CD5 (**Figure 5-7**); with the absence of CD4, Epstein-Bar Virus-encoded small RNA (EBER), CD56, and CD20 (**Figure 8-9**). T-cell receptor gene rearrangement was not performed due to financial constraints. Based on these clinical and histopathologic findings, a diagnosis of Subcutaneous panniculitis-like T-cell Lymphoma was made. Due to the high serum ferritin level, workup for hemophagocytic lymphohistiocytosis (HLH) was considered; however, the patient's parents did not give consent for additional laboratory tests and staging work-up with bone marrow aspiration and cerebrospinal fluid analysis with cytospin. Instead, the patient was started on dexamethasone (10mg/$m^2$) as first-line treatment before combination chemotherapy in light of the often-indolent course and favorable prognosis of SPTL (**Figure 10**).

To assess the extent of the disease, Positron Emission Tomography (PET) 2-[fluorine-18] fluoro-2-deoxy-D-glucose (FDG) scan was performed. The scan showed hypermetabolic, diffuse subcutaneous thickening, haziness, and stranding densities in the left upper arm, right epigastric; bilateral posterolateral lumbar regions, pelvic, gluteal, and lower extremities in keeping with known malignancy. Hypermetabolic bilateral inguinal, popliteal, and left paraspinal intramuscular lymph nodes were consistent with active lymphomatous disease. In addition, hypermetabolic foci seen in the tibia were suspicious for metastasis (**Figure 11, 12**).

The patient's parents eventually gave consent for chemotherapy. CSF analysis with cytospin was done prior to chemotherapy which was negative for central nervous system involvement. Options on chemotherapy were reviewed in view of prolonged pre-exposure to steroids and progression of lesions despite prior treatment. The patient's young age, unknown presence of HLH, and protracted course of the disease prompted initiation of treatment with multi-agent combination chemotherapy as per Berlin-Frankfurt-Münster (BFM) 90 protocol, which is typically used for aggressive pediatric non-Hodgkin lymphomas. She underwent chemotherapy protocol as follows: prednisone (60 mg/$m^2$), dexamethasone (6 mg/$m^2$), doxorubicin (30 mg/$m^2$), vincristine (1.5 mg/$m^2$), cytarabine (75 mg/$m^2$), 6-mercaptopurine (60 mg/$m^2$), cyclophosphamide (1000 mg/$m^2$), high dose methotrexate (5 g/$m^2$), and L-asparaginase (6000 mg/$m^2$). The patient had improvement in her systemic symptoms with no recurrence of fever and myalgia, and with the skin lesions subsiding near the completion of the induction phase (**Figure 13**). On subsequent follow-up, the patient had no infectious or treatment-related complications during chemotherapy.

## DISCUSSION

Panniculitis refers to the inflammation of subcutaneous fats. In most cases, it can be a sign of an underlying systemic disease. Specificity in diagnosis is difficult since different forms of panniculitides may have similar clinical appearance, thus a histopathologic study with correlation with

clinical features (e.g. including location of the lesions, the presence of systemic symptoms, laboratory findings), immunohistochemical staining, and molecular analysis are done for a definitive diagnosis. [13,14,15]

Panniculitis in the pediatric age group is rarely seen. Apart from Erythema Nodosum as being the most common type of panniculitis in children, other types of panniculitis, such as subcutaneous fat necrosis, is rare. In the absence of a specific diagnostic algorithm, panniculitis in children needs multiple diagnostic workups to ascertain a definite cause, considering that some of them may bear an uncertain prognosis or may be fatal if left untreated. [13,14,15]

Panniculitis can be either primary or idiopathic, or secondary. Secondary etiologies can be classified into the following broad categories: infections (streptococcal, mycobacterial, fungal, parasitic, and viral), inflammatory or connective tissue disease (erythema nodosum, erythema induratum, lipodermatosclerosis, lupus panniculitis, cutaneous polyarteritis nodosa, dermatomyositis-associated panniculitis), malignancy (subcutaneous panniculitis-like T-cell lymphoma), pancreatic disease (pancreatic panniculitis associated with pancreatitis or pancreatic carcinoma), immunodeficiency states (alpha-1 antitrypsin deficiency panniculitis), trauma (cold panniculitis, traumatic panniculitis, factitial panniculitis), and depositions (calciphylaxis, gout). The common clinical features of panniculitis, regardless of etiology, are erythematous, tender, subcutaneous nodules. [13,14,15]

Panniculitis can be classified into lobular or septal panniculitis based on whether the inflammation is seen in the fat lobules or septae, respectively. It can be further classified based on whether the inflammation is found with or without vasculitis and by the predominant cells found. Notably however, the pediatric-specific panniculitides all fall into the lobular pattern histologically. [13,14,15] Panniculitis is rarely caused by malignancy, but this possibility must be considered if the clinical picture does not fit the diagnosis. Subcutaneous panniculitis-like T-cell lymphoma (SPTCL) and Cytophagic Histiocytic Panniculitis (CHP) are the most common malignancy-related panniculitides. [13,14,15]

Subcutaneous panniculitis-like T-cell lymphoma accounts for less than 1% of all non-Hodgkin's lymphoma and most patients are adults, with the disease being extremely rare in children. Median patient age at diagnosis was 39 years with a slight female preponderance with male to female ratio of 0.5. [2,3,4] The overall 5-year median survival is approximately 80%, although the prognosis is poor if associated with a hemophagocytic syndrome, characterized by uncontrolled phagocytosis of blood components, cytopenias, coagulopathy, hepatosplenomegaly, and even death.[5] Being rare in pediatric population, so far, only few cases have been reported in literature with age range of 26-month-old to 17 years of age.

In the Philippines, a case of SPTCL was first reported in our institution by Dr. Michelle Rodriguez in 2005. In the Philippine Pediatric Society registry, there were no SPTCL cases recorded from 2006 to 2021. While under the Panniculitis-unspecified, there were 10 cases recorded.

Although the exact mechanism of the pathogenesis of SPTCL is still mostly unknown, Musick postulated that expression of C-C chemokine receptor type 5 (CCR5) on the neoplastic T-cells and its ligands CCL3, CCL4, and CCL5 located on the adipocyte membrane facilitated the migration of the neoplastic T-cells to the adipocyte membrane. [9] On the other hand, Levy identified a germline mutation causing loss of function of T-cell immunoglobulin mucin 3 (TIM-3) in 60% to 85% of SPTCL patients. TIM-3 acts as a negative immune checkpoint that regulates the effector function of T lymphocytes and myeloid cells. In these patients, TIM-3 deficiency was shown to promote T-lymphocyte and macrophage activation and the production of pro-inflammatory cytokines, challenging the malignant nature of skin T-lymphocyte infiltration. [10]

The diagnosis of SPTCL is based on the combination of clinical presentation, histopathologic examination of the skin lesion, immunohistochemical staining, and molecular analysis. Patients typically present with solitary or multiple subcutaneous nodules and plaques involving primarily the lower extremities and trunk, but in children and adolescents it may affect the head and neck. [2,3,7] Other tissues and organ involvement are rare.[5] In the pediatric population, constitutional symptoms were the presenting features in approximately 50% of the cases, including fever, chills, weight loss, myalgia, pancytopenia, and hepatosplenomegaly. [2,3,10] In our case, prior to diagnosis of SPTCL, the patient had a 7-month history of intermittent moderate-grade fever, myalgia, weight loss, and multiple subcutaneous nodules on both the lower and upper extremities. The patient was initially managed as a case of Acute Rheumatic Fever and despite treatment with antibiotics and corticosteroids, she continued to experience intermittent, moderate-grade fever, and persistence of multiple subcutaneous nodules on both the lower and upper extremities. At the time of consultation with a Pediatric Hematologist-Oncologist, there were multiple, non-tender, erythematous to violaceous nodules ranging in size from 5 to 10 cm affecting the bilateral thighs and legs, and the upper limbs (**Figure 1 A-E**). The patient had neither peripheral lymphadenopathy nor hepatosplenomegaly.

Histologic features include rimming of adipocytes by atypical lymphocytes, fat necrosis, karyorrhectic debris, and large macrophages with cytophagocytosis with distinct sparing of the interlobular septa, epidermis, and dermis. [1,2] In our case, the histopathologic examination of the skin biopsy specimen from the left thigh mass showed a lobular panniculitic infiltration pattern of the lymphocytes. The infiltrate is composed of atypical lymphocytes with irregular, hyperchromatic nuclei, some of which form a ring around adipocytes showing a histologic feature compatible with SPTL. In addition, the atypical

lymphocytes spared the epidermis, dermis and fibrous septae, and showed neither angioinvasive nor angiodestructive features (**Figure 2-4**).

Immunophenotypically, the neoplastic cells in SPTCL are cytotoxic T cells that are positive for CD3 and CD8 and negative for CD4 and CD56. Our case revealed that the atypical lymphocytes expressed $CD3^+$, $CD8^+$, and CD5+, with absence of CD4, Epstein-Barr Virus-encoded small RNA (EBER), CD56, and CD20 (**Figure 5-9),** consistent with SPTCL**.** Epstein-Barr virus was not detected; hence the virus did not appear to play a role in the pathogenesis of this lymphoma.[11] T-cell receptor (TCR) gene rearrangement was not performed because of financial constraints.

Imaging can have an advantage over physical examination for detecting clinically unsuspected SPTCL lesions, both on initial staging and during follow up examination. The SPTCL lesions can be easily assessed using various imaging modality, such as ultrasonography (US), computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET). [3] The Positron Emission Tomography (PET) 2-[fluorine-18] fluoro-2-deoxy-D-glucose (FDG) imaging features of SPTCL include multiple foci of FDG-avid subcutaneous adipose tissue lesions involving the extremities and trunk without visceral disease.[12] Our case revealed multiple foci of increased FDG-avid subcutaneous adipose tissue lesions on the left upper arm, the right epigastric area, bilateral posterolateral lumbar region, pelvic, gluteal, and lower extremities, with involvement of bilateral inguinal, popliteal, and left paraspinal intramuscular lymph nodes (**Figure 11-12**). Several previous studies have demonstrated that FDG PET/CT can be a useful tool for the initial accurate total body staging, restaging following therapy, detecting occult extracutaneous involvement, driving the biopsy towards the most active site, the stratification of prognosis and early therapy assessment. [12]

There is no single-best treatment regimen for SPTCL. The treatment reported in limited cases includes systemic corticosteroids, multidrug chemotherapy regimens such as CHOP (cyclophosphamide, adriamycin, vincristine, prednisone), cyclosporine, and combination therapy, but the overall response rate has been reported to be variable, ranging from 53% to 100% with a duration ranging from 2 to 72 months. Patients with α/β phenotype SPTCL lacking HLH respond well to immunosuppressive agents such as prednisone and cyclosporine, and low-dose chemotherapy involving a single agent, such as cyclophosphamide or methotrexate. The presence of constitutional symptoms, cytopenia, involvement of multiple sites, and coexisting hemophagocytic syndrome tend to be associated with a poor clinical outcome and require combination chemotherapy. Of all the immunosuppressive agents, corticosteroids are the most effective. Notable responses are found in patients with limited skin lesions and absent systemic symptoms. Nevertheless, responses usually are short-lived, with frequent disease recurrences after corticosteroid tapering. However, because of

the expected slow onset of response, such agents should be considered only in patients who have SPTCL with a less aggressive biology or as adjunctive treatment. Anthracycline-based combination regimens, in particular, CHOP, represent the most effective type of chemotherapy. Such regimens should be the option of choice when aggressive systemic treatment is considered. In our case, the patient was initially given corticosteroids, however there was recurrence of fever and progression of lesions despite treatment, hence the non-Hodgkin lymphoma-Berlin-Frankfurt-Münster (NHL-BFM) 90 chemotherapy, which is typically used for aggressive pediatric non-Hodgkin lymphomas, was the regimen used. The chemotherapy protocol includes induction phase, consolidation phase, and maintenance therapy courses, composed of prednisone, dexamethasone, doxorubicin, vincristine, cytarabine, 6-mercaptopurine, cyclophosphamide, methotrexate, and L-asparaginase. For relapse and refractory disease, additional strategies include salvage chemotherapy with cladribine, DHAP (dexamethasone, cytarabine, and Cisplatin), ESHAP (etoposide, methylprednisolone, cytarabine, and cisplatin), FLAG (fludarabine, cytarabine, and granulocyte-colony stimulating factor), mini-BEAM (carmustine, etoposide, cytarabine, and melphalan), VEPPB (vincristine, etoposide, prednisone, procarbazine, and bleomycin), radiation, and autologous peripheral blood stem cell transplant. The inconsistency in the treatment regimen extends to both the pediatric and adult cases reported in the literature. The rarity of this disease has prevented a unified treatment strategy from being developed. [16,17]

## SUMMARY

This is a case report of a 15-year-old female manifesting with indurated, non-tender, erythematous to violaceous subcutaneous nodules on the lower extremities associated with myalgia, intermittent moderate-grade fever, and weight loss over the past 7 months. A combination of clinical presentation, histopathologic examination of the skin lesion and immunohistochemical staining confirmed the diagnosis of Subcutaneous panniculitis-like T-cell lymphoma. Currently, there is no standard treatment regimen for SPTL due to its rarity. The patient is currently on maintenance phase per Berlin-Frankfurt-Münster (BFM) 90 protocol, which is composed of prednisone, dexamethasone, doxorubicin, vincristine, cytarabine, 6-mercaptopurine, cyclophosphamide, methotrexate, and L-asparaginase. There were no infectious or treatment-related complications during chemotherapy. She has had improvement in her systemic symptoms with no recurrence of fever and myalgia, and with the skin lesions subsiding near the completion of chemotherapy. A FDG PET/CT scan is warranted for chemotherapy reassessment and disease prognostication after completing the active treatment.

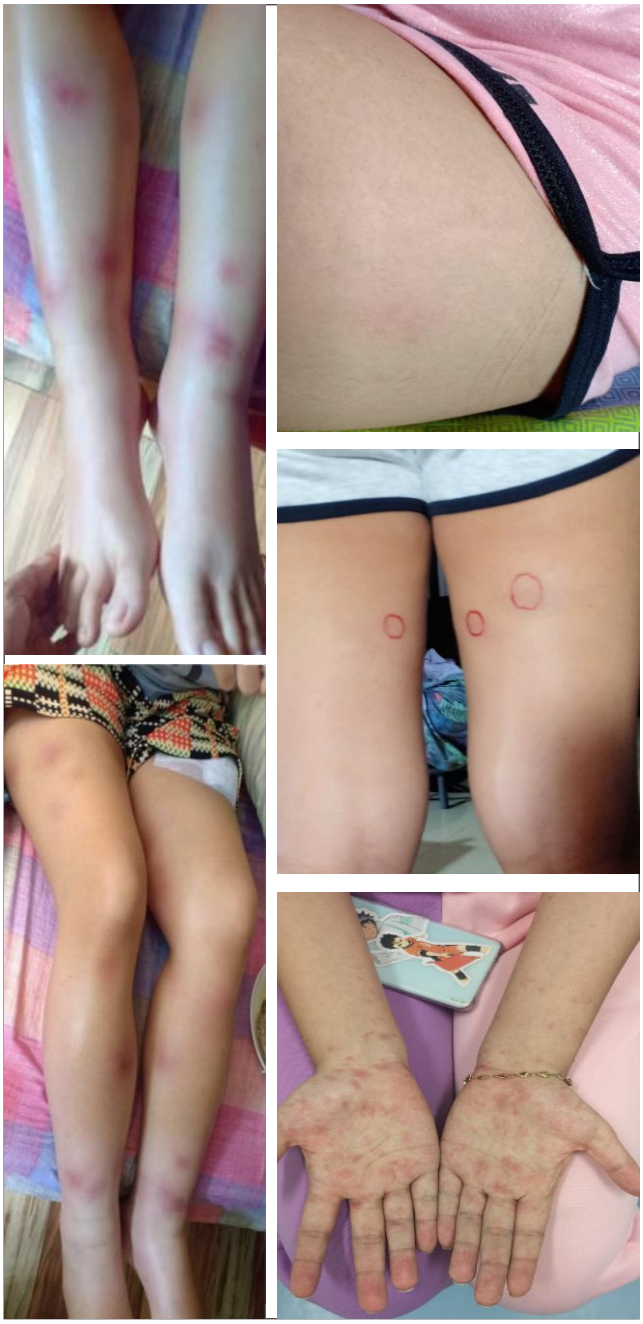

**Figure 1.** Multiple, indurated, non-tender, erythematous to violaceous colored subcutaneous nodules on the bilateral legs (**A, B**), the thighs (**C**), the popliteal area (**D**) and the hands (**E**).

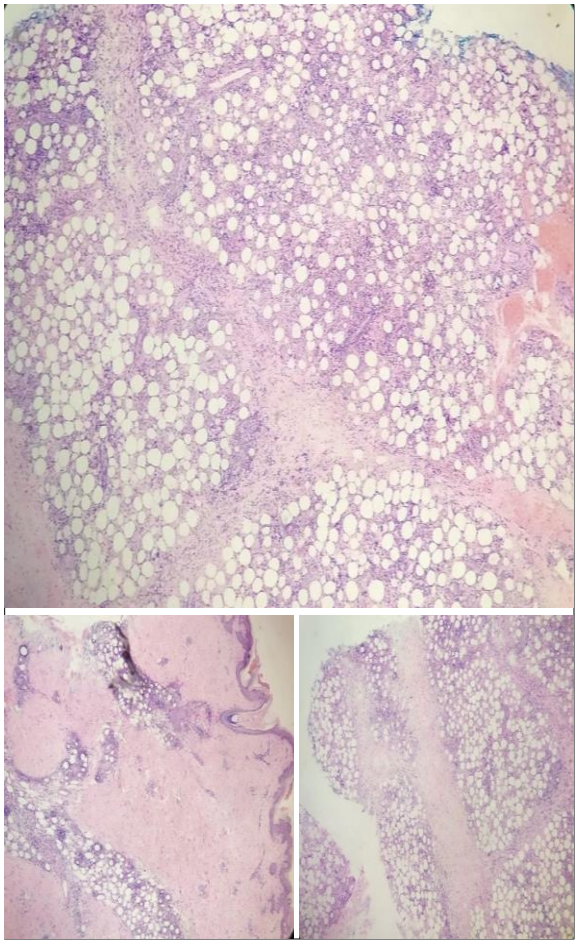

**Figure 2.** (**A**) Lymphocytic infiltrate primarily in the subcutaneous tissue involving the fibroadipose lobules and with relative sparing of the fibrous septae (Hematoxylin-Eosin (H-E) stain, 4x). (**B**) Area which shows that the epidermis and dermis are relatively spared (Hematoxylin-Eosin (H-E) stain, 4x). (**C**) Dense lymphocytic infiltrate again in the subcutaneous area, sparing the septae for the most part (Hematoxylin-Eosin (H-E) stain, 4x).

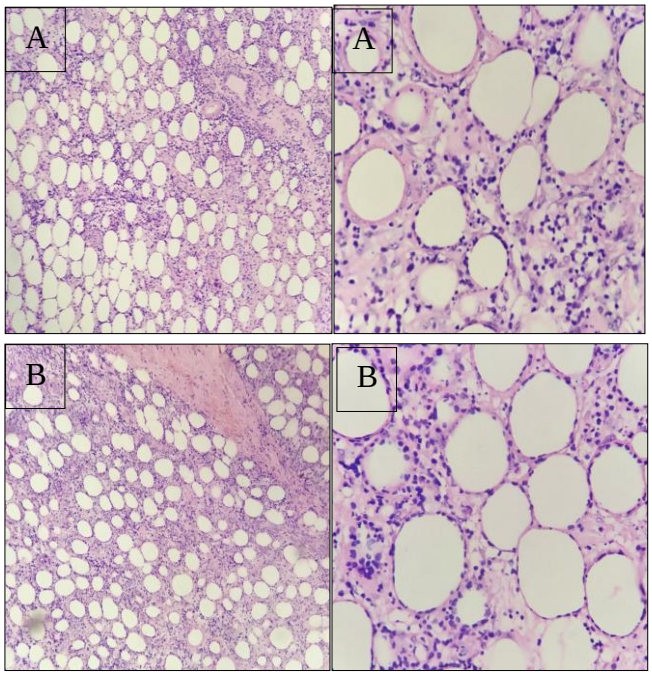


**Figure 4.** (A, B) Slightly enlarged tumoral lymphocytes with irregular, hyperchromatic nuclei. Some can be seen rimming the adipocytes (Hematoxylin-Eosin (H-E) stain, 40x)

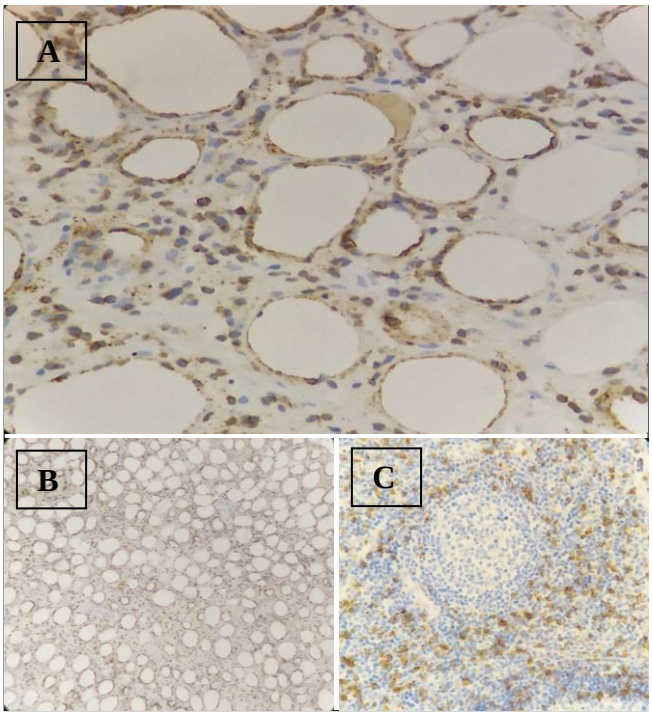


**Figure 6.** (**A**) CD8 shows reactivity in the tumoral cells, seen in both the stroma and lining the adipocytes (Immunohistochemical stain, 40x). (**B, C**) CD8 shows positivity in the cells of interest (Immunohistochemical stain; 4x, 10X).

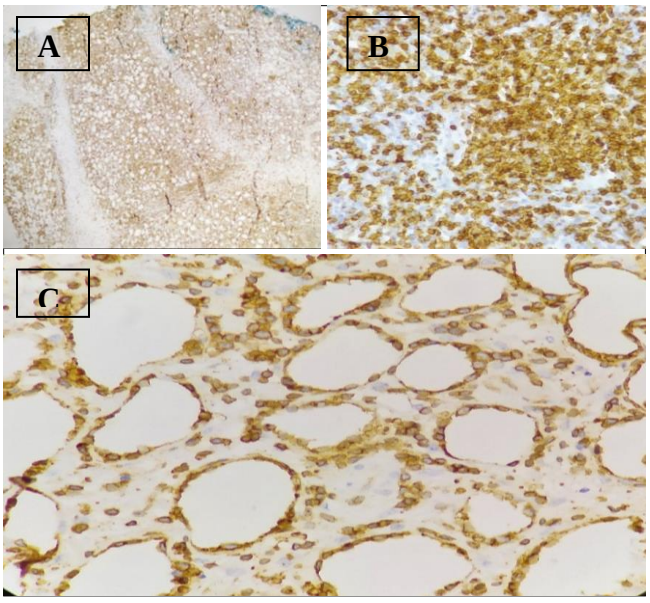


**Figure 5.** (**A**) Positive membranous staining of CD3 in the tumoral cells in a diffuse pattern (Immunohistochemical stain, 4x). (**B, C**) Atypical lymphocytes express $CD3^{+}$ (Immunohistochemical stain; 10x, 40x).

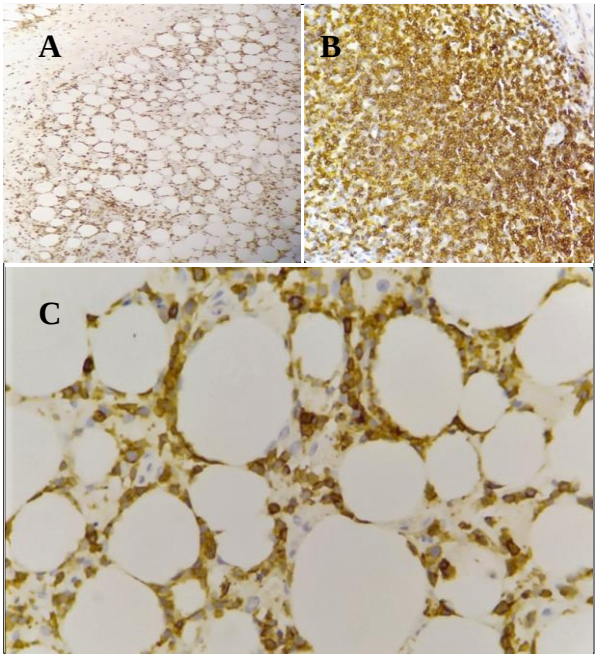


**Figure 7.** (**A, B, C**) Atypical cells shows CD5 reactivity.

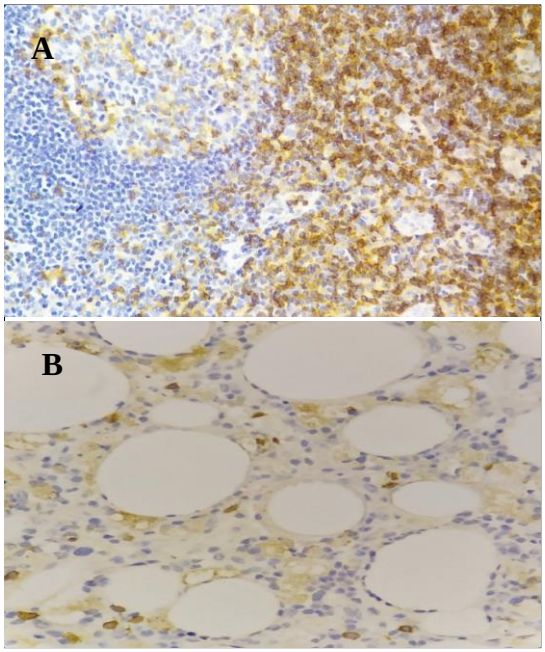


**Figure 8.** (**A, B**) CD4 Staining is not reactive in the cells of interest, though there is positivity scattered lymphocytic cells.

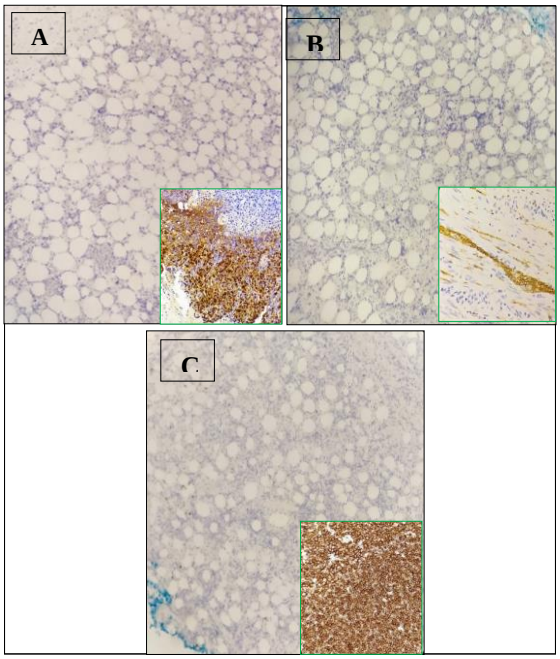


**Figure 9.** Immunohistochemical staining: (**A**) Epstein-Bar Virus-encoded small RNA (EBER) negative, (**B**) CD56 negative, (**C**) CD20 negative. (*Compared with the controlled inset showing positivity in EBER, CD56, and CD20)

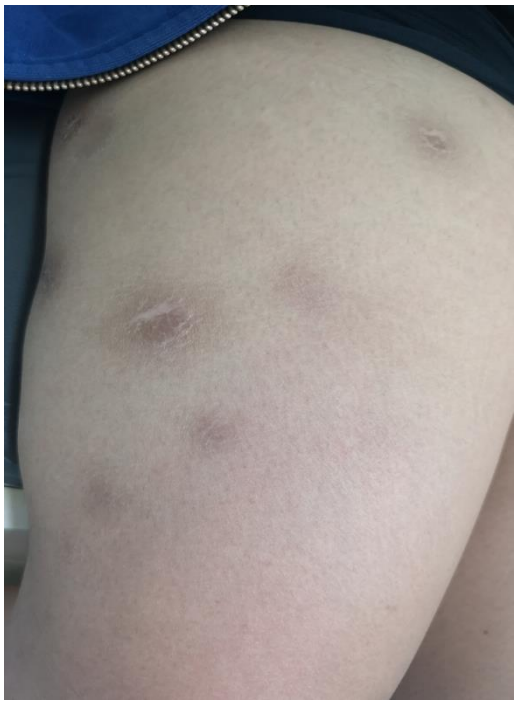

**Figure 10.** Multiple hyperpigmented subcutaneous nodules on the thighs after 10 days of treatment with Dexamethasone

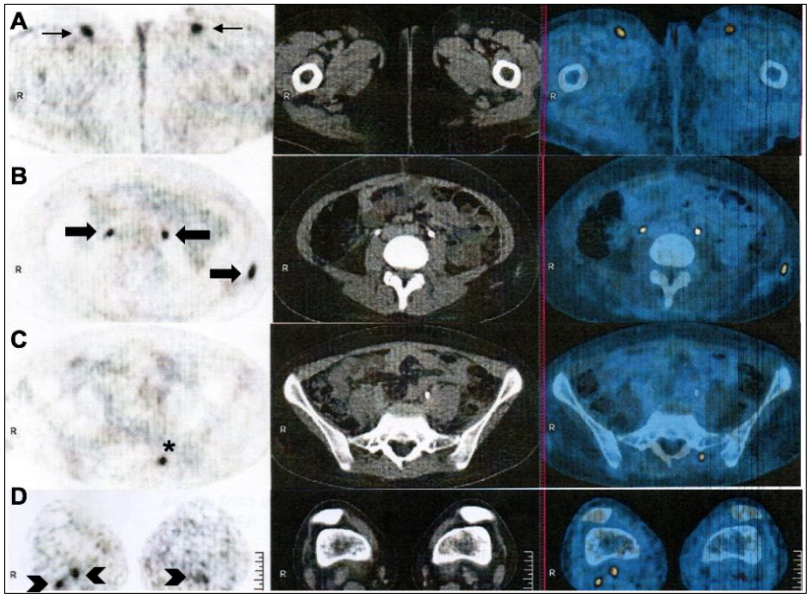


**Figure 11.** FDG-PET image of the (**A**) abdomen shows prominent-sized lymph nodes seen in the left inguinal/proximal thigh region, measuring 0.9 cm. Smaller lymph nodes are also seen in both inguinal regions. There is increased FDG uptake in the prominent left inguinal and small bilateral inguinal lymph nodes (thin arrows). (**B**) Musculoskeletal, FDG-avid diffuse subcutaneous thickening, haziness, and stranding densities in the left upper arm, right epigastric, bilateral posterolateral lumbar region, both pelvic, both gluteal, and both lower extremities (thick arrows). (**C**) A focus of increased FDG uptake is also noted in the left paraspinal (sacral) muscle, likely an intramuscular node (asterisk). (**D**) Another FDG-avid focus is noted in the proximal tibia and a smaller focus in the left proximal tibia. FDG-avid bilateral popliteal nodes are also noted, more prominent on the right (arrow heads).

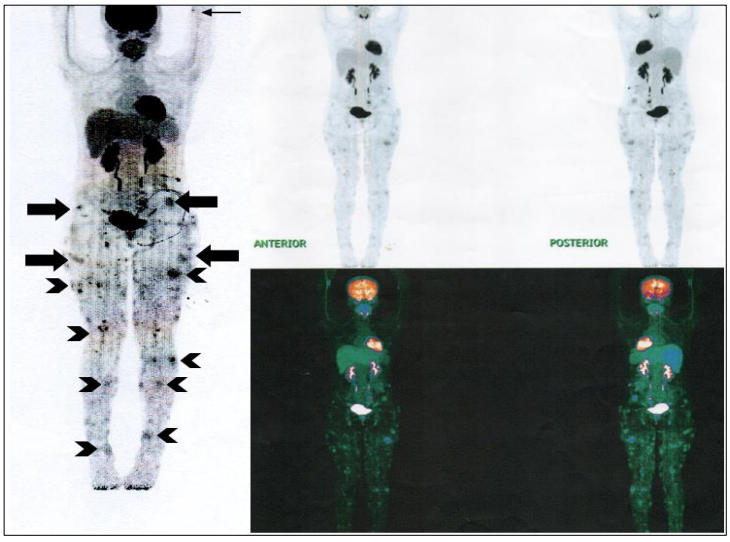


**Figure 12.** FDG-PET images show hypermetabolic diffuse subcutaneous thickening, haziness and stranding densities in the left upper arm (thin arrow), right epigastric, bilateral posterolateral lumbar regions, both pelvic, gluteal (thick arrows) and both lower extremities in keeping with known malignancy; hypermetabolic bilateral inguinal, popliteal and left paraspinal intramuscular lymph nodes are consistent with active lymphomatous disease (arrow heads); hypermetabolic foci in the tibia are suspicious for metastasis.


**Figure 13.** Brown-tinted, post-inflammatory hyperpigmentation of the subcutaneous nodules (**A**) 5 days after initiation of treatment and (**B**) near completion of induction treatment.

## REFERENCES

**1.** Sandlund J, Perkins S. Uncommon non-Hodgkin lymphomas of childhood: pathological diagnosis, clinical features and treatment approaches. British Journal of Haematology. 2015. 169(5): 631-646.

**2.** Nagai K, Nakano N, Iwai T, et al. Pediatric Subcutaneous Panniculitis-Like T-cell Lymphoma with Favorable Result by Immunosuppresive Therapy: A Report of Two Cases. Pediatric Hematology and Oncology. 2014. 31(6): 528-533.

**3.** Yim J, Kim M, Kim H, et al. Subcutaneous Panniculitis-like T-cell Lymphoma in a 26-Month-Old Child with a Review of Literature. Pediatric Dermatology. 2006. 23(6): 537-540.

**4.** Go R, Wester S. Immunophenotypic and Molecular Features, Clinical Outcomes, Treatments, and Prognostic Factors Associated with Subcutaneous Panniculitis-like T-cell Lymphoma: A Systemic Analysis of 156 Patients Reported in the Literaure. American Cancer Society (2004). 101(6): 1404-1413.

**5.** Huppman A, Xi L, Raffeld M, et al. Subcutaneous Panniculitis-Like T-cell Lymphoma in the Pediatric Age Group: A Lymphoma of Low Malignant Potential. Pediatr Blood Cancere. 2003. 60(7): 1165-1170.

**6.** Kim J, Chae E, Park Y, et al. Radiologic and Clinical Feautres of Subcutaneous Panniculitis-like T-cell Lymphoma. Journal of Computer Assisted Tomography. 2011. 35(3): 394-401.

**7.** Wells J, Kosky C, Scolyer R, et al. Unusual case of subcutaneous panniculitis-like T-cell lymphoma. Australasian Journal of Dermatology. 2004. 45(2): 114-118.

**8.** Gupta V, Arava S, Bakhshi S, et al. Subcutaneous Panniculitis-like T-Cell Lymphoma with Hemophagocytic Syndrome in a Child. Pediatric Dermatology (2016). 33(2): 72-76.

**9.** Fujii K. New Therapies and Immunological Findings in Cutaneous T-Cell Lymphoma. Frontiers in Oncology. 2019. Vol 8: 198.

**10.** Levy R, Fusaro M, Guerin F. Efficicacy of Ruxolitinib in Subcutaneous

Panniculitis-like T-cell Lymphoma and Hemophagocytic Lymphohistiocytosis. Blood Advances (2020). 4(7): 1383-1387.

**11.** Lim G, Hahn, S, Chung N. Subcutaneous panniculitis-like T-cell lymphoma in a child: whole-body MRI in the initial and follow-up evaluation. Pediatric Radiology. 2008. 39(1): 57-61.

**12.** Eser B, Altuntas F, Er O, et al. A case of subcutaneous panniculitis-like T-cell lymphoma with haemaphagocytosis developing secondary to chemotherapy. Journal of the European Academy of Dermatology and Venerology. 2004. 18(6): 713-715.

**13.** Musick SR, Lynch DT. Subcutaneous Panniculitis Like T-cell Lymphoma. [Updated 2021 Mar 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Retrieved from: https://www.ncbi.nlm.nih.gov/books/NBK538517/

**14.** Torrelo A, Hernandez A. Panniculitis in Children. Dermatologic Clinics (2008). 26(4): 491-500.

**15.** Wolff K, Goldsmith L, Katz S, et al (2011). Fitzpatrick's Dermatology in General Medicine, 8th Edition. McGraw-Hill. 1(70): 732.

**16.** Singh S, Philip C, John M. Pediatric Subcutaneous Panniculitis-like T-Cell Lymphoma with Hematophagocytosis Showing Complete Resolution with the BFM90 Protocol: Case Report and Review of Lietrature. J Pediatrc Hematol Oncol. 2019. 41 (6): 478-481.

**17.** Medhi K, Kumar R, Rishi A, et al. Subcutaneous Panniculitis-like T-cell Lymphoma With Hemophagocytosis: Complete Remission WITH BFM-90 Protocol. J Pediatrc Hematol Oncol. 2008. 30(7): 558-561.