

Pyoderma gangrenosum – a postoperative “pseudo-infection”

A.G. Iosifescu^{1,4}, C.I. Boiangiu², C.M. Comănescu³, V.A. Iliescu^{1,4}

¹Cardiac Surgery Unit no. 2, “Prof. Dr. C.C. Iliescu” Emergency Institute for Cardiovascular Disease, Bucharest, Romania

²Emergency Clinical Hospital for Plastic Reconstructive Surgery and Burns, Bucharest, Romania

³Dermatology Unit no. 2, Colentina Clinical Hospital, Bucharest, Romania

⁴University of Medicine and Pharmacy “Carol Davila”, Bucharest, Romania

Rezumat

Pyoderma gangrenosum – o “pseudo-infecție” postoperatorie

Pyoderma gangrenosum este o necroză ulcerativă cutanată, datorată infiltrației neutrofile a dermului, printr-o exacerbare non-infecțioasă a imunității mediate celular. Fiind caracterizată de patergie, boala poate fi declanșată de actul chirurgical; în acest caz, ea este ușor de confundat cu o infecție postoperatorie. Prezentăm un caz de pyoderma gangrenosum apărut după o intervenție de bypass aortocoronarian. Din a 7-a zi postoperatorie, pacientul a dezvoltat în jurul inciziilor, leziuni dermo-epidermice specifice bolii, febră înaltă, cu frisoane, și un tablou biologic de infamație severă. Tratamentul pentru un presupus sepsis de plagă, a fost ineficient. După stabilirea diagnosticului de pyoderma gangrenosum, tratamentul corticosteroid (Prednison 80 mg/zi) a condus, în decurs de 2 zile, la o ameliorare spectaculoasă, iar în 7 săptămâni, la epitelizarea completă a leziunilor. Dacă după debridarea unei plăgi operatorii, presupus septică (cu pustule, bule, ulcerării), nu se constată o ameliorare, ci extensia centrifugă a leziunilor, cu sindrom biologic “pseudo-septic”, dar culturi persistente negative, se poate suspecta pyoderma gangrenosum; caz în care, nu antibioticele, ci corticosteroizii (sau alte imunosupresive) sunt tratamentul de elecție.

Cuvinte cheie: Pyoderma gangrenosum, complicație postoperatorie, bypass aortocoronarian

Abstract

Pyoderma gangrenosum is a skin ulcerative necrosis, due to dermal neutrophilic infiltration, through a non-infectious exacerbation of cell-mediated immunity. Being characterized by pathergy, the disease may be triggered by surgery; in this case, it is easily mistaken for a postoperative infection. We report a case of pyoderma gangrenosum after coronary artery bypass surgery. The patient developed, from the 7th postoperative day, around the incisions, dermo-epidermic lesions specific for the disease, high fever with chills and a severe biological inflammatory syndrome. Treatment for wound sepsis was ineffective. After pyoderma gangrenosum was recognized, corticosteroids (Prednisone 80 mg/d) led, in two days time, to a spectacular improvement, and in 7 weeks, to complete epithelization of the lesions. If after debridement of a supposedly infected wound (with pustules, bullae or ulcerations), there is no improvement, but a centrifugal extension of the lesions, with a “sepsis-like” syndrome and persistent negative cultures, one should think at pyoderma gangrenosum; in that case, not the antibiotics, but corticosteroids (or other immunosuppressants) are the treatment.

Key words: Pyoderma gangrenosum, postoperative complication, coronary artery bypass

Corresponding author:

Andrei George Iosifescu MD
Institutul de Urgență pentru Boli
Cardiovasculare “Prof. Dr. C.C. Iliescu”
Șos. Fundeni, Nr. 258, Sector 2, București
022322, România
E-mail: iosifescuag@yahoo.com

Introduction

Pyoderma gangrenosum (PG) is a rare, non-infectious, ulceronecrotic dermatitis, with yet, unclear pathogeny; it is marked by a hyperergic inflammatory dermal and systemic reaction. The disease may be triggered by any skin trauma (pathergy),

surgery included. Postoperative PG may be easily mistaken for surgical wound infection with systemic sepsis. We report a case of PG produced after coronary artery bypass surgery.

Case report

G.C., a 55 years old male, known as hypertensive, dyslipidemic, with non-insulin-dependent diabetes mellitus, was referred to us for the treatment of stable angina pectoris, through multi-coronary disease. We performed revascularization through a quadruple coronary artery bypass grafting (with left internal mammary artery and three saphenous vein grafts, prelevated from both legs). Early postoperative evolution was good, with only two days of stay in the ICU. From the 7th postoperative day, he had high fever (38-39,7 °C), with repetitive chills and a picture of severe inflammation on the lab tests: severe leucocytosis (up to 28000 cells/ μ l), high sedimentation rate (105 mm/h), high CRP (251 mg/l), hyperfibrinogenemia (541 mg %), but normal procalcitonine (< 0,5 ng/ml). Around the surgical wounds of both legs (and later, also around the mediosternal wound), we noticed bullous formations, with serous content; bacteriology of the wound was repeatedly negative. Evolution of the skin lesions was progressive: the bullae left room for rapidly extending ulcerations; these were oval shaped, well delineated by prominent red- violaceous borders, 3-4 mm in width; the surface was covered by sphacelated tissues. The extension of the lesions was centrifugal from the wound axes, up to 3-4 cm from them (see Fig. 1). Intense, burn-like pain accompanied the described lesions.

At first, wound infection was suspected: their exploration and partial debridement showed no argument for that: the tissues were uninfiltrated tissues, no collection was found. Computed tomography excluded any pleuro-pulmonary or mediastinal complication. Hemocultures were inconclusive: 2 of 15, were positive, but with different germs (*staphylococcus hominis* and *staphylococcus hemolyticus*). In spite antibiotic treatment (Teicoplanin+ Vancomycin+ Cefazidim, then, Linezolid+ Gentamicin+ Moxifloxacin), the patient had fever and severely altered inflammation tests. Neither the lavages with chlorhexidine, nor antimicrobial dressings with silver (Atrauman®-Hartmann), had any beneficial effect: intense pain persisted, the ulcerations continued to extend.

In these severe circumstances, after many intra- and interdisciplinary inconclusive check-ups, we have not despaired, but searched the literature on skin ulcerous-necrotic postoperative complications: so we found the similarity between our case and *Pyoderma gangrenosum*. The diagnosis was confirmed by a dermatologist and Prednisone (80 mg/d) treatment was initiated. The results were impressive: in 2 days, fever and pains ceased, the progression of the lesions stopped, their borders lost the violaceous color and the biological tests were modified toward normal. Gradually, began epithelization of the skin ulcerations and secondary healing of the debrided wounds. After 3 weeks, we began the progressive decrease of the Prednisone doses. Overall, the treatment lasted 7 weeks, being stopped when epithelization was complete (see Fig. 2). No relapse was noted after 15 months of follow-up.



Figure 1. *Pyoderma gangrenosum* around the wound for left saphenous vein prelevation: ulcero-necrotic lesions, surrounded by red-violaceous prominent borders (photo taken the day corticosteroid treatment was begun)



Figure 2. *Postoperative pyoderma gangrenosum* after healing: the former ulcer is completely epithelized; it left room to a pink-colored scar

Discussion

PG is a rare disease - incidence around 3:10⁶ inhabitants/year (1), affecting mostly middle aged adults. It has been described by Brocq, in 1908, as “geometric fagedenism” (2); the term “*Pyoderma gangrenosum*” was introduced in 1930, by Brunsting (3), who thought it was a streptococcal infection; later, the infectious origin was ruled out (4), but the name of the disease persisted. Now, PG is classified among the neutrophilic dermatoses, defined by dermal neutrophilic infiltration.

PG pathogeny is not yet clear, but it seems to be due to a disturbance of cell-mediated immunity (5). This hypothesis is also sustained by the frequent (~ 50%) association of PG with other diseases with known immunopathologic potential (inflammatory bowel disease – mostly Crohn disease and ulcerative colitis, arthritis, malignant blood disorders, B and C hepatitis)(6,7).

There are 4 known forms of PG (1): pustular, ulcerative (pustules transform into extensive and painful pyogenic ulcerations), bullous (vesicles/bullae precede the ulceration, very painful, rapidly progressive, with a severe systemic inflammatory syndrome) and vegetative (superficial, painless). Our case was among the bullous forms of PG.

Interesting for the surgeon is that PG may be triggered by the operation itself, or by any associated act implying even a minimal trauma of the skin. This is explained by the dermatologic phenomenon of pathergy (genesis of persistent ulceration due to minimal cutaneous trauma) (5), which

occurs in 30-50% of the PG cases. Therefore, postoperative PG may arise after any type of surgery -though, it was more frequently reported after breast, abdominal and cardiothoracic operations (8).

Post-surgical PG is usually mistaken for postoperative infection. The error is based on certain arguments: pyogenic lesion around the operating wound, occurring 4 to 42 days after the intervention, with systemic inflammation suggestive for sepsis. In fact, PG is only a „pseudo-infection”; the confusion delays the real diagnosis and the efficient treatment; in addition, it leads to new cutaneous trauma (debridement, necrotic tissue excision), which, due to pathergy, amplifies the ulcerous-necrotic process.

The diagnosis is clinical and of exclusion. As in our case, bacterial cultures from the wound are negative. Biopsy may support the diagnosis, even if the findings are non-specific (neutrophilic dermal infiltrate, epidermal necrosis) PG (5). The already mentioned associated diseases with immunopathologic potential are to be thoroughly searched.

Corticosteroids are the elective treatment (Prednisone or Prednisolone, P.O., 60-120 mg/kg/d). Alternatively or complementary (in rebel cases), immunosuppression with cyclosporine A (3-5 mg/kg/d) may be useful. There are reports on the successful use of other immunosuppressants (Azathioprine 100-150 mg/d; Tacrolimus 0,1-0,3 mg/kg/d), of sulphones (Dapsone 100-300 mg/d) or TNF- α inhibitors (infliximab 5 mg/d, etanercept S.C. 25 mg x2/week) (2,9).

High-dose corticosteroid treatment is to be maintained until the lesions lose their active features and epithelization begins; later, the doses are gradually decreased, the drug being completely withdrawn when epithelization is complete (5). During tapering, relapses are possible; they impose an increase in the corticosteroid dose or the association of an immunosuppressant. Local treatment requires minimal trauma on the lesions (in order to prevent pathergic exacerbations). Applications of topical corticosteroids, of tacrolimus 0,1% or intralesional cyclosporine A, may be useful (2).

Surgical reintervention on the wound (excisions, skin grafts) or other operations are controversial: most believe that they are to be avoided as long as the lesions are active (9); yet, there are reports of surgical acts, without pathergic worsening, on condition of a strong concomitant immunosuppression (11). Even late after healing, any planned surgical procedure requires a prophylaxis with corticosteroids (pre- and postoperative) in order to prevent relapses, as PG is a recurrent disease (5).

Conclusions

PG after surgery mimics very well postoperative infection: a “pseudo-infection” of the wound, accompanied by “pseudo-sepsis”. If postoperative infection is suspected, wound exploration remains a gold standard in surgery. Nevertheless, if after debridement of a wound surrounded by pustules, bullae or ulcerations, one does not find any improvement, but a centrifugal extension of the lesions, with negative cultures, the possibility of PG should be taken into account.

The diagnosis and management of a postoperative PG case is multidisciplinary; at this one, worked together 12 doctors from 8 specialties.

PG requires a long-term treatment, based primarily on corticosteroids or/and immunosuppressants, as on the identification and treatment of associated disease. Once the diagnosis is established, the surgeon should refrain from any procedure implying skin trauma, in order to prevent worsening of the lesions through pathergy.

References

1. Powell FC, Su WP, Perry HO. Pyoderma gangrenosum: classification and management. *J Am Acad Dermatol.* 1996;34(3):395-409; quiz 410-2.
2. Bonamigo RR, Razera F, Olm GS. Neutrophilic dermatoses: part I. *An Bras Dermatol.* 2011;86(1):11-25; quiz 26-7. [Article in English, Portuguese]
3. Brunsting LA, Goeckerman WH, O’Leary PA. Pyoderma gangrenosum: clinical and experimental observations in five cases occurring in adults. *Arch Dermatol.* 1930;22:655-80.
4. Percival GH. Pyoderma gangrenosum: the histology of the primary lesion. *Br J Dermatol.* 1957;69(4):130-6.
5. Rand RP, Olerud JE, Verrier ED. Pyoderma gangrenosum after coronary artery bypass grafting. *Ann Thorac Surg.* 1993;55(4):1016-8.
6. Wines N, Wines M, Ryman W. Understanding pyoderma gangrenosum: a review. *MedGenMed.* 2001;3(3):6.
7. Ionescu M, Dumitraşcu T, Stroescu C, Bărbută S, Tomulescu V, Popescu I. Surgical treatment in ulcerative rectocolitis. Analysis of a 24 years experience of 50 patients. *Chirurgia (Bucur).* 2004; 99(3):125-35.
8. Wadia F, Malik MH, Porter ML. Postoperative wound breakdown caused by pyoderma gangrenosum after bilateral simultaneous total knee arthroplasty. *J Arthroplasty.* 2007;22(8):1232-5.
9. Brooklyn T, Dunnill G, Probert C. Diagnosis and treatment of pyoderma gangrenosum. *BMJ.* 2006;333(7560):181-4.
10. Armstrong PM, Ilyas I, Pandey R, Berendt AR, Conlon CP, Simpson AH. Pyoderma gangrenosum. A diagnosis not to be missed. *J Bone Joint Surg Br.* 1999;81(5):893-4.
11. Rothenburger M, Tjan TD, Schmid C, Schmidt C, Schwarz T, Scheld HH. Pyoderma gangrenosum after aortic valve replacement. *Ann Thorac Surg.* 2001;71(1):349-51.