Panniculitis

Roman Bronfenbrener, MD

Septal Predominant

Panniculitis	Location	Clinical	Other findings	Pathology	Treatment
Erythema Nodosum (EN)	Usually symmetrically in pretibial area, but may be more disseminated with involvement of thighs, forearms, upper arms	Acute eruption of painful, erythematous, subcutaneous nodules Bruise-like in final stages of evolution Heal without residual scarring	EN is a delayed hypersensitivity reaction pattern to a wide variety of ailments, best remembered with the **BEDREST** mnemonic **B**ehçet's **E**strogen (Pregnancy/ oral contraceptive pills) **D**rug (sulfa, β-lactams, iodides and bromides) **R**ecent Illness (predominantly streptococcal) **E**nteropathic (Inflammatory bowel disease) **S**arcoidosis **T**uberculosis (note: ⅓ of cases with NO disease association)	Predominantly septal inflammation No vasculitis present Characteristic *Miescher's* microgranuloma : Macrophages aggregated around empty clefts or polymorphonuclear cells	Bedrest NSAIDs Discontinue offending medication Treatment of underlying condition results in EN improvement Portends a good prognosis in sarcoidosis in association with hilar lymphadenopathy, uveitis, fever, and arthlargias (Löfgren's syndrome)
Morphea associated panniculitis	Trunk and extremities	Indurated and depressed plaques, some with overlying sclerodermoid changes Not typically painful	May be primary sclerosing disorder of subcutaneous septa (morphea profunda) or a subcutaneous extension of overlying generalized or linear morphea	Septal panniculitis with mucin deposition, infiltrate of lymphocytes with marked increase in plasma cells	Recalcitrant to traditional morphea therapies Intralesional triamcinolone Hydroxychloroquine
α-1 antitrypsin deficiency panniculitis	Lower trunk and proximal extremities and at sites of trauma	Larger than other panniculitides Tender erythematous, violaceous, and purpuric plaques with occasional ulceration	Most severe manifestations in homozygous (*PiZZ)* α-1 antitrypsin deficient patients Other manifestations include early onset emphysema, hepatic fibrosis with eventual cirrhosis, pancreatitis, and angioedema	Diverse, with both septal and lobular presentations Polymorphonuclear cells splayed between collagen bundles early in evolutio Eventual lobular necrosis with "skip areas" of normal fat interspersed amongst necrotizing panniculitis	Abstinence from alcohol α-1 antitrypsin supplementation via weekly IV infusion. After IV infusion, panniculitis resolves rapidly, but scarring remains

Lobular Predominant

Panniculitis	Location	Clinical	Other findings	Pathology	Treatment
Erythema induratum (nodular vasculitis)	Classically posterior lower legs Also feet, thighs, buttocks and arms	Female predominance Tender, erythematous nodules and ulcerative plaques	TB - associated in *some* cases (tuberculid) Also *nocardia* and certain medications (propylthiouracil) have been linked	Lobular or mixed panniculitis Vasculitis of medium sized vessels concurrently with mixed infiltrate of lymphocytes, neutrophils, and granulomatous inflammation in lobules.	PPD or Interferon Gamma Release Assay Treatment of underlying infection if indicated. Discontinuation of any offending medications NSAIDs, steroids, SSKI Bedrest, compression stockings, smoking avoidance
Pancreatic panniculitis	Most commonly legs, but may be diffuse. Face generally spared	In patients with acute or chronic pancreatitis, pancreatic carcinoma, or congenital pancreatic duct abnormalities Tender, erythematous subcutaneous nodules that may become confluent and exude oily liquid	May develop in up to 2% of patients with pancreatic disease. Can develop *before* clinical signs of pancreatic disease. *Schmid's triad:* Subcutaneous nodules, arthritis, eosinophilia. Associated with poor prognosis Heal with hyperpigmented and depressed scars	Fat necrosis with saponification leading to basophilic calcium deposition *Ghost cells* - necrosed lipocytes with thickened walls Mixed infiltrate of cells, occasional multinucleated giant cells Resolves with fibrosis and fat atrophy	Treatment of underlying pancreatic pathology leads to eventual resolution of panniculitis
Lupus panniculitis	Face, proximal limbs, trunk arising in crops. Tends to spare distal extremities	Associated with overlying cutaneous lupus lesions ranging from mild erythema to discoid lesions	Associated with chronic cutaneous lupus. Only about 10% have diagnostic criteria for systemic lupus erythematosus	Lobular inflammation with occasional granulomas, mucin deposition, lymphocytic vasculitis Frequently overlying changes of chronic cutaneous lupus erythematosus	Antimalarial therapy Pulsing steroids may be necessary Overlying chronic cutaneous lupus may be treated with topical or intralesional therapy

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Lobular Predominant (cont.)

Panniculitis	Location	Clinical	Other findings	Pathology	Treatment
Dermatomyositis panniculitis	Trunk and extremities	Sometimes seen with established disease, but rarely the initial manifestation May be seen in histologic sections without any overlying clinical lesions	Some studies have associated DM panniculitis with favorable prognosis	Lymphocytic and plasmacytic lobular or mixed lobuloseptal inflammation	Treat underlying dermatomyositis with immunosuppressive therapy Occasional response to plaquenil
Traumatic panniculitis	Cold Panniculitis - small children on cheeks and chin Sclerosing lipogranuloma - male genitalia Traumatic - sites of blunt trauma or injected material	Cold panniculitis - children with history of popsicle ingestion Sclerosing lipogranuloma - injection of mineral oil, paraffin, or other substances into male genitalia Traumatic - reports due to injection of Vitamin K, filler materials, as well as factitious substances (milk, feces)	Patient's history is key to diagnosis; however, many patients with psychiatric illness will deny injection of substance	Cold panniculitis - mixed infiltrate with septal and lobular inflammation, granulomas, mucin, and adipocyte necrosis Sclerosing lipogranuloma - "Swiss cheese" appearance of vacuoles (injected foreign substance) within subcutaneous fat Injection panniculitis - Localized inflammation with polarizable foreign body, granulomatous reaction, surrounded by mixed infiltrate	Removal of inciting event Intralesional steroids Surgical excision if localized process with foreign body present
Lipodermatosclerosis	Medial lower extremities Usually background of stasis dermatitis	Acute phase - tender, erythematous nodules and plaques, "pseudo cellulitis" appearance Chronic phase - indurated red-brown plaque. "Inverted wine bottle" appearance of leg	Chronic venous stasis changes with increased capillary permeability and resultant anoxia leads to sclerosing panniculitis Clinically most significant in dependent areas Early lesions may mimic other panniculitides or even infectious processes	Early - lobular necrosis and lymphocytic septal infiltrate with congested capillaries and hemosiderin deposits Chronic - "lipomembranous changes" with thickening of adipocyte membranes	Leg elevation Compression support stockings Intralesional kenalog Oral androgen therapy and pentoxyfilline are other therapeutic alternatives
Infection-induced panniculitis	May be at sites of direct innoculation, or as disseminated lesions in septic patients.	Subcutaneous fat involvement by infectious process Frequently immunosuppressed patients.	Causative agents include bacterial, mycobacterial, fungal, and parasitic organisms Pathogen directly present within subcutis Traumatic panniculitis may be associated with concurrent infectious panniculitis	May mimic other panniculitides, although commonly a mixed neutrophil predominant infiltrate with vascular proliferation and hemorrhage. Microbial stains (i.e. Gram stain, acid fast stain, PAS, etc.) are essential for diagnosis	Appropriate antimicrobial therapy Surgery for more vegetative processes (i.e Botryomycosis)

Lobular with Crystal Formation

Panniculitis	Location	Clinical	Other findings	Pathology	Treatment
Sclerema neonatorum	Widespread with volar and genital sparing	Diffusely hardened skin in ill premature infants occuring within first week after birth	Death frequently from sepsis, heart failure, or respiratory failure	Increased saturated fat content in lipocytes predisposes to crystallization Needle-shaped clefts in adipocytes with minimal surrounding inflammation	Treatment of underlying prematurity-related medical conditions Even with treatment, 75% of infants succumb to death Sclerema neonatorum is a sign of underlying illness, not the cause of demise
Subcutaneous fat necrosis of the newborn	Cheeks, trunk, thighs	Localized and circumscribed subcutaneous nodules with induration, but generally freely mobile Full term infant in first month of life	Hypercalcemia, thrombocytopenia, hypertriglyceridemia	Needle-shaped clefts in adipocytes with neutrophils, lymphocytes, and macrophages with occasional giant cells	Self-limiting process - no treatment necessary Follow calcium for associated hypercalcemia (increased 1α hydroxylase by macrophages in subcutaneous fat)
Post-Steroid Panniculitis	Cheeks, upper extremities, trunk	Toddlers to adolescents previously treated with systemic glucocorticoids (1-2 weeks prior to presentation)	History of rapid steroid withdrawl in children with high cumulative doses	Lobular involvement with needle-shaped clefts, multinucleated giant cells, lymphocytes, and macrophages	Self-limited - no treatment necessary Restarting steroids and initiating slow taper may help

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