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The Clinician's Guide to Dermatologic Differential Diagnosis

Second Edition

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There are a great number of people who made significant contributions to my personal and professional development, provided me with nurturing love and guidance, the opportunity to succeed, mentorship and encouragement, and valuable professional support which has enabled me to make a difference for my patients and my specialty. I am deeply grateful and indebted to them all. It is to these members of my life family that this book is lovingly dedicated.

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Marc E. Grossman, MD, FACP

Paul I. Schneiderman

To Alexander and Natalie
For bringing pure joy to my life

Marc E. Grossman

Preface to the Second Edition

More than a decade has passed since the publication of the first edition of this textbook, *A Clinician's Guide to Dermatologic Differential Diagnosis*. In that period of time, the medical literature has expanded exponentially in print and online. We have updated, edited, and incorporated new material into all of the "old chapters" of the Text.

Almost a hundred additional new chapters have been added to the text. The expansion of topics was mostly the cutaneous manifestations of systemic disorders of the subspecialties of medicine and surgery for the adult and pediatric patient.

The atlas has been improved and expanded. All the new images are 20% larger, making them easier to visualize, with more emphasis on morphologic detail to increase diagnostic acumen. The fine points of the physical examination enable the pictures to do the teaching. This second edition atlas contains 6000 completely new and different images from the 4000 original non-digital photographs of the first edition. Some of the new illustrations are different views or perspectives of the diagnostic images, different time periods in the evolution of skin disease, or more complete images of the entire patient providing high-power and low-power or scanning views of the clinical disorder represented.

On a personal note, the atlas contains the only published photograph of the first case of cutaneous anthrax as a weapon of bioterrorism in New York City in 2001 (diagnosed, photographed, and treated by the author MG). Our collection of photographs of Nazi concentration camp serial identification number tattoos on the left forearms of survivors will outlive our patients and memorialize the Holocaust for the six million.

The original concepts, expectations, and usefulness of our textbook have been confirmed by its continued value as a reference in the hospital, in the classroom, and in the office by the seasoned practitioner, the resident, and medical student. The first edition passed the "use test."

The correct dermatologic diagnosis is essential for the treatment to be effective. Starting with a symptom, sign, or organ system dysfunction from the table of contents, a perusal of the differential diagnosis lists has successfully led us to a diagnosis we had not considered beforehand. The text provides the essential comprehensive differential diagnosis to avoid diagnostic traps and errors of dermatologic heuristics (cognitive shortcuts). The atlas augments visual observational skills by providing focused photographs of characteristic findings in common and exotic diseases. Common findings in rare diseases and rare or unusual findings in common diseases are illustrated as well as atypical locations for both. For the patient that defies diagnosis, going systematically through check lists of diseases ensures that none is missed before concluding that the patient has a new or undescribed disorder, or that the rash has not yet evolved into its recognizable form.

Writing and editing the "Red Books" have been as much self-education for us as teaching has been for us over the past 40 years. Education is a lifelong process augmented by historical perspective, remarkable one-case experiences, and gestalt/gut feeling/intuition.

Most of our dermatology resident and medical student teaching has been in the Washington Heights section of Manhattan at Columbia Presbyterian Medical Center; in New Haven, Connecticut, at Yale University School of Medicine; and in New Hyde Park, New York, at Hofstra/Northwell Donald and Barbara Zucker School of Medicine.

We expect that these companion volumes will be helpful in all clinical settings and used by all healthcare providers on the academic campus or in the community environment, anywhere in the world.

New York, NY, USA
New Haven, CT, USA

Paul I. Schneiderman
Marc E. Grossman

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Agranulocytosis - infantile genetic agranulocytosis – subcutaneous abscesses *Acta Paediatr Scand 64:362–368, 1975*

Allergic contact dermatitis – to aluminum in vaccination site *Ped Derm 29:68–72, 2012*

Chediak-Higashi syndrome – photophobia, nystagmus, decreased pigmentation of iris *BJD 178:335–349, 2018*

Chronic familial neutropenia

Chronic granulomatous disease - bacterial abscesses, perianal abscesses *JAAD 36:899–907, 1997; AD 130:105–110, 1994; AD 103:351–357, 1971*; gene carriers may develop abscesses, hidradenitis suppurativa, and ulcerative stomatitis *BJD 178:335–349, 2018; Ped Derm 3:376–379, 1986;* female X-linked carriers of chronic granulomatous disease – infections with *Burkholderia cepacia* complex, *Aspergillus fumigatus, Trichosporon inkin, Nocardia spp. J Allergy Clin Immunol 141:365–371, 2018*

Common variable immunodeficiency *Ped Derm 26:155–158, 2009; BJD 147:364–367, 2002; J Allergy Clin Immunol 109:581, 1999*

Complement deficiencies – C1q *Clin Exp Immunol 38:52–63, 1979*

Congenital cyclic neutropenia – periodic fevers *BJD 178:335–349, 2018; Blood Rev 2:178–185, 1988; Am J Med 61:849–861, 1976*

Cyclic neutropenia *BJD 178:335–349, 2018; Ped Derm 18:426–432, 2001; Am J Med 61:849–861, 1976*

Dock8 deficiency syndrome (dedicator of cytokinesis 8 gene) (autosomal recessive hyper IgE syndrome) – immunodeficiency; resembles Job's syndrome; decrease T and B cells; increased IgE, decreased IgM, increased eosinophilia; cold abscesses, recurrent sinopulmonary infections, severe cutaneous viral infections and lymphopenia; warts, dermatitis, asthma, , cutaneous staphylococcal abscesses; malignancies – aggressive T-cell lymphoma vulvar squamous cell carcinoma, diffuse large B-cell lymphoma; Job's syndrome may be differentiated by presence of pneumatoceles and bronchiectasis, rash at birth, osteoporosis, scoliosis, craniosynostosis, minimal trauma fractures, joint hyperextensibility; dominant negative STAT3 mutation *BJD 178:335–349, 2018; AD 148:79–84, 2012*

Hyper-IgE syndrome (Job's syndrome) – cold abscesses *BJD 178:335–349, 2018*

Hyper IgM immunodeficiency syndromes - X-linked recessive - perirectal abscesses *JAAD 38:191–196, 1998*

ICF syndrome – immunodeficiency, centromere instability, and facial anomaly syndrome – cold abscesses *BJD 178:335–349, 2018*

IL-1 receptor-associated kinase 4 gene (IRAK-4) mutations – cellulitis, abscesses, impetigo *JAAD 54:951–983, 2006; Science 299:2076–2079, 2003*

IL-10 defect – perianal abscess *BJD 178:335–349, 2018*

Lactoferrin deficient neutrophils (neutrophil-specific granule deficiency) – autosomal recessive *Ann Rev Med 36:263–274, 1985; J Clin Immunol 4:23–30, 1984*

Leukocyte adhesion deficiency (beta-2 integrin deficiency) – abscesses, cellulitis, skin ulcerations, pyoderma gangrenosum; ulcerative stomatitis *BJD 178:335–349, 2018;*

BJD 139:1064–1067, 1998; J Pediatr 119:343–354, 1991; Ann Rev Med 38: 175–194, 1987; J Infect Dis 152:668–689, 1985; congenital deficiency of leucocyte-adherence glycoproteins (CD11a (LFA-1), CD11b, CD11c, CD18) – necrotic cutaneous abscesses, psoriasiform dermatitis, gingivitis, periodontitis, septicemia, ulcerative stomatitis, pharyngitis, otitis, pneumonia, peritonitis *BJD 123:395–401, 1990*

Leukocyte glucose-6-phosphatase deficiency *J Pediatr 87:1121–1124, 1975*

Mammalian sterile 20-like 1 deficiency *BJD 178:335–349, 2018*

Mendelian susceptibility to mycobacterial disease (MSMD) – *Mycobacterium bovis,* non-tuberculous mycobacteria, *Salmonella* – mutations in IL-12, interferon gamma, *IFNGR1, IFNGR2, STAT1,* IL-12B, *aIL-12RB1, IKBKG Ped Derm 31:236–240, 2014*

Mycobacteriosis (atypical) *BJD 178:335–349, 2018*
- GATA2 deficiency
- IFN gammaR1/2 defects
- IRF8 defects
- ISG15 disease
- Macrophages-gp91-phox defect
- MSMD (Mendelian susceptibility to mycobacterial disease)
- NEMO deficiency
- STAT-1 defects

Neutrophilic-specific granule deficiency; mutations in *CEBPE, GF11*

BJD 178:335–349, 2018

Papillon-Lefevre syndrome – perianal abscess *BJD 178:335–349, 2018*

Perforating neutrophilic and granulomatous dermatitis of the newborn – cutaneous eruption of immunodeficiency; papules, plaques, vesicles, crusts, ulcers; boggy pustular masses; purpuric lesions; prominent involvement of palms and soles; sparing of trunk *Ped Derm 24:211–215, 2007*

Transcobalamin II deficiency *Primary Immunodeficiencies. Amsterdam: Elsevier 353–362, 1980*

Tuftsin deficiency *J Pediatr 111:852–854, 1987*

X-linked hypogammaglobulinemia – perianal abscess *BJD 178:335–349, 2018; Medicine (Baltimore)85:193–202, 2006*

X-linked inhibitor of apoptosis-deficiency – perianal abscess *BJD 178:335–349, 2018*

CONGENITAL

Congenital agranulocytosis

Fetal scalp electrode placement *AD 135:697–203, 1999; JAAD 18: 239–259, 1988;* scalp abscess of 3 day old infant *Am J Obstet Gynecol 129:185–189, 1977*

First branchial cleft

Peristernal dermal sinus connecting to pectoralis major – swelling, suppuration, and pain *Ped Derm 37:40–51, 2020*

Pre-auricular cyst with secondary infection (*Staphylococcus, Proteus, Streptococcus, Peptococcus*) *J Oral Maxillofac Surg 56:827–831, 1998*

Subcutaneous fat necrosis of newborn *AD 146:882–885, 2010; Ped Derm 27:317–318, 2010*

DRUG

BCG (Bacille-Calmette-Guerin) reactions *BJD 164:1402–1403, 2011*

Calcium gluconate extravasation *AD 138:405–410, 2002; AD 134:97–102, 1998*

Epidermal growth factor inhibitors – abscess-like lesions *JAAD 55:657–670, 2006*

Granulocyte colony stimulating factor - cystic acne and hidradenitis suppurativa associated with myelodysplastic syndrome *AD 144:643–648, 2008*

Infliximab – polyarthritis and abscess formation during infliximab treatment of hidradenitis suppurativa *BJD 165:194–198, 2011*

Interferon-beta injection site *JAAD 34:365–367, 1996*

Iododerma – carbuncular lesions *Australas J Dermatol 28:119–122, 1987*

Isotretinoin – lip abscess *JAMA Derm 149:960–961, 2013; J Drugs Dermatol 8:1034–1036, 2009*

Vemurafenib (BRAF inhibitor) – cystic lesions of face, hidradenitis suppurativa, keratosis pilaris-like eruptions, eruptive melanocytic nevi; hyperkeratotic plantar papules, squamous cell carcinoma; multiple nodules of cheeks; follicular plugging; exuberant seborrheic dermatitis-like hyperkeratosis of face; hand and foot reaction; diffuse spiny follicular hyperkeratosis; cobblestoning of forehead *AD 1428:-1429, 2012; JAAD 67:1375–1379, 2012; AD 148:357–361, 2012*

Zinc – furuncles at injection site

Zyderm collagen implant (bovine collagen) *JAAD 25:319–326, 1991*

EXOGENOUS AGENTS

Drug abuse, intravenous *JAAD 69:135–142, 2013; NEJM 277:473–475, 1967*

Foreign body, including foreign body granuloma

Hair sinus – of the hand *JAAD 47:S281–282, 2002;* barber's sinus and cyst *AD 112:523–524, 1976;* of the breast *Clin Exp Dermatol 7:445–447, 1982*

Milk injections – suppurative panniculitis *Rook p. 2422, 1998, Sixth Edition*

Paraffin granuloma *Bolognia, p.1477, 2003*

Pilonidal sinus - of umbilicus *Lancet 2:281–2, 1956;* of suprapubic region

Silicone granuloma *AD 141:13–15, 2005; Derm Surg 27:198–200, 2001*

INFECTIONS OR INFESTATIONS

Abdominal-cutaneous fistulas *J Am Coll Surg 190:588–592, 2000*

Abdominal wall abscesses *AD 131:275–277, 1995*
- *Candida krusei*
- Crohn's disease
- Infected lipoma
- Post-operative wound infection

Abscess in a prepatellar bursa – personal observation

Abscess over ECMO port - personal observation

Abscess with sepsis - personal observation

Acanthamoeba *Clin Inf Dis 27:1547–1548, 1998; Clin Inf Dis 20:1207–1216, 1995*

Acinetobacter baumannii JAAD 75:1–16, 2016; JAMA Derm 150:905–906, 2014

Actinomycosis, multiple species *Med J Aust 169:120, 1998; Clin Inf Dis 19:143–145,1994; AD 124:121–126, 1988; Ann Int Med 132:328–332, 1981; JAMA 228:1397–1400, 1974;* A. meyeri *Clin Inf Dis 22:185–186, 1996*

Aeromonas hydrophila JAAD 61:733–750, 2009

African histoplasmosis (*Histoplasma duboisii*) *BJD 82:435–444, 1970*

Alternariosis *JAAD 52:653–659, 2005; Int J Derm 39:293–295, 2000*

Amebic abscess *Clin Inf Dis 20:1207–1216, 1995; Pediatrics 71:595–598, 1983;* rectal abscess *Int J Dermatol 41:676–680, 2002;*

Anal gland infection - perianal abscess

Apophysomyces elegans

Aspergillosis - abscess or kerion-like *JAAD 80:869–880, 2019; JAAD 29:654–655, 1993; BJD 85 (suppl):95–97, 1971*; *A. fumigatus East Afr Med J 75:436–438, 1998;* ulcers with satellite abscesses *Ped Derm 19:439–444, 2002; A. Flavus* – heart transplant patient - personal observation

Bacillary angiomatosis *AD 131:933–936, 1995*

Bacille-Calmette-Guerin (BCG) cold abscesses - single or multiple; *Ped Derm 208–212, 2000; Ped Derm 14:365–368, 1997;* in patient with severe combined immunodeficiency disease – abscesses, nodules, papules and pustules *Ped Derm 36:672–676, 2019*

Bacteroides – sepsis with abscesses

Bilophila wadsworthia J Clin Inf Dis 25 (Suppl 2):S88–93, 1997

Botryomycosis – granulomatous reaction to bacteria with granule formation; single or multiple abscesses of skin and subcutaneous tissue break down to yield multiple sinus tracts; small papule; extremities, perianal sinus tracts, face *Cutis 80:45–47, 2007; Int J Dermatol 22:455–459, 1983; AD 115:609–610, 1979*

Breast abscess *Clin Inf Dis 59:410,454–455, 2014*
- Anaerobic species in non-puerperal women
- *Brucella melitensis J Infect 33:219–220, 1996*
- Cat scratch disease *Clin Inf Dis 59:410,454–455, 2014*
- *Cryptococcus neoformans Scand J Infect Dis 34:309–310, 2002*
- *C*ystic neutrophilic granulomatous mastitis presenting as recurrent breast abscess; *Corynebacterium* species include *C. kroppenstedtii, C, amycolatum, C. tuberculostearicum, C. accolens, C. striatum, C. minutissimum Clin Inf Dis 59:410, 454–455, 2014*
- *Escherichia coli*
- Granulomatosis with polyangiitis *Acta Clin Belg 54:207–210, 1999*
- *Mycobacterium chelonei*
- Periareolar pilonidal abscesses
- Sarcoidosis *Pathologica 102:104–107, 2010*
- Squamous metaplasia of lactiferous ducts
- *Staphylococcus aureus* – most common cause in lactating women *Clin Inf Dis 59:410, 454–455, 2014*

Brucellosis (*Brucella melitensis*) – primary inoculation abscesses *Cutis 63:25–27, 1999; AD 117:40–42, 1981;* breast abscess *J Infect 33:219–220, 1996;* testicular abscess with Brucella epididymo-orchitis – scrotal swelling, pain, fever, diaphoresis *Clin Inf Dis 33:2017–2027, 2001*

Campylobacter jejuni - perirectal abscess

Candida - *Candida albicans Arch Dis Child 59:479–480, 1984;* abscess in heroin abusers *Dermatologica 177:115–119, 1988; JAAD 16:386–387, 1987; Candida tropicalis* - nodular subcutaneous abscesses *JAAD 16:623–624, 1987;* abscess or kerion-like carbuncle *JAAD 14:511–12,1986*; *Candida krusei AD 131:275–277, 1995*

Carbuncle - following herpes zoster - personal observation; perianal - personal observation

Cat scratch disease (suppurative adenopathy) *Ped Derm 5:1–9, 1988*

Chagas' disease (*Trypanosoma cruzi*) – chagoma; furuncle-like violaceous lesions with central edema and regional adenopathy *JAAD 60:897–925, 2009;* Chagas' disease – megacolon, intestinal perforation; unilateral painful bipalpebral edema, conjunctivitis, local lymphadenopathy, periorbital cellulitis, panniculitis, cardiac involvement *JAAD 75:19–30, 2016*

Chancroid

Clostridium botulinum – wound botulism in drug addicts *Clin Inf Dis 31:1018–1024, 2000*

Clostridium dificile Clin Inf Dis 20:1560–1562, 1995

Coccidioidomycosis *JAAD 55:929–942, 2006; JAAD 26:79–85, 1992;* primary cutaneous coccidioidomycosis *JAAD 49:944–949, 2003*

Cold abscess/Job's syndrome

Cowpox – human cowpox with fingertip necrosis and arm abscess, lymphangitis, lymphadenopathy *Clin Inf Dis 69:179–181, 2019*

Corynebacterium pseudotuberculosis Aust NZ Med 15:85–6, 1985; *C. xerosis* - abscess and sternal wound infection *J Clin Inf Dis 19:1171–1172, 1994*

Cryptococcosis *Pediatr Infect Dis J 19:85–86, 2000; JAAD 37:116–117, 1997; Cryptococcus albidis* – scalp abscess *Ped Derm 24:285–288, 2007*

Demodex folliculitis – demodectic facial abscesses *JAAD 49:S272–274, 2003; Ann DV 113:1047–1058, 1986*

Dental sinus *J Am Dent Assoc 130:832–836, 1999; Cutis 43:22–24, 1989; JAAD 2:521–524, 1980;* facial abscess *Ped Derm 29:421–425, 2012*

Dermatophilus congolensis – contact with infected animals *BJD 145:170–171, 2001*

Dermatophyte infections - pustules and abscesses *JAAD 30:1021–1022, 1994;* Trichophyton rubrum, invasive *Cutis 67:457–462, 2001*

Dissecting cellulitis

Dracunculosis

Edwardsiella tarda – myonecrosis with cutaneous abscesses *Clin Inf Dis 32:143–1433, 2001*

Eikenella corrodens – cheek abscess, forehead wound, scalp wound, neck wound, periorbital abscess *Clin Inf Dis 33:70–75, 2001;* submandibular and cervicofacial abscesses *Cutis 60:101–102, 1997;* thigh abscess *Diabetes Care 19:1011–1013, 1996*

Enterobius vermicularis - perianal abscesses *Cutis 71:268–270, 2003*

Escherichia coli

Eugonic fermenter (EF-4) – dog bites *J Clin Microbiol 8:667–672, 1978*

Exophiala species

Exserohilum rostratum JAAD 28:340–344, 1993

*Fasciola hepatica (*fluke parasite) *JAAD 42:900–902, 2000*

Felon

Filariasis – abscesses from reactions to adult filariae *Dermatol Clin 7:313–321, 1989*

Folliculitis decalvans

Fournier's gangrene – may start as perirectal abscess *Surgery 91:49–51, 1982*

Frontal sinusitis with abscess

Furunculosis *J Drugs in Dermatol 12:369–374, 2013*

Fusarium solani Cutis 63:267–270, 1999

Fusobacterium – abscesses with necrosis

Gemella morbillorum Acta DV 79:398, 1999

Glanders (melioidosis) – *Burkholderia (Pseudomonas) mallei* – cellulitis which ulcerates with purulent foul-smelling discharge, regional lymphatics become abscesses; nasal and palatal necrosis and destruction; metastatic papules, pustules, bullae over joints and face, then ulcerate; deep abscesses with sinus tracts occur; polyarthritis, septic arthritis, meningitis, pneumonia *Clin Inf Dis 31:981–986, 2000;* single or multiple abscesses *AD 135:311–322, 1999*

Gnathostomiasis *JAAD 33:825–828, 1995*

Gram negative enteric bacteria - perianal abscess

Gram negative web space infection with abscess - personal observation

Hafnei alvei Clin Inf Dis 20:1426, 1995

Hemophilus influenzae - hand abscesses with oropharyngeal infection *J Hand Surg 11A:844–846, 1986*

Histoplasmosis *Diagnostic Challenges Vol V;77–79, 1994; BJD 82:435–447, 1970*

Stye (hordeolum) – staphylococcal abscess of eyelid margin

Intersphincteric ulcers of men having sex with men (MSM) *Br J Surg 76:1064–1066, 1989*

Intravenous drug users *Clin Inf Dis 33:35–40, 2001*
- Anaerobes
  - *Fusobacterium nucleatum*
  - *Peptostreptococcus micros*
  - *Actinomyces odontolyticus*
  - Pigmented Prevotella
- Non-anaerobes
  - *Staphylococcus aureus*
  - *Streptococcus milleri group, viridans group, group A*
- Facultative gram-negative bacteria

Abscesses in non-intravenous drug users
- Anaerobes
  - *Peptostreptococcus (P. magnus, P. micros, P. saccharolyticus)*
  - Pigmented *Prevotella*
  - Actinomyces species
  - *Fusobacterium nucleatum*
- Non-anaerobes
  - *Staphylococcus aureus*
  - *Streptococcus - S. milleri group, viridans group, group A*

Kerion – crusted nodules and abscess of scalp *Ped Derm 28:655–657, 2011*

Kerion-like lesions *JAAD 29:654–655, 1993*
- *Aspergillus* and *rhizopus* infection in AIDS *JAAD 26:1017, 1991*
- Candidal carbuncles
- Metastatic adenocarcinoma to scalp *JAAD 29:654–655, 1993*

Lacrimal gland abscess – adjacent to medial canthus

Lactation mastitis (breast feeding) - cracked nipples; deep abscesses, mastitis *JAMA 289:1609–1612, 2003*

Lagochilascaris minor – subcutaneous abscesses; Surinam and Central America *Rook p.1395, 1998, Sixth Edition*

Legionella micdadei *Ann Int Med 102:630–632, 1985*

Leishmaniasis (*L. major*) - acute cutaneous form (wet, rural, zoonotic form); localized furuncle-like nodule *JAAD 73:897–908, 2015*

Listeria monocytogenes J Clin Inf Dis 19:988–989, 1994

Lymphogranuloma venereum – Jersild syndrome – perirectal abscesses, fistulae, sclerosis *JAAD 54:559–578, 2006;* inguinal adenitis with abscess formation and draining chronic sinus tracts; rectal syndrome in women with pelvic adenopathy, periproctitis with rectal stricture and fistulae; esthiomene – scarring and fistulae of the buttocks and thighs with elephantiasic lymphedema of the vulva; lymphatics may develop abscesses which drain and form ulcers *Int J Dermatol 15:26–33, 1976*

Melioidosis – *Burkholderia pseudomallei* – especially found in Thailand; pustules or subcutaneous abscesses *JAAD 75:1–16, 2016; Clin Inf Dis 60:21–26, 2015; Clin Inf Dis 60:243–250, 2015; Ped Derm 29:692, 2012; JAAD 54:559–578, 2006; Clin Inf Dis 40:988–989,1053–1054, 2005*

Molluscum contagiosum *AD 148:1257–1264, 2012; JAAD 43:409–432, 2000; Ped Derm 6:118–121, 1989;* inflammatory reaction surrounding molluscum contagiosum lesions due to immune reconstitution inflammatory syndrome (IRIS) *Ped Derm 27:631–634, 2010*

Mucormycosis

Mycetoma – early in course; sterile abscesses late in course *JAAD 53:931–951, 2005; Hautarzt 45:402–405, 1994;* scalp abscesses due to *Microsporum canis (*pseudomycetoma) *Cutis 78:473–475, 2006; M. canis and Trichophyton mentagrophytes Mycopathologia 81:41–48, 1983*

Mycobacterium abscessus – breast abscesses due to adulterated intramammary silicone injections *JAAD 50:450–454, 2004;* post-injection abscesses *Clin Inf Dis 24:1147–1153, 1997; Clin Inf Dis 19:263–273, 1994; AD 142:1287–1292, 2006; Am J Respir Crit Care Med 156 (pt 2):S1–S25, 1997; Rev Infect Dis 5:657–679, 1983;* leg abscess *Ped Derm 23:128–131, 2006;* pedicure-associated furunculosis *Clin Inf Dis 53:787–792, 2011;* abscess *Ped Derm 32:488–494, 2015*

Mycobacterium avium complex – abscess *J Drugs Dermatol 13:1491–1493, 2014; Rev Inf Dis 11:625–628, 1989*

Mycobacterium avium-intracellulare BJD 136:121–123, 1997; Clin Inf Dis 19:263–273, 1994; JAAD 27:1019, 1992; AD 124:1545–1549, 1988; perianal abscess

Mycobacterium bollettii – leg plaques, pustules, and abscesses due to foot baths for pedicures *AD 147:454–458, 2011*

Mycobacterium chelonei-fortuitum – BJD 171:79–89, 2014; JAAD 60:177–179, 2009; AD 142:1287–1292, 2006; Am J Respir Crit Care Med 156 (pt 2):S1–S25, 1997; JAAD 30:269–270, 1994; Clin Inf Dis 19:263–273, 1994; AD 122:695–697, 1986; Rev Infect Dis 5:657–679, 1983; *Medicine 60:95–109, 1981; ;* pedicure-associated furunculosis *Clin Inf Dis 53:787–792, 2011;* facial abscess *Ped Inf Dis 3:335–340, 1984;* cold abscesses; breast abscess *Clin Inf Dis 26:760–761, 1998;* multiple draining abscesses of leg *AD 143:951–952, 2007*

Mycobacterium fortuitum – AD 142:1287–1292, 2006; Am J Respir Crit Care Med 156 (pt 2):S1–S25, 1997; Rev Infect Dis 5:657–679, 1983; injection abscesses *Lancet ii:691, 1969;* leg abscesses from foot bath in nail salon *JAAD 54:520–524, 2006; NEJM 346:1366–1371, 2002;* at sites of subcutaneous insulin infusion *BJD 171:418–420, 2014;* after amateur tattooing *J Med Assoc Thai 95:834–837, 2012;* after treatment of molluscum contagiosum *Infect Chemother 45:85–93, 2013; J Eur Acad Dermatol and Venereol 24:604–606, 2010*

Mycobacterium haemophilum Ped Derm 32:488–494, 2015; Ann Int Med 97:723–724, 1982

Mycobacterium kansasii Ped Derm 32:488–494, 2015; JAAD 41:854–856, 1999; JAAD 36:497–499, 1997; Clin Inf Dis 19:263–273, 1994

Mycobacterium leprae - peripheral nerve abscess *Indian J Lepr 69:143–147, 1997; Acta Leprol 10:45–50, 1996;* suppuration of erythema nodosum leprosum *Rook p.1227, 1998, Sixth Edition*

Mycobacterium mageritense J Clin Microbiol 42:1813–1817, 2004

Mycobacterium marinum – tender red nodule or pustule which evolves into crusted ulcer with underlying suppurative abscess *Cutis 79:33–36, 2007; Clin Inf Dis 19:263–273, 1994*

Mycobacterium massiliense – leg plaques, pustules, and abscesses due to foot baths for pedicures *AD 147:454–458, 2011*

Mycobacterium mucogenicum – suppurative nodule *Med Cl (Barcelona) 132:370, 2009*

Mycobacterium peregrinum

Mycobacterium scrofulaceum AD 138:689–694, 2002; Clin Inf Dis 19:263–273, 1994; AD 123:369–370, 1987;

Mycobacterium smegmatis

Mycobacterium szulgai – carbuncle *Tubercle 66:65–67, 1985*

Mycobacterium thermoresistible

Mycobacterium tuberculosis – scrofuloderma – neck abscess *JAMA Derm 150:909–910, 2014; Cutis 85:85–89, 2010;* abscess *Ped Derm 30:7–16, 2013;* hot abscess; cold abscess (tuberculous gumma) *SKINmed 10:28–33, 2012;* tuberculous gumma (metastatic tuberculous ulcer) – firm subcutaneous nodule or fluctuant swelling breaks down to form undermined ulcer; bluish surrounding skin bound to the inflammatory mass; sporotrichoid lesions along draining lymphatics; extremities more than trunk *Am J Clin Dermatol 3:319–328, 2002; BJD 142:387–388, 2000; Scand J Infect Dis 32:37–40, 2000; Scand J Inf Dis 35:149–152, 1993; JAAD 19:1067–1072, 1988; JAAD 6:101–106, 1982; Semin Hosp Paris 43:868–888, 1967;* of the neck *BJD 142:387–388, 2000;* paradoxical subcutaneous tuberculous abscess *J Clin Inf Dis 26:231–232, 1998; J Clin Inf Dis 24:734, 1997;* cutaneous metastatic tuberculous abscess *Ped Derm 19:90–91, 2002; Cutis 66:277–279, 2000;* lupus vulgaris

Mycobacterium ulcerans Derm Clinics 17:151–185, 1999

Myiasis, furuncular – face, scalp, arms, legs; house fly *JAAD 75:19–30, 2016; BJD 76:218–222, 1964;* New World screw worm (*Cochliomyia*), Old World screw worm (*Chrysomya*), Tumbu fly, skin maggot fly, putzi fly, mango fly, *ver du Cayor (Cordyloba anthropophaga*)(tropical Africa) *JAAD 58:907–926, 2008; Int J Derm 34:624–626, 1995; BJD 85:226–231, 1971*; black blowflies (*Phormia*) *J Med Entomol 23:578–579, 1986;* greenbottle (*Lucilia*), bluebottle (*Calliphora*), flesh flies (*Sarcophaga, Wohlfartia vigil*) (eastern and central North America, central and southern Europe, Russia, Pakistan) *JAAD 58:907–926, 2008; Neurosurgery 18:361–362, 1986; Wohlfartia* opaca (western and southwest North America) *JAAD 58:907–926, 2008;* rabbit or rodent botflies (*Cuterebra spp.*)(eastern US, Ontario, Pacific Northwest) *JAAD 58:907–926, 2008; JAAD 21:763–772, 1989; Wohlfartia magnifica* – scalp abscess *Cutis 82:396–398, 2008;* human botflies (*Dermatobia hominis*)(Central and South America) *JAAD 58:907–926, 2008; JAAD 57:716–718, 2007; AD 121:1195–1196, 1985;* sheep nostril fly (*Oestrus ovis*) *Ann Trop Med Parasitol 82:221–223, 1988;* warble flies (*Hypoderma*) – migratory myiasis *AD 90:180–184, 1964; AD 126:199–202, 1990;* myiasis – creeping eruption (migratory myiasis); horse botfly (*Gasterophilus*)(worldwide) *JAAD 58:907–926, 2008*; heel fly, gad fly, cattle grubs (*Hypoderma bovis, lineatum) JAAD 58:907–926, 2008; BJD 143:912–914, 2000;* blowfly *JAAD 67:331–344, 2012;* furunculoid myiasis (tumbu fly) – pore overlying furuncular lesion *JAMA Derm 154:737–738, 2018*

Myositis - bacterial, filarial, post-traumatic

Necrotizing fasciitis *JAAD 20:774–781, 1989*

Neisseria gonorrhea - newborn with gonococcal scalp abscess *South Med J 73:396–397, 1980; Am J Obstet Gynecol 127:437–438, 1977;* foot abscess *Clin Orthop 234:209–210, 1988; Med J Aust 141:902, 1984;* gonococcal furunculoid lesions of penis and scrotum *Br J Inf Dis 49:364–367, 1973*

Nocardiosis - *Cutis 89:75–77, 2012;* actinomycetomas of trunk, extremities, feet– *N. brasiliensis, N. otitidiscaviarum, N. asteroides BJD 156:308–311, 2007; J Dermatol 26:829–833, 1999; AD 130:243–248, 1994; JAAD 21:137–139, 1989; JAAD 13:125–133, 1985; N. brasiliensis J Inf Dis 134:286–289, 1976; N. asteroides BJD 144:639–641, 2001; JAAD 39:793–794, 1998; J Clin Inf Dis 24:1154–1160, 1997; N. farcinica Ann Med Interne (Paris) 150:582–584, 1999; JAAD 38:874–876, 1998*; *N. otidiscaviarum Clin Inf Dis 20:1266–1270, 1995; J Trop Med Hyg 98:395–403, 1995; N. otitidiscaviarum* – multiple abscesses with draining sinus tracts *AD 143:1086–1087, 2007;* lymphocutaneous nocardiosis – crusted verrucous plaques with sporotrichoid nodules, abscesses, and pustules *Cutis 85:73–76, 2010*; nocardia abscess with osteomyelitis - personal observation

North American blastomycosis (*Blastomyces dermatitidis*) *JAAD 21:1285–1293, 1989*

Olecranson bursal sac abscess - personal observation

Orf *Ann Chir Main 5:129–132, 1986*

Osteomyelitis

Paracoccidioidomycosis – hematogenous or lymphatic spread *Rook p.1370, 1998, Sixth Edition*

Paragonimiasis - cold abscesses *Rev Ecuator Hig Med Trop 36:69–82, 1979*

Paronychial abscess *Dermatol Clin 33:207–241, 2015*

Parotid gland abscess – *Staphylococcus aureus;* personal observation

Pasteurella multocida – periocular abscess and cellulitis; tenosynovitis, septic arthritis *Am J Ophthalmol 128:514–515, 1999; JAAD 33:1019–1029, 1995*

Perianal abscesses
- Anal gland infection
- *Campylobacter jejuni*
- *Enterobius vermicularis*
- Gram negative enteric bacteria
- IL-10 defect *BJD 178:335–349, 2018*
- *Mycobacterium avium*
- Papillon-Lefevre syndrome *BJD 178:335–349, 2018*
- X-linked agammaglobulinemia *BJD 178:335–349, 2018*
- X-linked inhibitor of apoptosis-deficiency *BJD 178:335–349, 2018*

Perifolliculitis capitis

Perirectal abscess *NEJM 343:794–800, 2000*
- Actinomycosis
- Carcinoma
- Crohn's disease
- Cryptoglandular infection
- Foreign body
- Leukemia
- Lymphoma
- Lymphogranuloma venereum
- *Mycobacterium tuberculosis*
- Pelvic inflammation
- Radiation
- Trauma (operative, enema, impalement)

Phaeohyphomycosis *JAAD 19:478–481, 1988; AD 123:1346–1350, 1987;* subcutaneous phaeohyphomycosis *JAAD 36:863–866, 1997;*

diffuse infiltrated pigmented plaques; subcutaneous cysts, abscesses, ulcerated plaques, hemorrhagic pustules, necrotic papulonodules, cellulitis *JAAD 75:19–30, 2016; JAAD 40:364–366, 1999; JAAD 28:34–44, 1993; AD 127:721–726, 1991; JAAD 19:478–481, 1988; AD 123:1346–1350, 1987*

Phialophora

Phlegmon - perirectal abscess - Pseudomonas *Clin Inf Dis 20:302–308, 1995; Serratia marcescens* - personal observation

Porphyromonas asaccharolytica – abscesses below waistline

Pott's puffy tumor – subperiosteal abscess of forehead with frontal bone osteomyelitis secondary to frontal sinusitis *Ped Derm 27:406–408, 2010*

Differential diagnosis of Pott's puffy tumor *Ped Derm 27:406–408, 2010*

- Carbuncle
- Dermoid cyst
- Epidermoid cyst
- Giant frontal mucocele
- Infected hematoma
- Intracranial malignant meningioma
- Intraosseous lipoma
- Lipoblastoma
- Lipoma
- Superficial temporal artery pseudoaneurysm

Prevotella species – abscesses below waistline *J Clin Inf Dis 25 (suppl 2):S88–93, 1997*

Protothecosis *AD 112:829–832, 1976;* draining abscesses of cheeks following fat injection *J Clin Aesthet Dermatol 12:13–16, 2019*

Pseudomonas sepsis *Am J Med 80:525–529, 1986*

Pyomyositis *JAAD 51:308–314, 2004*

Rat bite fever (*Streptobacillus moniliformis*) - acral hemorrhagic pustules and abscesses *JAAD 38:330–332, 1998; BJD 129:95–96, 1993;* chronic abscesses *AD 148:1411–1416, 2012; MMWR 53:1198–1202, 2005; Cleveland Clin Q 52 (2):203–205, 1985; Pediatr Clin N Am 26:377–411, 1979*

Rhizopus in AIDS - kerion-like *JAAD 26:1017, 1992*

Rhodococcus equi Clin Inf Dis 34:1379–1385, 2002; Clin Inf Dis 20:478–479, 1995

Salmonella – *S. enteritidis J Infect 27:204–205, 1993; JR Soc Med 83:190, 1990;* neck abscess *Head Neck 13:153–155, 1991*; S. typhimurium

Scalp abscess - subgaleal abscess *JAAD 18:239–259, 1988*; posterior scalp abscess due to sinusitis-associated epidural abscess *Int J Pediatr Otorhinolaryngol 43:147–151, 1998;* neonatal abscess - coagulase-negative staphylococcus *Textbook of Neonatal Dermatology, p.190, 2001*

Scrotal abscess - bacterial, filariasis, Guinea worm, tumbu fly

Serratia marcescens - frontal sinusitis with abscess; cutaneous abscess *Cutis 66:461–463, 2000; JAAD 41:319–321, 1999;* multiple abscesses *JAAD 58:891–893, 2008*

Sparganosis

Sporotrichosis - hot and cold abscesses *Derm Clinics 17:151–185, 1999;* perirectal abscess *Am Rev Respir Dis 112:119–123, 1975*

Staphylococcus aureus – abscess (furuncle) – face, neck, arms, wrists, fingers (including felon), buttocks, anogenital area *NEJM 370:1039–1047, 2014; J Drugs in Dermatol 13:119–124, 2014;* methicillin-resistant *S. aureus Cutis 78*:*113–116, 2006;* MRSA abscess – necrotic papule with surrounding erythema *AD 144:952–954, 2008;* carbuncle; multiple abscesses in bone marrow transplant patient; intravenous drug abuse - soft tissue infections *Clin Inf Dis 61:1840–1849, 2015*

Staphylococcus aureus, coagulase-negative (staphylococcus epidermidis) – abscesses of scalp and breast in the neonate *Textbook of Neonatal Dermatology, p.190, 2001*

Staphylococcus lugdunensis – associated with molluscum contagiosum *Ped Derm 32:289–291, 2015*

Sternoclavicular joint septic arthritis *J Clin Inf Dis 19:964–966, 1994*

Streptococcus milleri group (S. intermedius, S.constellatus, S. anginosus) *Clin Inf Dis 32:1511–1515, 2001*

Streptococcus pneumoniae Clin Inf Dis 21:697–698, 1995; neck *Clin Inf Dis 19:149–151, 1994*

Streptococcus pyogenes – soft tissue infections *Clin Inf Dis 61:1840–1849, 2015*

Subungual abscess - personal observation

Sweat gland periporitis *JAAD 38:1–17, 1998*

Sycosis – deep staphylococcal folliculitis *Dermatol Wochenschr 152:153–167, 1966*

Syphilis - syphilitic gumma

Talaromyces marneffei (Penicillium marneffei) – facial abscess *JAMA Derm 155:1195–1197, 2019; JAAD 37:450–472, 1997*

Tinea capitis (*T. verrucosum, T. mentagrophytes*) – kerion *AD 114:371–372, 1978;* tinea capitis mimicking dissecting cellulitis – alopecia and inflammatory nodules of scalp *Ped Derm 30:753–754, 2013*

Tinea corporis, invasive(*T.violaceum*) *BJD 101:177–183, 1979*

Tinea faciei *Clin Exp Dermatol 25:608–610, 2000*

Toxocariasis *JAAD 33:825–828, 1995*

Trichomonas – penile abscesses *Bull Soc Gr Dermatol Syphiligr 76:345, 1969*

Trypanosomiasis – trypanosomal chancre – red tender 2–5 cm nodule with blister on surface of forearm or leg

Tsukamurella paurometobolum J Clin Inf Dis 23:839–840, 1996

Tularemia - bubo

Tungiasis – abscess-like lesion of sole or between toes *JAAD 67:331–344, 2012; AD 141:389–394, 2005; JAAD 20:941–944, 1989; JAAD 15:117–119, 1986*

Yersinia enterocolitica

Yersinia species (plague) - near bubo *Clin Inf Dis 19:655–663, 1994; J Inf Dis 165:740–743, 1992; Yersinia pestis* – carbuncle *AD 135:311–322, 1999*

Xylohypha emmonsii

Zygomycosis - primary cutaneous - including *Apophysomyces elegans, Saksenaza vasiformis J Clin Inf Dis 24:580–583, 1997*

INFLAMMATORY DISORDERS

Acute dacryocystitis - lacrimal gland inflammation *Eyelid and Conjunctival Tumors, Shields JA and Shields CL, Lippincott Williams and Wilkins, 1999, p.189*

Crohn's disease – perianal abscess *Ped Derm 35:566–574, 2018;* metastatic - red papules and plaques with overlying scale/crust; red scaly plaque with shallow ulcer; red plaques and nodules; abscess-like lesions *JAAD 71:804–813, 2014; J Eur Acad Dermatol Venereol 15:343–345, 2001; JAAD 36:697–704, 1997;* fistulae and abscesses *Int J Colorectal Dis 11:222–226, 1996; JAAD 10:33–38, 1984; BJD 80:1–8, 1968;* penile abscesses *Cutis 72:432–437, 2003*

Cystic neutrophilic granulomatous mastitis – abscess-like lesion of breast; *Corynebacterium kroppenstedtii, C. amycolatum, C. tuberculostearicum, C. accolens, C. striatum, C. minutissimum Clin Inf Dis 59:410,454–455, 2014*

Dissecting cellulitis of the scalp (perifolliculitis capitis abscedens et suffodiens) – painful, sterile abscesses with interconnecting sinus tracts; scarring; keloids *JAMA Derm 152:1280–1281, 2016; JAAD 62:534–536, 2010; JAAD 23:752–753, 1990; Dermatol Clin 6:387–395, 1988; Ann Plast Surg 18:230–237, 1987; Cutis 32:378–380, 1983; Minn Med 34:319–325, 1951; AD 23:503–518, 1931*

Granulomatous mastitis – abscess, sinus tract, or subcutaneous nodule of breast *The Breast Journal 14:588–590, 2008*

Hidradenitis suppurativa – inflammatory nodules *JAMA Derm 149:1192–1194, 2013; BJD 165:415–418, 2011; BJD 162:195–197, 2010; JAAD 62:205–217, 2010; BJD 161:831–839, 2009; AD 145:580–584, 2009; JAAD 60:539–561, 2009; Ped Derm 24:465–473, 2007; AD 142:1110–1112, 2006; Derm Surg 26:638–643,3207, 2000; BJD 141:231–239, 1999*

- Diseases associated with hidradenitis suppurativa: *JAAD 60:539–561, 2009*
  - Acanthosis nigricans
  - Acne conglobata
  - Acne vulgaris *Br Med J 292:245–248, 1986; Surg Gynecol Obstet 95:455–464, 1952*
  - Bazex-Dupre-Christol syndrome
  - Crohn's disease *Inflammatory Bowel Dis 7:33–326, 2001; Int J Colorectal Dis 8:117–119, 1993; BJD 126:523, 1992*
  - Dissecting cellulitis of the scalp
  - Dowling-Degos disease *Clin Exp Dermatol 31:454–456, 2006; Clin Exp Dermaol 29:622–624, 2004; Hautarzt 52:642–645, 2001; Australas J Dermatol 38:209–211, 1997; Clin Exp Dermatol 21:305–306, 1996; Ann DV 120:120:705–708, 1993; JAAD 24:888–892, 1991; Cutis 45:446–450, 1990*
  - Fox-Fordyce disease *JID 31:127–135, 1958*
  - Interstitial keratitis *AD 95:473–475, 1967*
  - Keratitis-ichthyosis-deafness syndrome *Eur J Dermatol 15:347–352, 2005; JAAD 51:377–382, 2004*
  - Obesity *Acta DV 85:225–232, 2005; J Eur Acad Dermatol Venereol 17:276–279, 2003*
  - Pachyonychia congenita *JID Symp Proc 10:3–17, 2005; BJD 123:663–666, 1990; JAAD 19:705–711, 1988*
  - PAPA (pyogenic arthritis, pyoderma gangrenosum, acne) syndrome *Mayo Clin roc 72:611–615, 1997*
  - Pilonidal cysts and sinuses
  - Pyoderma gangrenosum
  - Reflex sympathetic dystrophy *Arch Phys Med Rehabil 82:412–414, 2001*
  - SAPHO (synovitis, acne, pustulosis, hyperostosis, osteitis) syndrome *J Clin Rheumatol 8:13–22, 2002*
  - Scrotal elephantiasis
  - Smoking *Acta DV 85:225–232, 2005; J Cut Med Surg 8:415–423, 2004; J Eur Acad Dermatol Venereol 17:276–279, 2003; Dermatology 198:261–264, 1999*

Mamillary fistula (periareolar abscess) *Br J Surg 73:367–368, 1986*

Panniculitis

Pyoderma fistulans sinifica (fox den disease) *Clin Inf Dis 21:162–170, 1995*

Pyodermia chronica glutealis – hidradenitis suppurativa like draining nodules in genitofemoral region and/or buttocks *J Dermatol 25:242–245, 1998*

Pyoderma gangrenosum – with granulomatosis and polyangiitis - personal observation

Subcutaneous fat necrosis of the newborn *Cutis 70:169–173, 2002*

Ulcerative colitis - sterile abscesses *JAAD 42:363–365, 2000*

METABOLIC DISEASES

Alpha-1 antitrypsin deficiency-associated panniculitis *JAAD 51:645–655, 2004; AD 123:1655–1661, 1987*

Niemann-Pick disease - suppurative lesions of the face *Rook p. 2644, 1998, Sixth Edition*

Pancreatic panniculitis - cutaneous pseudoabscess *NEJM 375:1972–1981, 2016; Rook p. 2414, 1998, Sixth Edition; JAAD 34:362–364, 1996; Am J Gastroenterol 83:177–179, 1988; Arthritis Rheum 22:547–553, 1979*

NEOPLASTIC DISORDERS

Anorectal carcinoma - ischiorectal abscess *Br J Med 285:1393, 1982*; anal squamous cell carcinoma in situ *J Clin Inf Dis 21:603–607, 1995*

Epidermoid cyst, inflamed (ruptured)/infected

Extramammary Paget's disease – may resemble ischiorectal abscess *Rook p.3181, 1998, Sixth Edition*

Giant condyloma of Buschke and Lowenstein *AD 136:707–710, 2000*

Kaposi's sarcoma

Lipoma - inflamed/infected

Lymphoma - CTCL *JAAD 33:850–851, 1995;* CD30+ large T cell lymphoma of upper lip *Br J Oral Maxillofac Surg 35:193–195, 1997;* primary B-cell lymphoma – abscess of lower back *JAAD 55:S24–27, 2006;* cutaneous extranodal natural killer T-cell lymphoma – multiple violaceous or red nodules of extremities, subcutaneous nodules, cellulitis, abscess-like lesions *JAAD 70:1002–1009, 2014*

Metastases – necrotic fluctuant metastasis mimicking abscess - personal observation;

to scalp - kerion-like *JAAD 29:654–655, 1993;* Metastasis – necrotic fluctuant metastasis mimicking abscess - personal observation

Myxoid cyst with secondary *Staphylococcus aureus* - personal observation

Perforated intra-abdominal tumor - abdominal wall abscess

AD 131:275–277, 1995

Squamous cell carcinoma - finger lesion mimicking abscess *Scand J Plast Reconstr Surg Hand Surg 34:91–92, 2000*

PRIMARY CUTANEOUS DISEASE

Acne keloidalis nuchae *JAAD 39:661, 1998*

Cheilitis glandularis (Volkmann's cheilitis) – enlarged lip with crusts and scale; deep-seated abscesses and fistulae *J Derm Surg 1:372–375, 1985*

Malakoplakia – perianal nodules, vulvar nodules, skin colored nodules, ulcerations, abscesses, red papules, masses *Dermatol Online June 15, 2019; Arch Pathol Lab Med 132:113–117, 2008; AD 134:244–245, 1998; Am J Dermatopathol 20:185–188, 1998; JAAD 34:325–332, 1996*

Pyoderma faciale (form of acne rosacea) – sudden onset of nodules, abscesses, sinuses *AD 128:1611–1617, 1992*

PSYCHOCUTANEOUS DISORDERS

Factitial dermatitis – fluctuant subcutaneous lesions *JAAD 1:391–407, 1979;* factitial injection of hydrocarbons *AD 128:997–998, 1992*

SYNDROMES

Anti-phospholipid antibody syndrome – sterile abscesses *Cutis 283–286, 2001*

Behcet's syndrome *JAAD 40:1–18, 1999*

Chediak-Higashi syndrome – photophobia, nystagmus, decreased iris pigmentation, neutropenia, hyperglobulinemia, decreased platelet dense bodies, giant inclusion bodies; mutation in *LYST BJD 178:335–349, 2018*

Chronic granulomatous disease *BJD 178:335–349, 2018*

Down's syndrome – furunculosis

Griscelli syndrome *Am J Med 65:691–702, 1978*

Hyper IgE syndrome (Job's, Buckley's, Quie-Hill syndromes (allergic rhinitis)) – autosomal dominant; dermatitis, cold abscesses of neck and trunk, coarse facial skin with broad nose; rough thickened skin with prominent follicular ostia; atrophoderma vermiculatum; retained primary dentition, bone abnormalities, cyst-forming pneumonia, elevated IgE levels; papular, pustular, excoriated dermatitis of scalp, buttocks, neck, axillae, groin; furunculosis; folliculitis-like papular and papulopustular lesions; oral candida; chronic paronychia; growth failure; otitis media common; *STAT3* (transcription 3 gene activator and signal transducer) mutations (abnormality of JAK-STAT cytokine signaling pathway *BJD 178:335–349, 2018; Ped Derm 30:621–622, 2013; JAAD 65:1167–1172, 2011; NEJM 357:1608–1619, 2007; JAAD 54:855–865, 2006; Dermatol Therapy 18:176–183, 2005; AD 140:1119–1125, 2004; Pediatr 141:572–575, 2002; Curr Prob in Derm 10:41–92, 1998; Clin Exp Dermatol 11:403–408, 1986; Medicine 62:195–208, 1983*

IRAK-4 deficiency (homozygous mutations of IL-receptor-associated kinase 4 gene) – cutaneous infections with *Staphylococcus aureus;* abscesses, cellulitis, impetigo *JAAD 54:951–983, 2006*

Keratosis-ichthyosis-deafness (KID) syndrome – autosomal recessive; dotted waxy, fine granular, stippled, or reticulated surface pattern of severe diffuse hyperkeratosis of palms and soles (palmoplantar keratoderma), ichthyosis with well marginated, serpiginous erythematous verrucous plaques, hyperkeratotic elbows and knees, perioral furrows, leukoplakia, bilateral sensorineural deafness, photophobia with vascularizing keratitis, blindness, hypotrichosis of scalp, eyebrows, and eyelashes, dystrophic nails, chronic mucocutaneous candidiasis, otitis externa, abscesses, blepharitis; connexin 26 mutation *Ped Derm 27:651–652, 2010; Ped Derm 23:81–83, 2006; JAAD 51:377–382, 2004; BJD 148:649–653, 2003; Cutis 72:229–230, 2003; Ped Derm 19:285–292, 2002; Ped Derm 15:219–221, 1998; Ped Derm 13:105–113, 1996; BJD 122:689–697, 1990; JAAD 23:385–388, 1990; JAAD 19:1124–1126, 1988; AD 123:777–782, 1987*; *AD 117:285–289, 1981; J Cutaneous Dis 33:255–260, 1915*

Leukocyte adhesion deficiency – lack of pus, abnormal wound healing; mutations in *TGB2, FERMT3, SLC3C1 BJD 178:335–349, 2018*

NOMID syndrome (neonatal onset multisystem inflammatory disease)

PAPA syndrome – pyoderma gangrenosum, cystic acne, aseptic arthritis; sterile abscesses at injection sites; mutation in CD2 binding protein-1 *Am J Clin Dermatol 18:555–562, 2017; Ped Derm 22:262–265, 2005; Proc Natl Acad Sci USA 100:13501–13506, 2003; Mayo Clin Proc 72:611–615, 1997*

PAPASH syndrome – pyogenic arthritis, pyoderma gangrenosum, acne, hidradenitis suppurativa; autoinflammatory syndrome; mutation in *PSTPIP1* gene *JAMA Derm 149:762–764, 2013*

Papillon-Lefevre syndrome – abscesses and pneumonia *Cutis 93:193–198, 2014; Ped Derm 18:45–47, 2001; Curr Prob in Derm VIII:41–96, 1996; Ped Derm 14:354–357, 1994*

PASH syndrome (pyoderma gangrenosum, acne, and hidradenitis suppurativa) *BJD 176:1588–1598, 2017; JAAD 66:409–415, 2012*

Rosai-Dorfman disease – hidradenitis suppurativa-like lesions *Ped Derm 4:247–253, 1987*

SAPHO syndrome - palmoplantar pustulosis with sternoclavicular hyperostosis; acne fulminans, acne conglobata, hidradenitis suppurativa, psoriasis, multifocal osteitis *Sem Arthr Rheum 42:254–265, 2012; Cutis 71:63–67, 2003; Curr Opinion Rheumatol 15:61–69, 2003; Cutis 64:253–258, 1999; Cutis 62:75–76, 1998; Rev Rheum Mol Osteoarthritic 54:187–196, 1987; Ann Rev Rheum Dis 40:547–553, 1981*

Schwachman-Diamond syndrome – periodontal disease and caries; abscesses, short stature, delayed puberty, skeletal changes, pancreatic exocrine deficiency, pancytopenia, failure to thrive, hepatomegaly, pneumonia, otitis media, osteomyelitis *Ped Derm 28:568–569, 2011*

Steatocystoma multiplex

Sweet's syndrome – abscess-like lesions *J Dermatol 27:794–797, 2000; JAAD 31:535–556, 1994*

WHIM syndrome – warts, hypogammaglobulinemia, infections, myelokathexis (neutrophil retention in bone marrow); abscesses, sinusitis, otitis media, pneumonia; chronic neutropenia; mutation in chemokine receptor CXCR4 family gene *Br J Haematol 164:15–23, 2014; JAAD 66:292–311, 2012; Curr Opin Hematol 16:20–26, 2009; Ped Derm 26:155–158, 2009; AD 144:366–372, 2008; Nat Genet 34:70–74, 2003; J Biol Chem 276:42826–42833, 2001*

Wiskott-Aldrich syndrome *Int J Dermatol 24:77–81, 1985*

TRAUMA

Body piercing *Ann Plast Surg 45:374–381, 2000*

Drug addiction - skin popping; abscesses with ulceration *BJD 150:1–10, 2004*

Injection of chemotherapy into intra-abdominal fat space - abdominal wall abscess

Complication of liposuction

VASCULAR

Granulomatosis with polyangiitis – abscess-like pyoderma gangrenosum

Pseudo-Kaposi's sarcoma

Vascular anomaly

ACANTHOSIS NIGRICANS-LIKE LESIONS

JAAD 57:502–508, 2007

AUTOIMMUNE DISEASES AND DISORDERS OF IMMUNE FUNCTION

Dermatomyositis - longstanding dermatomyositis with lipodystrophy-like appearance (hirsutism, loss of subcutaneous tissue, acanthosis

nigricans) *JAAD 57:502–508, 2007; J Rheumatol 23:1487–1488, 1996*

Lupus erythematosus *JAAD 57:502–508, 2007; Lupus 6:275–278, 1997*

Pemphigus foliaceus - acanthosis nigricans-like changes

Pemphigus vulgaris *J Dermatol 8:550–552, 1998; Dermatology 185:309–310, 1992; AD 118:115–116, 1982*

Scleroderma – axillary verrucous pigmentation *JAAD 57:502–508, 2007; Br Med J ii:1642–1645, 1966*

DEGENERATIVE DISEASES

Pyramidal tract degeneration *JAAD 57:502–508, 2007*

DRUG-INDUCED

Birth control pills *AD 111:1069, 1975*

Corticosteroids *JAAD 57:502–508, 2007*

Diethylstilbestrol

Fusidic acid *JAAD 28:501–502, 1993*

Heroin *JAAD 57:502–508, 2007*

Hydantoin derivatives *JAAD 57:502–508, 2007*

Insulin reaction – localized acanthosis nigricans at sites of injection *AD 144:126–127, 2008; AD 122:1054–1056, 1986*

Melphalan flexural dermatitis - personal observation

Methyl-testosterone *JAAD 57:502–508, 2007*

Niacinamide

Nicotinic acid *Dermatology 189:203–206, 1994; JAAD 5:709–710, 1981; AD 89:222–223, 1964*

Palifermin – flexural hyperpigmentation, papillomatosis, and erythema; also on elbows and knees *BJD 159:1200–1203, 2008*

Somatotropin-induced acanthosis nigricans *BJD 141:390–391, 1999*

Triazinate *AD 121:232–235, 1985*

INFECTIONS

Tinea corporis - acanthosis nigricans-like changes

METABOLIC DISEASES

Acral hypertrophy syndrome

Acromegaly *JAAD 57:502–508, 2007; JAMA 198:619–623, 1966*

Addison's disease

Cirrhosis

Cushing's syndrome

Diabetes insipidus

Encephalopathy, benign *JAAD 57:502–508, 2007*

Endocrine associations of acanthosis nigricans
- Acral hypertrophy syndrome
- Acromegaly *JAAD 57:502–508, 2007; JAMA 198:619–623, 1966*
- Insulin-resistant states
  - Type A syndrome
  - Type B syndrome
  - Diabetes mellitus - sign of insulin resistance *Ped Derm 19:12–14, 2002; Dermatology 198:164–166, 1999; J Basic Clin Physiol Pharmacol 9:419–439, 1998*
- Lipoatrophic diabetes
  - Familial lipodystrophy of the limbs and lower trunk (face-sparing lipodystrophy) (familial partial lipodystrophy) (Kobberling-Dunnigan syndrome, Dunnigan variety) – normal at birth with onset of lipoatrophy at puberty, extreme muscularity and lack of subcutaneous fat in all extremities, excess adipose tissue of face and neck, acanthosis nigricans, mild to moderate fasting or postprandial hyperinsulinemia, impaired glucose tolerance or diabetes mellitus after age 20 years, hypertriglyceridemia/low HDL-C levels and pancreatitis *J Clin Endocrinol Metab 85:1776–1782, 2000*; *Australas J Dermatol 39:100–105, 1998; QJM 90:27–36, 1997*
  - Lawrence-Seip syndrome *AD 91:326–334, 1965*
  - Lipodystrophy, total *AD 91:320–325, 1965;*
  - Partial lipodystrophy *Pediatrics 33:593–612, 1964*
- Leprechaunism *AD 117:531–535, 1981*
- Pinealoma
- Pineal hyperplasia syndrome (Rabson-Mendenhall syndrome) - autosomal recessive, insulin-resistant diabetes mellitus, coarse facies, hirsutism
- Hyperandrogenic states
  - Types A and B syndromes
  - Polycystic ovarian disease (Stein-Leventhal syndrome) *Clin Endocrinol 30:459–464, 1989*
  - Ovarian stromal hyperthecosis and the hyperandrogenism, insulin resistance and acanthosis nigricans syndrome *J Reprod Med 40:491–494, 1995*
  - Stromal luteoma
  - Ovarian dermoid cysts
- Cushing's disease
- Hormone therapy - corticosteroids, oral contraceptives, estrogens, pituitary extract, insulin
- Pituitary basophilism
- Obesity
- Hypothyroidism
- Addison's disease
- Hypogonadal syndrome with insulin resistance

Familial hypertrophy of the pineal body *JAAD 57:502–508, 2007*

Familial insulin resistance with acanthosis nigricans, acral hypertrophy, and muscle cramps

Gigantism *JAAD 57:502–508, 2007*

Hashimoto's thyroiditis

Hemochromatosis

Hyperinsulinemia *Ped Derm 12:323–326, 1995*

Hyperphosphatasemia (juvenile Paget's disease of bone) *Clin Exp Dermatol 7:605–609, 1982*

Hyperthyroidism *JAAD 21:461–469, 1989;* Hashimoto's thyroiditis *JAAD 57:502–508, 2007*

Hypothyroidism *JAAD 21:461–469, 1989*

Insulin resistance, type A – *JAMA Derm 149:875–877, 2013;* acanthosis nigricans, ovarian hyperandrogenism *Ped Derm 19:267–270, 2002*

Insulin-resistant acanthosis nigricans – Type B (autoantibodies); Type C (postreceptor level); obesity

Insulin-resistant diabetes mellitus with acanthosis nigricans and hypertension – autosomal recessive; severe hyperinsulinemia, amenorrhea, hirsutism; mutation in muscle-specific regulatory subunit of protein phosphatase 1 (PPAR-gamma and PP1R3A) *BJD 147:1096–1011, 2002*

Insulin-resistant diabetes mellitus with acanthosis nigricans – autosomal dominant, autosomal recessive; polycystic ovarian disease in some cases *BJD 147:1096–1011, 2002*

Lipodystrophic diabetes

Lupoid hepatitis *JAAD 57:502–508, 2007*

Lupoid nephritis

Metabolic syndrome - personal observation

Obesity *JAAD 81:1037–1057, 2019; JAAD 57:502–508, 2007; J Reprod Med 32:531–536, 1987*

Phenylketonuria *JAAD 57:502–508, 2007*

Pituitary hypogonadism *JAAD 57:502–508, 2007*

Polycystic ovarian disease (Stein-Leventhal syndrome) – acanthosis nigricans, acne vulgaris, hirsutism, hair loss *JAAD 71:847–856, 2014; JAAD 57:502–508, 2007; NEJM 352:1223–1236, 2005; Clin Endocrinol 30:459–464, 1989; NEJM 294:739–745, 1976;*

Am J Obstet Gynecol 29:181–191, 1935

Differential diagnosis:

- Cushing's syndrome
- Hyperprolactinemia
- Hypothyroidism
- Late onset congenital adrenal hyperplasia – increased 17 hydroxy-progesterone
- Pregnancy
- Premature ovarian failure – increased FSH, increased LH, decreased or normal estradiol
- Virilizing ovarian or adrenal tumor – total testosterone >200ng/dl; DHEAS >700 ug/dl; increased androstenedione

Pregnancy *BJD 146:925–927, 2002*

Primary biliary cirrhosis *J Gastroenterol Hepatol 11:1021–1023, 1996*

Pseudo-acanthosis nigricans

Streak gonads *JAAD 57:502–508, 2007*

Vulvar acanthosis nigricans - marker for insulin resistance in hirsute women *Fertil Steril 59:583–586, 1993*

Wilson's disease *JAAD 57:502–508, 2007*

NEOPLASTIC DISEASES

Familial hyperplasia of the pineal body/pinealoma

Linear epidermal nevus – acanthosis nigricans form of epidermal nevus *JAAD 55:696–698, 2006; BJD 95:433–436, 1976*

Lymphoma - lesions of CTCL simulating acanthosis nigricans *Am J Dermatopath 7:367–371, 1985*

Melanocytic nevi - giant melanocytic lesions - acanthosis nigricans-like changes

Parapsoriasis en plaque *Ann Dermatol Venereol 118:23–26, 1991*

PARANEOPLASTIC DISORDERS

Apudomas

Leser-Trelat *JAAD 42:357–362, 2000*

Malignant acanthosis nigricans – verrucous papules at corners of mouth; cobblestoned hard palate; fissured tongue; velvety dorsal fingers; Adenocarcinoma of breast, lung, colon, esophagus, gallbladder, kidney, liver, ovary, pancreas, prostate, rectum, uterus, gastrointestinal tract *Cutis 89:14–16, 2012; Int J Dermatol 43:530–532, 2004; Cancer 15:433–439, 1962; Arch Surg 47:517–552, 1943;* malignant acanthosis nigricans and tripe palms; cobblestoned lips, buccal mucosa, and tongue – pancreatic carcinoma *Cutis 78:37–40, 2006*

Pituitary basophilism and other pituitary tumors *JAAD 57:502–508, 2007*

Sezary syndrome *BJD 174:233–234, 2016*

PRIMARY CUTANEOUS DISEASES

Acanthosis nigricans, benign – sporadic *JAAD 31:1–19, 1994;* familial (autosomal dominant) *Int J Dermatol 35:126–127, 1996; J R Soc Med 87:169, 1994; BJD 133:104–108, 1995; AD 120:1351–1354, 1984; Arch Surg 47:517–552, 1943; JAMA 53:1369–1373, 1909; International atlas of rare skin diseases. London: HK Lewis & Co; 1891. pp 1–3; pp 4–5;* familial acanthosis nigricans with hyperpigmented plaques – K6507FGFR3 mutation *AD 143:1153–1156, 2007;* benign generalized *Ped Derm 21:277–279, 2004; Ped Derm 20:254–256, 2003;* acral acanthosis nigricans (acral acanthotic anomaly) – hyperpigmentation of elbows, knees, and knuckles *JAAD 5:345–346, 1981;* malignant – gastrointestinal malignancies, especially gastric carcinoma *BJD 141:714–716, 1999*; rarely lymphoma *JAAD 31:1–19, 1994;* autosomal recessive acanthosis nigricans – insulin receptor mutation *BJD 169:476–478, 2013*

Atopic dermatitis - acanthosis nigricans-like changes

Bullous congenital ichthyosiform erythroderma (epidermolytic hyperkeratosis) - acanthosis nigricans-like changes

Confluent and reticulated papillomatosis *AD 129:961–963, 1993*

Granular parakeratosis *Ped Derm 20:215–220, 2003*

Ichthyosis hystrix - acanthosis nigricans-like changes

Transverse nasal groove *Ped Derm 36:973–974, 2019*

Unilateral nevoid acanthosis nigricans – may be epidermal nevus resembling acanthosis nigricans *JAAD 58:S102–103, 2008; JAAD 57:502–508, 2007; Acta DV 84:234–235, 2004; Int J Dermatol 30:452–453, 1991; BJD 95:433–436, 1976*

SYNDROMES

Acanthosis nigricans and hypochondroplasia – café au lait macules, nevi, lentigines, seborrheic keratosis; mutation in *FGFR3 Ped Derm 36:242=246, 2019*

Acral hypertrophy syndrome

Adrenogenital syndrome

Alstrom syndrome – retinitis pigmentosa, sensorineural deafness, obesity, diabetes mellitus *BJD 164:878–880, 2011; AD 143:1153–1156, 2007; BJD 147:1096–1011, 2002; Acta Paediatr Taiwan 41:270–272, 2000; Hum Mol Genet 6:213–219, 1997; Arch Dis Child 50:703–708, 1975*

Ataxia-telangiectasia – acanthosis nigricans and hirsutism *Ped Derm 28:494–501, 2011; JAAD 57:502–508, 2007; JAAD 10:431–438, 1984*

Bannayan-Riley-Ruvalcaba-Zonana syndrome (PTEN phosphatase and tensin homolog hamartoma) – dolichocephaly, frontal bossing, macrocephaly, ocular hypertelorism, long philtrum, thin upper lip, broad mouth, relative micrognathia, lipomas, penile or vulvar lentigines, facial verruca-like or acanthosis nigricans-like papules, multiple acrochordons, angiokeratomas, transverse palmar crease, accessory nipple, syndactyly, brachydactyly, vascular malformations, arteriovenous malformations, lymphangiokeratoma, goiter, hamartomatous intestinal polyposis *JAAD 68:189–209, 2013; JAAD 53:639–643, 2005; AD 132:1214–1218, 1996*

Bartter's syndrome *JAAD 57:502–508, 2007*

Beare-Stevenson syndrome – autosomal dominant; acanthosis nigricans, cutis verticis gyrata (furrowed skin), craniosynostosis with other craniofacial anomalies; hypertelorism, swollen lips, swollen fingers, prominent eyes, ear anomalies, and anogenital anomalies, umbilical herniation with prominent umbilical stump; defect in FGFR 3 gene *JAAD 57:502–508, 2007; Ped Derm 20:358–360, 2003; BJD*

147:1096–1011, 2002; Am J Med Genet 44:82–89, 1992; AD 128:1379–1386, 1992

Becker's nevus - acanthosis nigricans-like changes

Berardinelli's (Berardinelli-Seip) syndrome – congenital generalized (total) lipodystrophy; extreme muscularity and generalized loss of body fat from birth, acanthosis nigricans, acromegalic features, umbilical hernia, hirsutism and clitoromegaly, severe fasting and postprandial hyperinsulinemia, early onset diabetes mellitus, hypertriglyceridemia; 1-acylglycerol-3-phosphate O-acyltransferase 2; seipin *AD 143:1153–1156, 2007*; *JAAD 52:341–344, 2005; AD 139:81–83, 2003; J Clin Endocrinol Metab 85:1776–1782, 2000*

Bloom's syndrome *JAAD 57:502–508, 2007*

Capozucca syndrome *JAAD 57:502–508, 2007*

Cardio-facio-cutaneous syndrome (Noonan-like short stature syndrome) – autosomal dominant, acanthosis nigricans, xerosis/ichthyosis, eczematous dermatitis, growth failure, hyperkeratotic papules, ulerythema ophryogenes, seborrheic dermatitis, CALMs, nevi, keratosis pilaris, patchy or widespread ichthyosiform eruption, sparse curly short scalp hair and eyebrows and lashes, hemangiomas, congenital lymphedema of the hands, redundant skin of the hands, short stature, abnormal facies, cardiac defects *JAAD 46:161–183, 2002; Ped Derm 17:231–234, 2000; JAAD 28:815–819, 1993; AD 129:46–47, 1993; JAAD 22:920–922, 1990;* port wine stain *Clin Genet 42:206–209, 1992*

Chondrodystrophy with dwarfism *JAAD 57:502–508, 2007*

Costello syndrome – acanthosis nigricans; palmar hyperkeratosis,

warty papules around nose and mouth, legs, perianal skin; loose skin of neck, hands, and feet, thick, redundant palmoplantar surfaces, hypoplastic nails, short stature, craniofacial abnormalities *JAAD 57:502–508, 2007; Eur J Dermatol 11:453–457, 2001; Am J Med Genet 82:187–193, 1999; Eur J Dermatol 9:533–536, 1999; J Pediatr 133:441–448, 1998; J Med Genet 35:238–240, 1998; JAAD 32:904–907, 1995*; *Am J Med Genet 47:176–183, 1993; Aust Paediat J 13:114–118, 1977*

Crouzon syndrome (craniofacial dysostosis) – autosomal dominant; craniosynostosis, hypertelorism, exophthalmos and external strabismus, parrot-beaked nose, short upper lip, hypoplastic maxilla, prognathism *JAAD 57:502–508, 2007; BJD 147:1096–1011, 2002; Cleft Palate Craniofac J 37:78–82, 2000; J Med Genet 33:744–748, 1996;*acanthosis nigricans *AD 128:1378–1386, 1992; Ped Derm 13:18–21, 1996;* Crouzon's syndrome with acanthosis nigricans (CAN) – onset of acanthosis nigricans during childhood, melanocytic nevi, craniosynostosis, ocular proptosis, midface hypoplasia, choanal atresia, hypertelorism, anti-Mongoloid slant, posteriorly placed ears, hydrocephalus; mutation in FGFR3 *Ped Derm 27:43–47, 2010; Am J med Genet 84:74, 1999*

FGFR-related craniosynostoses

Apert syndrome

Beare-Stevenson syndrome

Crouzon syndrome

Crouzon syndrome with acanthosis nigricans

FGFR-2-related isolated coronal synostosis

Jackson-Weiss syndrome

Muenke syndrome

Pfeiffer syndrome

Dowling-Degos syndrome (reticulated pigmented anomaly of the flexures) *AD 114:1150–1157, 1978*

Down's syndrome *J Eur Acad Dermatol Venereol 15:325–327, 2001*

Dunnigan syndrome (familial partial lipodystrophy)- lamin A/C mutation *AD 143:1153–1156, 2007*; *JAAD 57:502–508, 2007*

Edwards syndrome

Familial insulin resistance with acanthosis nigricans, acral hypertrophy, and muscle cramps *Genetic Skin Disorders, Second Edition, 2010, pp.94–97*

HAIR-AN syndrome (type A insulin resistance syndrome) – acne, muscular physique, alopecia (hyperandrogenism), hidradenitis suppurativa, insulin-resistance, acanthosis nigricans *AD 145:492–494, 2009; JAAD 57:502–508, 2007; AD 133:431–433, 1997; J Reprod Med 39:327–336, 1994; JAAD 31:1–19, 1994; JAAD 21:461–469, 1989; J Reprod Med 32:531–536, 1987;* polycystic ovaries and signs of virilization *NEJM 294:739–745, 1976*

Hermansky-Pudlak syndrome - hypertrichosis of the eyebrows, and trichomegaly of the arms and legs *AD 135:774–780, 1999*

Hirschowitz (Groll-Hirschowitz) syndrome - nerve deafness, peripheral sensory demyelinization, loss of gastric motility, ileal and jejunal diverticulae with ulcers *JAAD 57:502–508, 2007; Clin Genet 28:76–78, 1985*

Hypochondrodysplasia – acanthosis nigricans, short stature, frontal bossing, high forehead, prognathism, thick lips, large broad hands *Ped Derm 27:664–666, 2010*

Insulin resistant diabetes mellitus, acanthosis, and hypertension - peroxisome proliferator activated receptor gamma *AD 143:1153–1156, 2007*; *JAAD 57:502–508, 2007*

Keratosis-ichthyosis-deafness syndrome (KID syndrome) - nipple lesions; flexural acanthosis nigricans-like lesions *JAAD 51:377–382, 2004*

Laurence-Moon-Bardet-Biedel syndrome *JAAD 57:502–508, 2007; JAAD 21:461–469, 1989*

Lawrence-Seip syndrome *JAAD 57:502–508, 2007*

Lelis syndrome – acanthosis nigricans with hypohidrosis, hypotrichosis with absent lower eyelashes, pubic and axillary hair absent, hystrix-like ichthyosis of axillae, hypodontia, furrowed tongue, hyperconvex nail dystrophy, palmoplantar keratoderma, vitiligo; facies including long narrow face with upslanting palpebral fissures, strabismus, proptosis, midface hypoplasia, perioral radial furrows and perioral hyperpigmentation, prognathism, hypodontia, furrowed tongue, high arched palate *Ped Derm 33:563, 2016; Am J Med Genet 146:2155–2158, 2008; J Coll Physicians' Surg Pak 14:626–627, 2004; Am J Med Genet A 149:1612–1613, 2002; Am J Med Genet 113:381–384, 2002*

Leprechaunism (Donohue's syndrome) – autosomal recessive; insulin resistance with extreme hyper-insulinemia, intrauterine growth retardation, elfin facies; abnormal skin with hypertrichosis; decreased subcutaneous fat, protuberant ears, distended abdomen, large hands, feet, genitalia, gonadal cystic and pancreatic islet cell hyperplasia; mutation in insulin receptor *AD 143:1153–1156, 2007*; *JAAD 57:502–508, 2007; BJD 147:1096–1011, 2002; J Pediatr 32:739–748, 1948*

Partial congenital lipodystrophy – adipose tissue depots variably affected by lipoatrophy or lipohypertrophy, hepatosplenomegaly, cardiomyopathy, features of acromegaly or hypertriglyceridemia *Ped Derm 19:267–270, 2002*

Miescher's syndrome - generalized lipodystrophy, acanthosis nigricans, hypertrichosis, insulin-resistant diabetes

MORFAN syndrome - mental retardation, prenatal and postnatal overgrowth, peculiar facies, acanthosis nigricans *JAAD 57:502–508, 2007; Am J Med Genet 45:525–528, 1993*

Multiple endocrine neoplasia syndrome (MEN I) – angiofibromas of vermilion border; facial angiofibromas, lipomas, abdominal collagenomas, cutis verticis gyrate, pedunculated skin tags, acanthosis nigricans, red gingival papules, confetti-like hypopigmented macules; primary hyperparathyroidism with hypercalcemia,

kidney stones, prolactinoma, gastrinoma, bilateral adrenal hyperplasia; mutation in menin, a nuclear protein involved in cell cycle regulation and proliferation *JAAD 61:319–324, 2009; J Clin Endocrinol Metab 89:5328–5336, 2004; AD 133:853–857, 1997*

Olmsted syndrome *Int J Derm 36:359–360, 1997; Sem Derm 14:145–151, 1995*

Prader-Willi syndrome *JAAD 57:502–508, 2007; JAAD 21:461–469, 1989*

Pseudoacromegaly syndrome – Type A insulin resistance syndrome with acral enlargement, muscle hypertrophy, widened teeth spacing, muscle cramps *JAAD 57:502–508, 2007; Ped Derm 19:267–270, 2002*

Rabson-Mendenhall syndrome – autosomal recessive; insulin-resistant diabetes mellitus, growth retardation, fissured tongue, unusual facies (prominent jaw), dental precocity, hypertrichosis, acanthosis nigricans, onychauxis (thick fingernails), abdominal protuberance and phallic enlargement; mentally precocious; early dentition; and premature sexual development, pineal hyperplasia, hyperplasia of the adrenal cortex; mutation in insulin receptor *AD 143:1153–1156, 2007*; *JAAD 57:502–508, 2007; BJD 147:1096–1011, 2002; Ped Derm 19:267–270, 2002; Am J Clin Pathol 26:283–290, 1956*

Rud's syndrome - ichthyosis, epilepsy, mental retardation, retinitis pigmentosa *JAAD 57:502–508, 2007*

SADDAN syndrome – autosomal dominant; short stature, severe tibial bowing, severe achondroplasia with profound developmental delay and acanthosis nigricans *BJD 147:1096–1011, 2002; Am J Med Genet 85:53–65, 1999*

Sjogren-Larsson syndrome – acanthosis nigricans-like lesions *Ped Derm 22:569–571, 2005; Ped Derm 20:180–182, 2003*

Thanatophoric dysplasia – autosomal dominant; micromelic dwarfism; defect in FGFR3 *BJD 147:1096–1011, 2002*

Total congenital lipoatrophy – severe insulin resistance with Type A features, hepatosplenomegaly, cardiomyopathy, features of acromegaly, hypertriglyceridemia, or genital hypertrophy *Ped Derm 19:267–270, 2002*

Type B insulin resistance syndrome – acanthosis nigricans in fourth decade *JAAD 57:502–508, 2007*; generalized acanthosis nigricans; production of autoantibodies against the insulin receptor *Cutis 86:299–302, 2010*

Werner's syndrome *JAAD 57:502–508, 2007*

ACIDOSIS AND RASH IN THE NEWBORN

Ped Derm 23:142–144, 2006

Mitochondrial DNA syndromes

Mevalonic aciduria

Epidermolytic hyperkeratosis

Holocarboxylase synthetase deficiency – autosomal recessive disorder of biotin metabolism; multiple carboxylase deficiency

Maple syrup urine disease – acrodermatitis enteropathica-like skin manifestations *Acta Ped Taiwan 44:246–248, 2003*

Pseudohypoaldosteronism – miliaria rubra-like skin rash aggravated at the time of salt-losing crisis *BMJ Case Rep March 20, 2014*

ACNEIFORM ERUPTIONS

AUTOIMMUNE AND DISEASES OF IMMUNE DYSFUNCTION

Chronic granulomatous disease - severe acneiform eruptions *JAAD 36:899–907, 1997;* X-linked chronic granulomatous disease – photosensitivity, rosacea-like lesions of face *Ped Derm 3:376–379, 1986*

Dermatitis herpetiformis – vesiculopustular facial eruption *AD 140:353–358, 2004*

Hyper-IgE syndrome – neonatal acne-like eruption; resembles eosinophilic pustular folliculitis of infancy *AD 140:1119–1125, 2004; Ped Derm 1:202–206, 1984*

Lupus erythematosus - systemic, discoid lupus erythematosus – follicular plugging within ear resembling comedones *NEJM 269:1155–1161, 1963;* DLE resembling acne rosacea *Lupus 1:222–237, 1992;* umbilicated papular eruption of the back with acneiform hypertrophic follicular scars *BJD 87:642–649, 1972;* familial systemic lupus erythematosus with white blood cell killing defect - personal observation

Pemphigus vulgaris

STAT1 gain of function mutation – most common cause of chronic mucocutaneous candidiasis; demodicidosis with facial papulopustular eruptions, blepharitis, chalazion, dermatitis of the neck, nail dystrophy, congenital candidiasis *Ped Derm 37:159–161, 2020*

CONGENITAL LESIONS

Cephalic pustulosis (neonatal acne) *Int J Derm 38:128–130, 1999; AD 134:995–998, 1998*

Disseminated congenital comedones *Ped Derm 28:58–59, 2011*
vs. Familial dyskeratotic comedones *Indian J Dermatol Venereol Leprol 74:142–144, 2008; Eur J Derm 14:214–215, 2004; BJD 140:956–959, 1999*

Infantile and neonatal acne *Cutis 94:13–16, 2014*

Toxic erythema of the newborn

Transient neonatal pustular melanosis

DRUG-INDUCED

Drug-induced acne
- Accutane - flare of pustules
- ACTH *JAAD 21:1179–1181, 1989*
- Actinomycin D – papulopustular sterile folliculitis *NEJM 281:1094–1096, 1969*
- Afatinib (epidermal growth factor receptor-tyrosine kinase inhibitor) – acneiform eruptions, pruritus, exerosis, paronychia *JAMA Derm 152:340–342, 2016*
- Aminopterin *Eur J Dermatol 9:491–492, 1999; Arch Derm Research 282:103–107, 1990*
- Ampicillin - acneiform pustular eruption of cheeks *Cutis 56:163–164, 1995*
- Anabolic steroids *Cutis 50:113–116, 1992; Cutis 44:30–35, 1989*
- Androgenic hormones – in adults; infantile acne *JAAD 56:S15–18, 2007*
- Antiepidermal growth factor receptor antibody C225 *BJD 144:1169–1176, 2001;* others in this group of drugs *JAAD 56:317–326, 2007; J Clin Oncol 20:2240–2250, 2002*

Azathioprine hypersensitivity reaction – occurs within first four weeks of treatment; acneiform lesions; fever, malaise, arthralgias, myalgias, nausea, vomiting, diarrhea; morbilliform eruption, leukocytoclastic vasculitis, acute generalized exanthematous pustulosis, erythema nodosum, Sweet's syndrome; red papulonodules with pustules *JAAD 65:184–191, 2011*
Bevacizumab (VEGF inhibitor) *J Drugs Dermatol 1:1052–1055, 2013; AD 146:577, 2010*
Bromoderma *JAAD 58:682–684, 2008; AD 115:1334–1335, 1979*
Cetuximab (epidermal growth factor receptor inhibitor) – rosacea-like *JAAD 56:317–326, 2007; JAAD 55:657–670, 2006; JAAD 55:429–437, 2006; AD 141:1173–1174, 2005; J Clin Oncol 18:904–914, 2000*
Chloral hydrate
Chlorides
Chlorinated hydrocarbons
Corticosteroids – oral, inhaled, topical; acne rosacea – papules, pustules, atrophy, telangiectasia *Cutis 83:198–204, 2009; JAAD 54:1–15, 2006; Clin Exp Dermatol 18:148–150, 1993; JAAD 21:1179–1181, 1989; AD Forsch 247:29–52, 1973;* perianal comedones due to topical steroids *JAAD 7:407, 1982; Dermatologica 119:211–220, 1959;* childhood acne due to inhaled corticosteroids *Ped Derm 31:712–715, 2014;* desonide perioral dermatitis - personal observation; topical corticosteroid rosacea - personal observation
Cyclosporine *Dermatologica 172:24–31, 1986;* cysts of face in infancy *AD 145:797–799, 2009*
Dabrafenib – keratoacanthomas; plantar calluses, seborrheic keratosis, acneiform eruptions, epidermoid cysts, alopecia, verruca vulgaris *BJD 167:1153–1160, 2012*
Danazol *Cutis 24:431–432, 1979*
Dantrolene *BJD 104:465–468, 1981* Dilantin *NEJM 287:148, 1972;* fetal hydantoin syndrome (childhood acne) *Ped Derm 14:17–21, 1997*
Disulfiram
Epidermal growth factor receptor inhibitors - cetuximab and panitumumab; erlotinib and gefitinib; lapatinib; canertinib; vandetanib *JAMA Derm 153:939–940, 2017; JAAD 72:203–218, 2015;* follicular papules, pustules, acneiform eruption *JAAD 69:657–658, 2013; Cutis 90:77–80, 2012; JAAD 56:500–505, 2007; JAAD 56:460–465, 2007*
Erlotinib (Tarceva) – epidermal growth factor receptor inhibitor - acneiform eruptions, pruritus, xerosis, paronychia *JAMA Derm 152:340–342, 2016; –* acneiform eruption of chest *JAAD 69:463–472, 2013; Clin in Dermatol 29:587–601, 2011; AD 144:949–950, 2008; JAAD 56:317–326, 2007; JAAD 55:429–437, 2006; JAAD 54:358–360, 2006*
Etanercept – cystic acne *Cutis 94:31–32, 2014*
Ethambutol
Ethionamide
Etretinate
Everolimus – mTOR inhibitor; broad red patches of face, scalp, upper trunk; also widespread dermatitis, acneiform eruptions *The Dermatologist July 2015; pp.47–48*
Gefitinib (epidermal growth factor receptor-tyrosine kinase inhibitor) – acneiform eruptions, pruritus, exerosis, paronychia *JAMA Derm 152:340–342, 2016*
Gemzar - rosacea
Gold *Acta DV 57:165, 1977*
Gonadotrophins
Granulocyte colony-stimulating factor *JAAD 34:855–856, 1996;* cystic acne and hidradenitis suppurativa associated with myelodysplastic syndrome *AD 144:643–648, 2008*
Haloperidol
Halothane
Infliximab *BJD 156:402–403, 2007*
INH *AD 109:377–381, 1974*
Iododerma *JAAD 36:1014–1016, 1997;* radioactive iodine for thyroid ablation – acneiform and generalized pustular eruption *J Drugs in Dermatol 9:1070–1071, 2011*
IRESSA (inhibitor of epidermal growth factor receptor) – acneiform eruption of face and chest *BJD 147:598–601, 2002*
Levofloxacin – localized exanthematous pustulosis of forehead *BJD 152:1076–1077, 2005*
Lithium *J Dermatol 18:481–483, 1991; BJD 106:107–109, 1982*
MEK inhibitors – C1-1040, selumetinib, trametinib – morbilliform eruption, papulopustular eruptions, xerosis, paronychia *Ped Derm 34:90–94, 2017; JAAD 72:221–236, 2015*
Nardil
Nivolumab – lichen planus follicularis tumidus *JAMA Derm 155:1197–1198, 2019*
Non-selective antiangiogenic multikinase inhibitors – sorafenib, sunitinib, pazopanib – hyperkeratotic hand foot skin reactions with knuckle papules, inflammatory reactions, alopecia, kinking of hair, depigmentation of hair; chloracne-like eruptions, erythema multiforme, toxic epidermal necrolysis, drug hypersensitivity, red scrotum with erosions, yellow skin, eruptive nevi, pyoderma gangrenosum-like lesions *JAAD 72:203–218, 2015*
Olanzapine *Cutis 66:97–100, 2000*
Oral contraceptives
Panitumumab – epidermal growth factor receptor inhibitor *JAAD 71:754–759, 2014; AD 146:926–927, 2010;* cerebriform and acneiform eruption – associated with Demodex infection of follicles *BJD 174:686–687, 2016*
Phenobarbital
Phosphodiesterase 5 inhibitors (sildenafil, vardenafil, tadalafil) – facial erythema and rosacea *BJD 160:719–720, 2009*
Prostacycline – rosacea - personal observation
Pustular drug eruption
PUVA *Br Med J ii:866, 1977*
Quinidine *AD 117:603–604, 1981*
Quinine
Rifampicin
Selective serotonin reuptake inhibitors *JAAD 56:848–853, 2007*
Sirolimus (Rapamune) – acneiform eruptions of face, neck, and trunk *JAAD 55:139–142, 2006*
Sulfur
Tacrolimus ointment – rosacea-like dermatosis with overgrowth of *Demodex folliculorum AD 140:457–460, 2004; JAAD 62:1050–1052, 2010;* focal acne *AD 143:1223–1224, 2007*
Thiouracil
Thiourea
Traxidone
Trimethadione
Trametinib – acneiform eruption in children with neurofibromatosis for plexiform neurofibromas; due to *Demodex JAMA Derm 156:706–708, 2020*
Tyrosine kinase inhibitors (second generation tyrosine kinase inhibitors in chronic myelogenous inhibitors) – dasatinib, radotinib, nilotinib *BJD 174:456–458, 2016*
Vemurafenib/dabrafenib – papulopustular facial rash *JAAD 71:217–227, 2014*
Vitamin B12 *Cutis 24:119–120, 1979*

EXOGENOUS AGENTS

Acne cosmetica *AD 106:843–850, 1972*

Acne venenata (contact) – malar regions, angles of jaw, behind ears are involved; nose spared