Medication Use During Hospitalizations for Generalized Pustular Psoriasis

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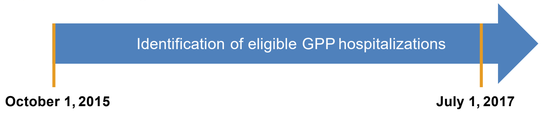
BACKGROUND & STUDY OBJECTIVES

- Generalized pustular psoriasis (GPP) is a rare and severe, potentially life-threatening autoinflammatory skin disease[1-3]
- GPP is characterized by recurrent flares that consist of disseminated erythematous skin rash with sterile neutrophil-filled pustules[1-3]
- GPP flares are believed to be the main driver of healthcare resource use for patients with GPP, due to serious complications such as sepsis, renal failure, respiratory abnormalities that may lead to an emergency department visit or hospital stay, and even death[4,5]
- Evidence is lacking on GPP flares leading to hospitalization and how they are treated
- This study characterizes medication use during GPP-related hospitalizations

METHODS

- This study was a descriptive, retrospective cross-sectional analysis conducted in the Cerner Health Facts® electronic medical record (EMR) database (Figure 1)
- Hospitalizations were identified between October 1, 2015 and July 1, 2017 (Figure 1)
- Visits were included in the study if they were GPP-related, defined as a GPP diagnosis (ICD-10-CM code: L40.1) in the first or second position at admission or discharge, and if the discharge date was within the study period
- Hospitalizations were the units of analysis. Only 4 (6%) patients had a second hospitalization and no patients had more than 2 hospitalizations
- Patient demographics, length of stay, Intensive Care Unit (ICU) admission, comorbidities, and medication use were characterized with descriptive statistics

Figure 1. Study design



RESULTS

Patient population and demographics

- Out of 2,461,749 hospitalizations with discharge dates during the study time period, 71 GPP-related hospitalizations were included in the study (Table 1)
- Hospitalizations were predominately among Caucasian (68%) with a mean (standard deviation (SD)) age of 51 (22.6) years (Table 1)
- GPP was the principal diagnosis in 34% of hospitalizations and secondary to other skin conditions, comorbidities, and complications in the remaining 66% of hospitalizations (Table 1)
  - Other skin conditions included cellulitis, rash, contact dermatitis, and large plaque parapsoriasis made up 15% of other principal diagnoses (Data not shown)
- The mean (SD) length of stay for a hospitalization was 9 (14.0) days. Three hospitalizations included an ICU admission and two hospitalizations resulted in death (Table 1)

Table 1. Characteristics of all hospitalizations meeting eligibility criteria

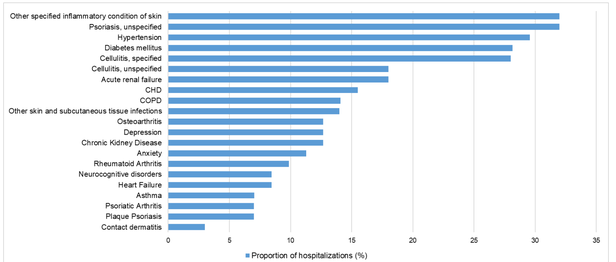
	GPP Hospitalization N= 71
Eligibility, n (%)	
GPP diagnosis only at admission GPP	9 (12.7%)
diagnosis only at discharge	58 (81.7%)
GPP diagnosis at both admission and discharge	4 (5.6%)
Diagnosis priority of GPP, n (%)	
Primary	24 (33.8%)
Secondary	47 (66.2%)
Age at admission, mean (SD)	51.4 (22.6)
Age group at admission, n (%)	
<18	6 (8.5%)
18-29	6 (8.5%)
30-49	19 (26.8%)
50-64	16 (22.5%)
>=65	24 (33.8%)
Female, n (%)	37 (52.1%)
Race, n (%)	
Caucasian	48 (67.6%)
African American	13 (18.3%)
Asian	1 (1.4%)
Native American	0 (0.0%)
Hispanic	1 (1.4%)
Other	8 (11.3%)
Census Region, n (%)	
Northeast	14 (19.7%)
Midwest	24 (33.8%)
South	18 (25.4%)
West	15 (21.1%)
Plan Type*, n (%)	
Medicaid	20 (28.2%)
Medicare	26 (36.6%)
HMO	3 (4.2%)
PPO	2 (2.8%)
Other	13 (18.3%)
Unknown	7 (9.8%)
Hospitalization length of stay (days), mean (SD)	8.6 (14.0)
Intensive care unit admission, n (%)	3 (4.2)
Mortality during GPP hospitalization, n (%)	2 (2.8)
Length of stay involving each mortality, days	11;18

*__Medicaid__: Medicade, Medicaid Managed Care (undesignated); __Medicare:__ Medicare, Medicare Managed Care (undesignated); __HMO:__ HMO/Managed Care (undesignated); __PPO:__ PPO (undesignated); __Other:__ Self-pay, Other Non-Govt, Other Government, Other Commercial Payer, Free, Research, Blue Cross / Blue Shield, CHAMPUS (military dependents); __Unknown:__ Unknown/Missing/Invalid, Not Mapped

Comorbidities

- Common comorbidities documented during hospitalizations for GPP were other inflammatory skin conditions and subcutaneous tissue infections including cellulitis (46%), psoriasis (32%), plaque psoriasis (7%), and psoriatic arthritis (7%), and contact dermatitis (3%) (Figure 1)
- Hypertension (30%), diabetes (28%), CHD (15%), COPD (14%), CKD (13%), and osteoarthritis (13%) were also frequent comorbidities (Figure 1)
- Depression and anxiety was reported in 13% and 11% of hospitalizations, respectively (Figure 1)
- Many patients presented with septicemia (24%), bacterial infections (20%), acute renal failure (18%) and other complications at admission (data not shown)

Figure 1. Proportion of comorbidities coded during GPP hospitalizations



CHD= Coronary heart disease; **COPD**= Chronic obstructive lung disease; **Other specified inflammatory condition of skin includes:** Other psoriasis; Seborrheic dermatitis, unspecified; Pruritus, unspecified; Erythema intertrigo; Bullous pemphigoid; Other specified erythematous conditions; Erythematous condition, unspecified; Sunburn of second degree; Other rosacea; Rosacea, unspecified; Hidradenitis suppurativa. **Other skin and subcutaneous tissue infections includes:** Impetigo, unspecified; Pyoderma; Staphylococcal scalded skin syndrome; Cutaneous abscess of neck; Cutaneous abscess of left lower limb; Cutaneous abscess of right foot; Cutaneous abscess, unspecified; Local infection of the skin and subcutaneous tissue, unspecified

Medication use

- Medication use during GPP-related hospitalizations included topicals (triamcinolone (42%); clobetasol (17%)), systemic corticosteroids (prednisone (20%); methylprednisolone (11%)), and non-biologic and biologic immunosuppressants (cyclosporine (6%); methotrexate (4%); etanercept (1%)) (Table 2)
- Intravenous (IV) fluids (79%), analgesics (acetaminophen 67%) and antibiotics (vancomycin 21%) were also common (Table 3)
- Opiods within the analgesics drug class such as morphine and hydromorphone were also commonly used during GPP hospitalizations (Table 3)

Table 2. Top Medications used for dermatological and immunosuppressive treatment

Drug Class	N(%)
Topicals	
Triamcinolone	30 (42.3)
Clobetasol	12 (16.9)
Emollients	9 (12.7)
Oral Steroids	
Prednisone	14 (19.7)
Methylprednisolone	8 (11.3)
Dexamethasone	7 (9.9)
Immunosuppressants	
Cyclosporine	4 (5.6)
Tacrolimus	1 (1.4)
Methotrexate	3 (4.2)
Biologics	
Etanercept	1 (1.4)

Table 3. Other frequent medication usage during GPP hospitalizations

Drug Class	N (%)
Intravenous Products	
IV solution	56 (78.9)
Other	5 (7.0)
Analgesics	
Acetaminophen	48 (67.6)
Morphine	17 (23.9)
Hydromorphone	15 (21.1)
Anticoagulants	
Enoxaparin	24 (33.8)
Heparin	20 (28.2)
Warfarin	6 (8.5)
Antiemetics	
Ondansetron	35 (49.3)
Diphenhydramine	25 (35.2)
Promethazine	4 (5.6)
Glucose elevating agents	
Glucose	16 (22.5)
Glucagon	11 (15.5)
Proton pump inhibitors	
Pantoprazole	16 (22.5)
Omeprazole	2 (2.8)
Diuretics	
Furosemide	15 (21.1)
Hydrochlorothiazide	3 (4.2)
Antibiotics	
Vancomycin	15 (21.1)
Ceftriaxone	8 (11.3)

CONCLUSION

- Hospitalizations for GPP commonly involved treatment with topicals and systemic corticosteroids, while in some cases immunosuppressants were administered.
- Low use of biologics were noted during hospitalizations. This may be due to a range of factors:
  - GPP patients may be already on a biologic for a coexisting immune-mediated condition,
  - Attending physicians may be reluctant to treat GPP patients with a biologic due to lack of experience with GPP,
  - Or the need to stabilize the patient's medical condition and manage comorbidities was prioritized over treating the GPP flare.
- Frequent use of IV fluids may reflect efforts to treat GPP flare complications such as dehydration, sepsis, or acute renal failure.
- Use of analgesics, including opioids during many GPP admissions suggest a need for significant pain management.
- Study limitations:
  - No treatment data was available outside the hospitalization encounter, thus the use of medications taken prior to admission were unknown and may have impacted inpatient treatment selection.
- Future research should examine treatment patterns preceding hospitalizations to explore unmet needs in GPP flare management.

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This study was sponsored by Boehringer Ingelheim Pharmaceuticals, Inc. (BIPI). The author(s) met criteria for authorship as recommended by the International Committee of Medical Journal Editors (ICMJE). The authors received no direct compensation related to the development of the poster. BIPI was given the opportunity to review the poster for medical and scientific accuracy as well as intellectual property considerations. DS, SDB, WCV and MLH are or were employees of BIPI. JJW was a paid consultant for this study.

San Diego Dermatology Symposium (SDDS22), Mar 11-13, 2022, San Diego, CA
Previously presented at: AMCPNexus Conference, October 20, 2020