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POSTOPERATIVNA PIODERMA GANGRENOZUM – PRIKAZ SLUČAJA
POSTSURGICAL PYODERMA GANGRENOSUM – A CASE REPORT

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Sažetak

Uvod. *Postoperativna pioderma gangrenozum predstavlja podtip pioderme gangrenozum koji se javlja na mestima hirurške traume. Reč je o retkoj neutrofilnoj dermatozi koju karakterišu bolne papulopustule koje evoluiraju u bolne ulceracije sa livid nim, podrivenim rubom, koje se periferno šire.* ***Prikaz slučaja.*** *Prikazujemo pacijentkinju starosti 67 godina, bez prethodne anamneze pioderme gangrenozum, kod koje su se novonastale ulceracije razvile na mestima hirurške traume nakon perkutane kolostomije i torakocenteze. Dijagnoza posthirurške pioderme gangrenozum postavljena je na osnovu kliničke slike i histopatološkog pregleda biopsije kože uzete sa ivice ulceracije. Pacijentkinja je lečena sedam meseci kortikosteroidima, a potom ciklosporinom A, što je dovelo do potpune reepitelizacije.* ***Zaključak.*** *Ovaj entitet može imitirati atipičnu infekciju hirurške rane, što može dovesti do neadekvatnog lečenja i brze progresije bolesti. Od suštinskog je značaja izbeći nepotrebne agresivne debridmane i započeti adekvatnu terapiju na vreme.*
Ključne reči: *pioderma gangrenozum; postoperativne komplikacije; hirurške stome; ulceracija kože; torakocenteza; ishod lečenja; diferencijalna dijagnoza; vezikulobulozne dermatoze*

Abstract

Introduction. Postsurgical pyoderma gangrenosum is a distinct subtype of pyoderma gangrenosum which occurs at sites of surgical trauma. It is a rare neutrophilic dermatosis characterized by tender papulopustules that evolve into painful ulcers with a violaceous, undermined borders and peripheral extension. **Case Report.** We present a 67-year-old woman with no prior history of pyoderma gangrenosum who developed ulcerative lesions at sites of surgical trauma following percutaneous colostomy and thoracocentesis. The diagnosis of postsurgical pyoderma gangrenosum was established based on clinical presentation and histopathological examination of a skin biopsy obtained from the ulcer margin. The patient was treated with systemic corticosteroids followed by cyclosporine A over a seven-month period, resulting in complete re-epithelialization. **Conclusion.** Postsurgical pyoderma gangrenosum may mimic atypical wound infection, potentially leading to inappropriate treatment and rapid disease progression. Recognition of this entity is essential to avoid unnecessary surgical debridement and to ensure timely initiation of appropriate immunosuppressive therapy.
Key words: Pyoderma Gangrenosum; Postoperative Complications; Surgical Stomas; Skin Ulcer; Thoracentesis; Treatment Outcome; Diagnosis, Differential; Skin Diseases, Vesiculobullous

Uvod

Pioderma gangrenozum (PG) je idiopatsko, hronično i rekurentno ulcerativno oboljenje kože, koje karakterišu bolne papulopustule koje evoluiraju u jasno ograničene, bolne ulceracije sa lividnim, podrivenim ivicama, koje se periferno šire [1,2]. Lezije se najčešće razvijaju na trupu i donjim ekstremitetima [3]. Može se javiti u svim životnim dobima, sa najvećom učestalošću između 40. i 59. godine života, češće kod žena. Često je udružena sa sistemskim bolestima, najčešće reumatoidnim artritisom, hematološkim poremećajima ili inflamatornim bolestima creva [1,4]. Postoperativna pioderma gangrenozum (PSPG) specifičan je entitet koji se može javiti na mestima trauma na koži, uključujući hirurške rezove, laparoskopiju i venepunkciju [2,3]. PSPG se manifestuje u vidu ulceracije sa nekrotičnim centrom, purulentnim debrisom i karakterističnom ivicom [5]. Patergija predstavlja ključni faktor u patogenezi i kliničkoj manifestaciji ovog podtipa PG i označava nastanak ili pogoršanje promena na koži nakon traume [6]. Kod ovih pacijenata PG može biti pogrešno dijagnostikovana kao infekcija hirurške rane i lečena sistemskim antibioticima i nepotrebnim debridmanom, što može dovesti do brzog pogoršanja lezija usled patergije [2,3].

Prikaz slučaja

Pacijentkinja starosti 67 godina podvrgnuta je perkutanoj transverzalnoj kolostomiji i medijalnoj laparotomiji sa resekcijom distalnog kolona zbog kliničke slike akutnog ileusa, uzrokovanog divertikulozom, što je potvrđeno histopatološkom analizom. Kao komplikacija postavljanja centralnog venskog katetera razvio se jatrogeni pneumotoraks, te je učinjena desnostrana torakocenteza.

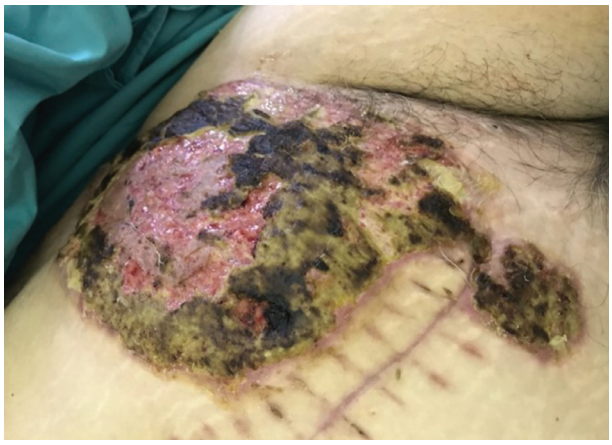
Četvrtog postoperativnog dana javlja se eritem i papule na mestima postavljenog abdominalnog i torakalnog drena, nakon čega su se brzo razvile bolne ulceracije. Pacijentkinja je bila afebrilna, biomarkeri inflamacije bili su blago povišeni (sedimentacija eritrocita 34 mm/h, C-reaktivni protein 9,91 mg/L), dok su kompletna krvna slika, biohemijski parametri, jetreni enzimi i analiza urina bili u referentnim vrednostima. Serologija na virusne hepatitise, anti-HIV antitela, kao i VDRL i TPHA testovi bili su negativni.

Introduction

Pyoderma gangrenosum (PG) is an idiopathic, chronic, and recurrent ulcerative skin disorder characterized by tender papulopustules that progress into well-demarcated, painful ulcers with violaceous, undermined borders and peripheral extension [1,2]. Lesions most commonly affect the trunk and lower extremities [3]. PG can occur at any age, with a peak incidence between 40 and 59 years, and shoes a female predominance. It is frequently associated with systemic disease, particularly hematologic disorders, inflammatory bowel disease, and rheumatoid arthritis [1,4]. Postsurgical pyoderma gangrenosum (PSPG) represents a specific subtype that develops at sites of cutaneous trauma, including surgical incisions, laparoscopic ports, and venipuncture sites [2,3]. Clinically, PSPG typically presents as rapidly progressive ulceration with a necrotic base, purulent exudate, and a characteristic violaceous border [5]. Pathergy – defined as lesion development or exacerbation following minor trauma – is key pathogenic mechanism in this condition [6]. Due to its clinical resemblance to surgical site infection, PSPG is frequently misdiagnosed, leading to inappropriate treatment with systemic antibiotic and surgical debridement, both of which may exacerbate the disease through pathergy [2,3].

Case Report

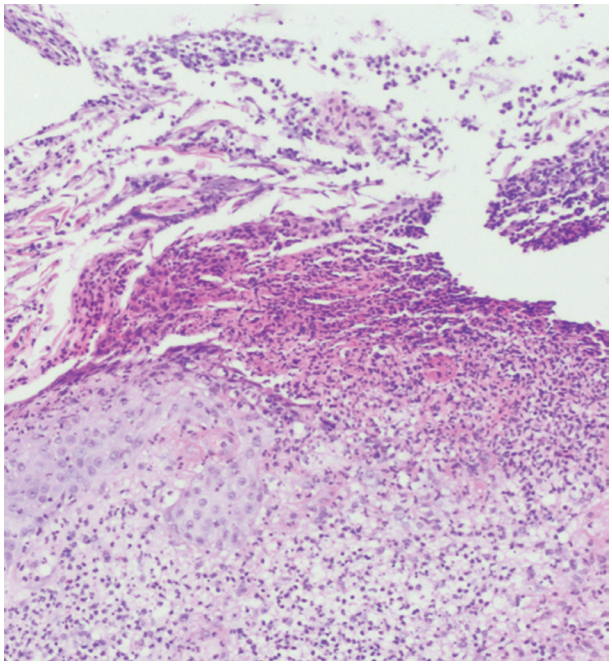
A 67-year-old female patient underwent percutaneous transverse colostomy and midline laparotomy with distal colon resection due to acute ileus caused by diverticulosis, confirmed histopathologically. As a complication of central venous catheter placement, an iatrogenic pneumothorax developed, necessitating right-sided thoracocentesis. On the fourth postoperative day, erythema and papular lesions appeared at the sites of abdominal and thoracic drain insertion, followed by rapid progression into painful ulcerations. The patient was afebrile. Laboratory findings revealed mildly elevated inflammatory markers (erythrocyte sedimentation rate 34 mm/h, C-reactive protein 9.91 mg/L), while complete blood count, biochemical parameters, liver function tests, and urinalysis were within normal limits. Serology tests for viral hepatitis,



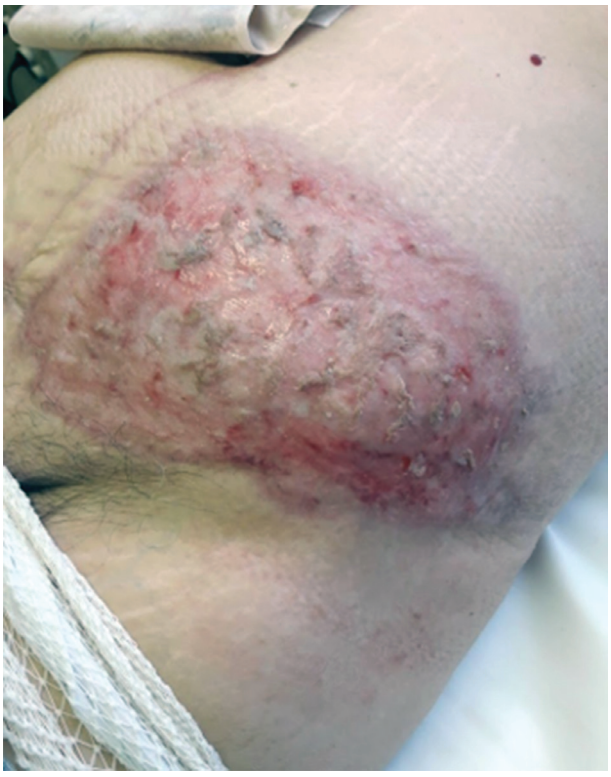
***Slika 1**. Peristomalna jasno ograničena ulceracija sa lividnim rubom, granulacionim i nekrotičnim tkivom na levoj strani abdomena*
Figure 1. Peristomal well-demarcated ulceration with violaceous border, granulation, and necrotic tissue on the left side of abdomen

*Brisevi rana su uzeti za mikrobiološku kulturu, pri čemu su izolovani Staphylococcus aureus i Acinetobacter. Pacijentkinja je lečena kombinovanom sistemskom antibiotskom terapijom (vankomicin i meropenem) bez kliničkog efekta. Nakon dermatološke konsultacije indikovana je biopsija kože sa perifernog ruba ulceracije, koja je upućena na histopatološku analizu **(Slike 1 i 2).** Nalaz je pokazao gust neutrofilni infiltrat i znake leukocitoklastičnog vaskulitisa, sugestivne za PG **(Slika 2).** Direktna imunofluorescencija, kao i kulture na tipične i atipične mikobakterije i duboke mikoze bile su negativne. Testiranja na antinuklearna antitela, ekstraktabilne nuklearne antigene, p- i c-anti-neutrofilna antitela, cirkulišuće imunokomplekse i krioglobuline bila su u referentnim granicama. Kompjuterizovana tomografija grudnog koša, abdomena i karlice nije pokazala znake zahvatanja unutrašnjih organa. Lečenje je započeto metilprednizolonom u dozi od 40 mg (0,8 mg/kg/tt) i dapsonom 50 mg dnevno. Šestog dana terapije dapson je obustavljen zbog hepatotoksičnosti. Terapija je nastavljena kombinacijom kortikosteroida i ciklosporina u dozi od 5 mg/kg/tt tokom prvog meseca, uz postepeno smanjenje doze tokom narednih sedam meseci. Lokalno su primenjivani antiseptici i hidrokoloidni zavoji. Nakon sedam meseci terapije i potpune reepitelizacije, učinjeno je hirurško zatvaranje kolostome **(Slika 3).** Pacijentkinja je primala profilaktičku terapiju prednizonom u dozi od 20 mg/dnevno, jednu nedelju*

HIV, VDRL, and TPHA were negative. Wound cultures grew *Staphylococcus aureus* and *Acinetobacter* species. Despite treatment with broad-spectrum antibiotics (vancomycin and meropenem), no clinical improvement was observed. Dermatologic consultation prompted a skin biopsy from the ulcer margin. Histopathological analysis **(Figures 1 and 2)** revealed a dense neutrophilic infiltrate with features of leukocytoclastic vasculitis, consistent with PG **(Figure 2).** Direct immunofluorescence and microbiological investigations for atypical mycobacteria and deep fungal infections were negative. Autoimmune workup, including antinuclear antibodies, extractable nuclear antigens, p- and c- anti-neutrophil antibodies (ANCA), circulating immune complexes, and cryoglobulins, were unremarkable. Computed tomography of the thorax, abdomen, and pelvis showed no evidence of systemic involvement. Systemic treatment was initiated with methylprednisolone 40 mg/day (0.8 mg/kg BW) and dapsone 50 mg/day. Dapsone, however, was discontinued after six days due to hepatotoxicity. Treatment was continued with corticosteroids in combination with cyclosporine A (5 mg/kg/



***Slika 2.** Neutrofilni infiltrat i leukocitoklastični vaskulitis, sugestivni za piodermu gangrenozum*
Figure 2. A neutrophilic infiltrate and leukocytoclastic vasculitis suggestive of PG



Slika 3. *Potpuna epitelizacija nakon sedmomesečnog lečenja ciklosporinom A*
Figure 3. Complete epithelialization after 7-months of treatment with cyclosporin A

pre i tri nedelje nakon operacije. Tokom daljeg praćenja nije bilo znakova pogoršanja PG.

Diskusija

Pioderma gangrenozum (PG) je retka neutrofilna dermatoza koja se može razviti spontano ili nakon povreda kože [2]. Velika studija sprovedena 2018. godine, koja je obuhvatila 2.273 pacijenta sa piodermom gangrenozum tokom trogodišnjeg perioda od 2008. do 2010. godine, pokazala je da se bolest javlja u svim starosnim grupama, sa najvećom učestalošću kod osoba uzrasta od 40 do 59 godina, kao i da su 66,4% obolelih činile žene. Kod 61 pacijenta (2,7%) postoperativna infekcija ili komplikacija bila je inicijalna dijagnoza [4]. Pridružena sistemska bolest bila je prisutna kod više 50–70% slučajeva pioderme gangrenozum, najčešće u vidu inflamatorne bolesti creva, reumatoidnog artritisa i mijeloproliferativnih poremećaja [7]. Dva odvojena sistematska pregleda literature na temu PSPG objavili su 2015. i 2016. godine Uni-

day) during the first month, followed by gradual dose tapering over seven months. Topical antiseptics and hydrocolloid dressings were applied. Complete re-epithelialization was achieved after seven months of therapy. Subsequently, the patient underwent colostomy closure **(Figure 3)** under prophylactic corticosteroid therapy (prednisone 20 mg/day) initiated one week preoperatively and continued for three weeks postoperatively. No recurrence was observed during follow-up.

Discussion

Pyoderma gangrenosum (PG) is a rare neutrophilic dermatosis that may arise spontaneously or following cutaneous injury [2]. A large study conducted between 2008 and 2010, including 2,273 patients, demonstrated that PG affects all age groups, with a peak incidence between 40 and 59 years, and a predominance in females (66.4%). Postoperative onset was reported in 2.7% of cases [4]. An associated systemic disease is present in 50–70% of cases, most commonly inflammatory bowel disease, rheumatoid arthritis, and myeloproliferative disorders [7]. Two systematic reviews of PSPG were conducted by the University of Alberta and the Mayo Clinic, reported consistent findings regarding mean age, female predominance, mean time to onset, comorbidities and surgical procedures **(Table 1)** [2,8]. In contrast, our patient had confirmed diagnosis of colon diverticulosis, and no identifiable systemic comorbidity at diagnosis. PSPG occurred on the sites of abdominal incision and thoracocentesis on the fourth postoperative day. PSPG typically begins with erythema with excessive pain [3]. Rapid progression to ulceration with violaceous, undermined borders presents as the inflammatory process extend within the dermis [2,5]. Misdiagnosis as wound infection is common, particularly in peristomal cases, where lesions may resemble irritant dermatitis or stitch abscess [9]. Histopathological findings are nonspecific; leukocytoclastic vasculitis is present in approximately 40% of cases [10]. The lack of response to antibiotic therapy and worsening after debridement should rise suspicion for PSPG. In such cases, PSPG should be included in the differential diagnosis [1]. The pathogenesis of PG is complex and not fully understood. Pathergy

Tabela 1. *Rezultati dva sistematska pregleda literature na temu postoperativne pioderme gangrenozum*
Table 1. Results of two systematic reviews of post-surgical pyoderma gangrenosum

	Univerzitet Alberta University of Alberta (2015)	*Klinika Mayo* Mayo Clinic (2016)
Pacijenti/Patients	220	140
Prosečna starost/Mean age	45 y	50.1 y
Žene : *Muškarci*/Female : male	65% : 35%	72% : 28%
Istorija PG/History of PG	37 (16.8%)	6 (4.2%)
Prosečno vreme do početka/Mean time to onset	7.2 days	7 days
Komorbiteti/Comorbidities	40 (18%)	46 (34%)
Hematološki poremećaji/Hematological disorders	19 (8.6%)	20 (14.7%)
Inflamatorna bolest creva/Inflammatory bowel disease	13 (5.9%)	12 (8.8%)
Reumatoidni artrits/Rheumatoid arthritis	8 (3.6%)	4 (2.9%)
Hirurške procedure/Surgical procedures		
Grudi/Breast	56 (25%)	45 (32.1%)
Abdominalni/Abdominal	30 (14%)	44 (31.4%)
Kardiotorakalni/Cardiothoracic	30 (14%)	13 (9.3%)

verzitet u Alberti i Mejo klinika, sa sličnim rezultatima u pogledu prosečne starosti bolesnika, predominacije ženskog pola, prosečnog vremena neophodnog za razvoj bolesti, najčešćih komorbiditeta i hirurških intervencija ***(Tabela 1)*** *[2,8]. Kod naše pacijentkinje potvrđena je dijagnoza divertikuloze kolona, uz negativnu anamnezu na sistemska oboljenja, dok detaljna dijagnostička obrada u trenutku postavljanja dijagnoze nije ukazala na postojanje komorbiditeta. Bolest se razvila na mestima abdominalnog reza i torakocenteze četvrtog postoperativnog dana. Tipično, prvi znak PSPG je eritem praćen izraženim bolom [3]. Klasično se PSPG prezentuje karakterističnim lividnim, podrivenim rubovima oko centralne ulceracije sa purulentnim debrisom [2,5]. PSPG se često pogrešno dijagnostikuje kao infekcija hirurške rane. Kod peristomalne PG može se zameniti za kontaktni dermatitis, iritaciju usled curenja fecesa ili urina ili apsces oko šava [9]. Histopatološki nalaz nije specifičan, a leukocitoklastični vaskulitis se viđa kod 40% pacijenata [10]. Sistemski antibiotici su neefikasni, a agresivni hirurški debridman može izazvati patergiju i brzo pogoršanje bolesti. U takvim slučajevima PSPG treba uključiti u diferencijalnu dijagnozu [1]. Patogeneza je kompleksna i još uvek nedovoljno razjašnjena. Patergija je ključni faktor u patogenezi ovog podtipa PG i javlja se kod do 30% pacijenata [6]. Poznata je uloga poremećaja funkcije neutrofila i T-limfocita, kao i uloga in-*

plays a central role and occurs in up to 30% of patients [9]. Immunological mechanisms involve dysregulated neutrophil function and T-cell activity, with increased expression of pro-inflammatory mediators such as interleukin-1β, IL-8, IL-17, tumor necrosis factor-α, matrix metalloproteinase (MMP) 2, MMP-9, and vascular endothelial growth factor (VEGF) [11]. Increased migration of neutrophils to the dermis, resulting from intrinsic neutrophil abnormalities or altered integrin-endothelial interactions, may play a major role in the pathogenesis of pyoderma gangrenosum. An association has been described between PG and leukocyte adhesion deficiency type (LAD)-1, a hereditary disorder of neutrophil trafficking characterized by reduced expression of the CD18 integrin and the development of PG-like lesions. Abnormal T-cell function is also implicated, likely driven by an imbalance between pro-inflammatory Th17 cells and regulatory T-cells, with decreased proportion of Tregs observed in PG lesions [11]. Several studies have demonstrated that T-cell overactivity and increased IL-17 levels promote neutrophil recruitment and activation [12,13]. Emerging evidence further highlights the role of the innate immunity, particularly inflammasome activation, in disease pathogenesis [11]. In patients without associated comorbidities, systemic corticosteroids – ei-

flamatornih medijatora poput interleukin-1β, IL-8, IL-17, faktor nekroze tumora-α, matriks metaloproteinaze (MMP) 2, MMP-9 i vaskularni endotelni faktor rasta (VEGF) [11]. Povećana migracija neutrofila u dermis, usled abnormalnih neutrofila ili poremećenih interakcija između integrina i endotela, može imati ključnu ulogu. Utvrđena je povezanost između PG i deficijencije adhezije leukocita tipa 1 (LAD-1), naslednog poremećaja migracije neutrofila. Kod ovih pacijenata prisutna je smanjena ekspresija integrina CD18 i razvoj PG sličnih lezija. Poremećena funkcija T-limfocita potencijalno je posledica neravnoteže između proinflamatornih Th17 ćelija i regulatornih T-ćelija, uz smanjen udeo Treg ćelija u PG lezijama [11]. Dve odvojene studije pokazale su da prekomerna aktivnost T-limfocita i povišeni nivoi IL-17 dovode do privlačenja neutrofila [12,13]. Novija istraživanja takođe ukazuju na ulogu urođenog imuniteta, naročito inflamazoma [11]. Za PG bez komorbiditeta sistemski kortikosteroidi, samostalno ili u kombinaciji sa ciklosporinom, smatraju se terapijom prvog izbora [4]. Dapson, antineutrofilni lek, pokazuje efikasnost u kombinaciji sa kortikosteroidima [4]. Ostale terapijske opcije uključuju ciklofosfamid, metotreksat, azatioprin, sulfasalazin i hiperbaričnu oksigenoterapiju [1,2]. Biološka terapija inhibitorima TNF-α (infliksimab, adalimumab) i IL-1 antagonistima pokazala je efikasnost, a infliksimab je terapija prvog izbora kod pacijenata sa PG i inflamatornom bolešću creva [14,15]. Uz sistemsku terapiju, lokalno lečenje ima za cilj prevenciju sekundarne bakterijske infekcije, smanjenje bola i obezbeđivanje optimalnih uslova za epitelizaciju [4]. Profilaktička terapija kortikosteroidima preporučuje se kod svih pacijenata sa anamnezom PSPG pre narednih hirurških zahvata. Kod naše pacijentkinje nije došlo do relapsa PG nakon ponovljenog hirurškog zahvata, uz profilaktičku primenu sistemskih kortikosteroida započetu nedelju dana pre operacije i nastavljenu tri nedelje nakon operacije.

Zaključak

Postoperativna pioderma gangrenozum je redak, ali ozbiljan oblik pioderme gangrenozum koji se javlja na mestima hirurških zahvata, najčešće na abdomenu i toraksu. Može imitirati infekciju rane, a neadekvatno lečenje može dovesti do brze progresije bolesti. Dermatolozi i hirurzi treba da imaju ovaj entitet u vidu kako bi se izbegli nepotrebni agresivni zahvati. Rana di-

ther as monotherapy or in combination with cyclosporine – are considered to be the first-line treatment [4]. Dapsone, as anti-neutrophilic agent, has demonstrated efficacy when used in combination with corticosteroids [4]. Additional therapeutic options include cyclophosphamide, methotrexate, azathioprine, sulfasalazine, and hyperbaric oxygen therapy [1,2]. In the present case, the patient was treated with a combination of methylprednisolone (40 mg/day) and cyclosporine A (5 mg/kg/day) during the initial month, followed by gradual dose tapering. Complete re-epithelialization was achieved after seven months of therapy. Biologic agents, including TNF inhibitors such as infliximab and adalimumab, as well as IL-1 antagonists, have also demonstrated efficacy in PG. Notably, infliximab is considered a first-line therapy in PG associated with inflammatory bowel disease [14,15]. In addition to systemic therapy, appropriate topical management is essential to prevent secondary infection, reduce pain, and provide an optimal environment for epithelization [4]. Prophylactic corticosteroid therapy is recommended in patients with a history of PSPG prior to subsequent surgical procedures. In our case, no recurrence was observed following repeated surgery performed under prophylactic systemic corticosteroid therapy initiated one week preoperatively and continued for three weeks postoperatively.

Conclusion

Postsurgical pyoderma gangrenosum is a rare but serious complication of surgical procedures, most commonly affecting the abdomen and thorax. Its clinical resemblance to wound infection may lead to inappropriate management and rapid disease progression. Early recognition, avoidance of unnecessary surgical intervention, and timely initiation of immunosuppressive therapy are essential for favorable outcomes.

Abbreviations

PG – Pioderma gangrenozum
PSPG – Post-surgical pyoderma gangrenosum
ANCA – Antineutrophil cytoplasmic antibodies

jagnoza i pravovremena imunosupresivna terapija ključni su za povoljan ishod.

Lista skraćenica

PG –Pioderma gangrenozum
PSPG –Postoperativna pioderma gangrenozum
ANCA – Antineutrophil cytoplasmic antibodies
BW –telesna težina
MMP –matriks metaloproteinaza
VEGF – growth factor/ vaskularni endotelni faktor rasta
LAD – leukocyte adhesion deficiency/ deficijencija adhezije leukocita

BW – Body weight
MMP – matrix metalloproteinase

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