Neutrophilic Dermatoses as a Continuous Spectrum: An Illustrative Case

A 19-year-old Chinese male was referred to our department for bilateral preauricular and left cheek abscesses of 1-week duration. He had a significant past medical history of ulcerative colitis (UC) controlled on mesalazine (4 g/day) and short courses of oral steroids. The patient had received paracetamol, tramadol and lactulose 6 days prior to this admission for perianal pain, all of which he had taken before. There were no other new or traditional medicines prior to the development of facial lesions.

He initially presented to the surgeons and underwent incision and drainage of his cheek and preauricular lesions. The facial wounds then progressed into large ulcers with violaceous undermined borders and a necrotic centre (Fig. 1). This occurred together with a flare of his UC. He was also noted to have pustules on his chin and an ulcer on his left chest which had evolved from a pustule (Fig. 2a). During hospitalisation, he developed further chest and groin pustules (Fig. 2b) associated with fever. He had no joint pain or back stiffness. A formal pathergy test was not performed, but no papules, pustules or ulceration was observed at the sites of insertion of venipuncture or blood tests.

Laboratory results demonstrated elevated white cell count of 23.5 x 10^9/L (normal: 4.0 to 10.0 x 10^3/L), neutrophilia 89% (normal: 35% to 80%), C-reactive protein 241.7 mg/L (normal <3.0 mg/L), procalcitonin 0.29 µg/L (normal: 0 to 0.05 µg/L), erythrocyte sedimentation rate of 64 mm/h (normal: 3 to 15 mm/h). Renal panel was normal and liver function test showed albumin of 32 g/L (normal: 37 to 51 g/L) and mildly elevated alanine aminotransferase of 60 U/L (normal: 10 to 55 U/L). The autoimmune markers anti-nuclear antibody and anti-double stranded deoxyribonucleic acid (DNA) were negative. Chest x-ray was normal, blood and urine cultures showed no bacterial growth.

A punch biopsy from the lower anterior edge of the patient's left cheek ulcer was taken. What is your diagnosis?

A. Subcorneal pustular dermatosis
B. Pyoderma gangrenosum with Sweet-like features
C. SAPHO syndrome
D. Atypical mycobacterial infection
E. Dermatitis artefacta

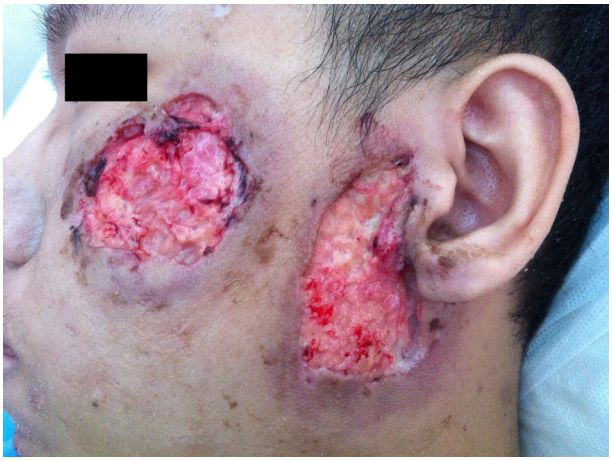

Fig. 1. Close-up view of an ulcer with violaceous undermined edges and devitalised yellow tissue on the left chest.

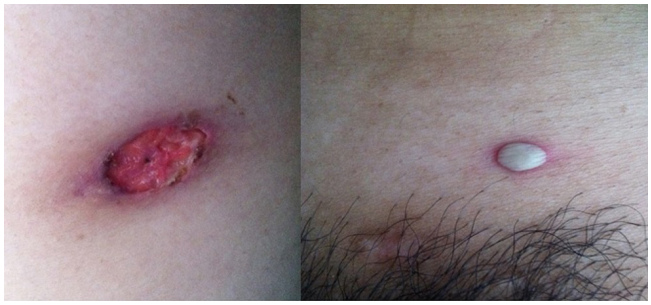

Fig. 2. A) Close-up view of an ulcer with violaceous undermined edges and devitalised yellow tissue on the left chest. B) Close-up view of a pustule with an erythematous halo in the suprapubic region.

Answer: B

Discussion

A 3 mm punch biopsy from the left cheek ulcer edge was obtained for haematoxylin and eosin (H&E) staining as well as for culture. Microbial and fungal culture were negative. Histopathology showed neutrophilic suppurative inflammation with vasculitis (Fig. 3). The epidermis was acanthotic and traversed by neutrophils and lymphocytes with aggregation of neutrophils in the stratum corneum. The dermis and subcutaneous fat was replaced by suppurative and necrotising inflammation. There was accompanying tissue lysis and abscess formation, mixed inflammatory exudation, fat necrosis and small vessel vasculitis which were felt to be secondary to the intense suppurative inflammation. There was no dermal papillary oedema.

Our patient was given empirical intravenous antibiotics in view of the fever and raised inflammatory markers. On day 5 of admission, he was commenced on oral prednisolone 40 mg daily (0.5 mg/kg) and discharged on a tailing regime. By the sixth day after commencement of prednisolone, the patient's chest and groin pustules had improved significantly. One month after being discharged, he was started on infliximab. Two months after first presenting with multiple facial lesions, the patient's facial ulcers had healed with hypertrophic scars and his chest and groin pustules had completely resolved, leaving hyperpigmented macules.

Neutrophilic dermatoses are a group of cutaneous conditions believed to be caused by an underlying neutrophil-mediated process in the absence of any infective process. They typically exhibit a dense infiltrate of normal polymorphonuclear leukocytes on histopathology.

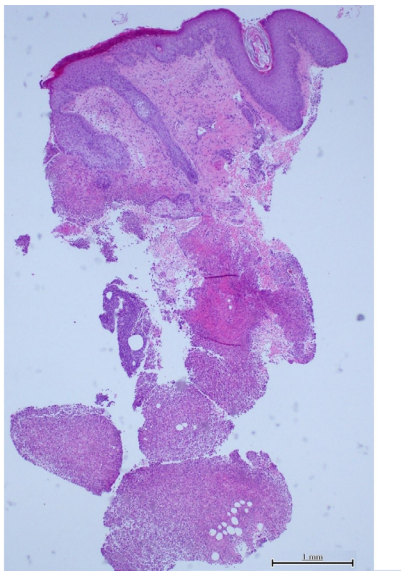

Fig. 3. Histopathology showing dense neutrophilic infiltration in the dermis and subcutis with small vessel vasculitis (original H&E magnification 200x).

The scope of neutrophilic dermatoses, first described by Caughman et al[1] in 1983, has been expanded to include pyoderma gangrenosum (PG), Sweet's syndrome, erythema elevatum diutinum, and subcorneal pustular dermatosis.

Clinical differences between subtypes of neutrophilic dermatoses may be attributed to differences in the intensity and extent of inflammatory response and may represent 2 different points on a spectrum. There are several reports in the literature of PG associated with Sweet's syndrome, and multiple forms of neutrophilic dermatoses existing in the same patient.

Two case reports, in particular, highlight the difficulty in distinguishing PG from Sweet's syndrome. In the first case, reported as PG in a patient with myelofibrosis, the authors received a correspondence by Sherertz contesting the diagnosis to be Sweet's syndrome. In the second case of a patient reported to have Sweet's syndrome on a background of ulcerative colitis, correspondence to the authors contested the diagnosis as bullous PG.[2]

In UC specifically, there have been several case reports of multiple forms of neutrophilic dermatoses occurring in the same patient, commonly that of PG and Sweet's syndrome. Salmon et al described a patient who presented with concurrent lesions of Sweet's syndrome and PG;[3] while Benton et al reported a patient who presented with PG initially, and 9 months later, developed Sweet's syndrome.[4]

Our patient described in this report had an eruption of pustules with a course correlating to the severity of his bowel disease. Coinciding with the flare of UC, one of the pustules eventually progressed to ulcerate, forming a tender ulcer with violaceous and undermined border, typical of PG. The pustules quickly subsided with systemic corticosteroids. This is similar to the pustular variant of PG reported in the patients described by O'Loughlin and Perry.[5] Pustular eruptions have been reported in UC and range from 1% to 6%. Many of these case reports describe lesions which share overlapping features between PG and Sweet's syndrome.

Interestingly in our patient, the lesions showed a predilection for the face and upper trunk, a feature of Sweet's syndrome. Although our patient fulfilled the diagnostic criteria for Sweet's syndrome (fever with leucocytosis and raised ESR, marked improvement with systemic steroids and histopathology showing inflammation composed mainly of neutrophils without primary vasculitis), the clinical feature of rapid progressive ulcers were not classical of Sweet's syndrome.

The exact pathogenesis of neutrophilic dermatoses is still unknown. Many cytokines and granulocyte colony-stimulating factor (GCSF) have been implicated in both Sweet's syndrome and PG,[6] in addition to granulocyte-

macrophage colony stimulating factor and adhesion molecules. This may represent a shared pathogenesis between PG and Sweet's syndrome.

As we progress in our understanding of neutrophilic dermatoses, we may consider approaching this group of conditions as a continuous spectrum with varying presentations. More research is needed to pave the way in understanding the pathogenesis and relationship between the different presentations of neutrophilic dermatoses. In summary, this case of pustular PG with Sweet-like features further substantiates the hypothesis that neutrophilic dermatoses may be a continuum with many overlapping features.

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