

Healthcare resource utilization in patients with generalized pustular psoriasis in Japan: A claims database study

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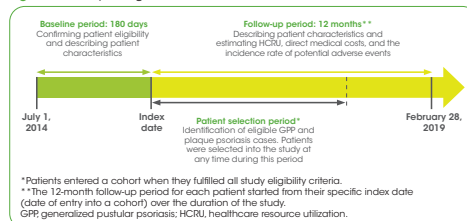
Introduction

- Generalized pustular psoriasis (GPP) is defined as a rare, neutrophilic skin disease characterized by episodes of widespread eruption of sterile, macroscopically visible pustules that can occur with or without systemic inflammation and with or without plaque psoriasis^{1,2}
 - The clinical course of GPP can be either relapsing (recurrent flares) or persistent with intermittent flares^{3,4}
- The overall prevalence of GPP in Japan is unknown, however, data report that between 1.1% and 1.8% of all clinical types of psoriasis in Japan are GPP^{5,6}
- Although GPP and plaque psoriasis are clinically and genetically distinct diseases, patients with GPP often follow the same treatment pathways as those with plaque psoriasis⁷⁻¹⁰
 - These therapies may not be effective in this patient population, highlighting a challenge in the treatment of GPP⁴
- Recommended treatments for the various subtypes of pustular psoriasis include anti-tumor necrosis factor (TNF) inhibitors as well as etretinate, methotrexate, and ciclosporin
 - There are currently eight approved biologics for the treatment of GPP in Japan: certolizumab pegol, adalimumab, infliximab, risankizumab, guselkumab, secukinumab, brodalumab, and ixekizumab^{2,11}
- This study describes the characteristics and healthcare resource utilization (HCRU) of patients with GPP in Japan, using the Japan Medical Data Center (JMDC) database

Methods

- Patients were diagnosed as having GPP or plaque psoriasis if they had ≥ 1 inpatient or outpatient confirmed International Classification of Diseases, 10th Revision (ICD-10) L40.1 or L40.0 diagnostic code, respectively
- All analyses were conducted via the Aetion Evidence Platform[®] v3.11, using the JMDC database, a Japanese administrative claims database¹²
- The study period was from July 1, 2014 to February 28, 2019, with the first diagnostic code marking the index date (Figure 1)
- Subjects from the general population (excluding subjects with any psoriasis other than psoriatic arthritis) who were matched 4:1 to patients with GPP based on age and sex, along with patients in the plaque psoriasis cohort, provided context to the GPP burden of disease and HCRU
- Patient characteristics during the 180-day baseline period, and medication use among patients with 12 months' follow-up were analyzed
- The following outcomes were evaluated:
 - Comorbidities during the 12-month follow-up, including but not limited to hormonal/metabolic conditions, pulmonary conditions, and psychiatric conditions
 - Dermatologic treatments received during the 12-month follow-up
 - Concomitant medications during the 12-month follow-up
 - All-cause HCRU during the 12-month follow-up
- Biologics were identified by drug names (generic or brand names)
- All analyses were descriptive in nature; no formal comparisons were conducted
- Only parameters that included ≥ 5 patients in any of the cohorts are presented here
- For HCRU analyses, all-cause visits were included

Figure 1. Study design

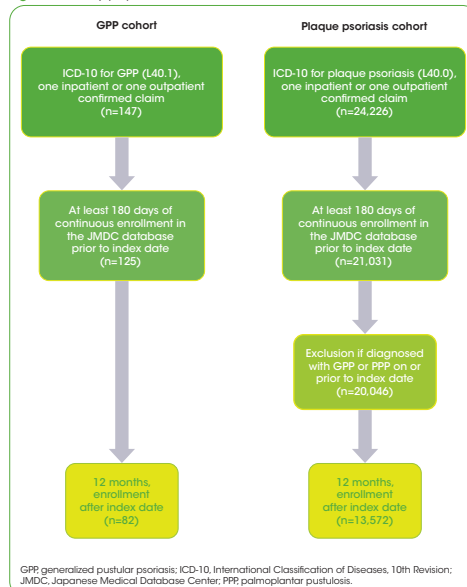


Results

Patient demographics and baseline characteristics

- In total, 125 patients with GPP, 20,046 with plaque psoriasis (excluding those with a diagnosis of GPP or palmoplantar pustulosis), and 500 in the general population matched cohort were identified at baseline
- Overall, 82 patients with GPP and 13,572 patients with plaque psoriasis had 12 months of continuous enrollment, which was required for the follow-up period analyses (Figure 2)
 - In the general population matched cohort, 327 subjects had 12 months of continuous enrollment

Figure 2. Study population



GPP: generalized pustular psoriasis; ICD-10: International Classification of Diseases, 10th Revision; JMDC: Japanese Medical Data Center; PPP: palmoplantar pustulosis.

- Demographics were similar across cohorts, although there was a higher proportion of patients > 18 years of age in the plaque psoriasis cohort (90.1%) than in the GPP cohort (80.8%) (Table 1)

Table 1. Patient demographics at baseline

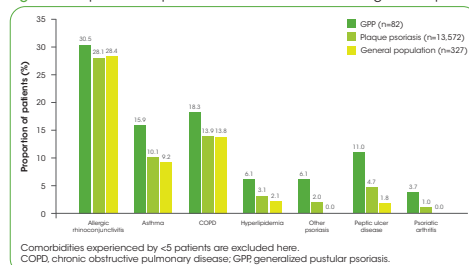
	GPP n=125	Plaque psoriasis n=20,046	General population n=500
Male, n (%)	75 (60.0)	12,438 (62.0)	300 (60.0)
Age, years, mean (SD)	39.0 (18.9)	42.8 (16.0)	38.9 (18.8)
<18 years, n (%)	24 (19.2)	1,983 (9.9)	94 (18.8)
≥ 18 years, n (%)	101 (80.8)	18,063 (90.1)	406 (81.2)
Insured, n (%)	75 (60.0)	13,516 (67.4)	305 (61.0)
BMI among patients with at least one measurement, kg/m ² , mean (SD)	22.9 (3.0)*	23.9 (4.0)*	22.9 (4.0)*
Abdominal circumference among patients with at least one measurement, cm, mean (SD)	83.6 (9.1)*	84.4 (10.4)*	82.4 (10.8)*
SBP among patients with at least one measurement, mmHg, mean (SD)	122.8 (17.4)*	122.8 (16.2)*	122.5 (15.2)*
DBP among patients with at least one measurement, mmHg, mean (SD)	76.3 (11.4)*	76.4 (11.8)*	76.2 (12.1)*

*Patients and subjects with missing values are not included in this analysis. BMI, body mass index; DBP, diastolic blood pressure; GPP, generalized pustular psoriasis; SBP, systolic blood pressure; SD, standard deviation.

Comorbidities during the 12-month follow-up

- During the 12-month follow-up, patients with GPP were more likely to suffer from certain comorbidities than those in the plaque psoriasis and general population cohorts, including chronic obstructive pulmonary disease (COPD; 18.3% vs 13.9% and 13.8%, respectively), asthma (15.9% vs 10.1% and 9.2%), hyperlipidemia (6.1% vs 3.1% and 2.1%), and peptic ulcer disease (11.0% vs 4.7% and 1.8%) (Figure 3)
- Other comorbidities patients with GPP were more likely to suffer from included psoriatic arthritis, allergic rhinoconjunctivitis, myocardial infarction, type 2 diabetes, and Crohn's disease (Figure 3)

Figure 3. Proportions of patients with comorbidities during follow-up



Comorbidities experienced by ≤ 5 patients are excluded here. COPD, chronic obstructive pulmonary disease; GPP, generalized pustular psoriasis.

Dermatologic medication use during the 12-month follow-up

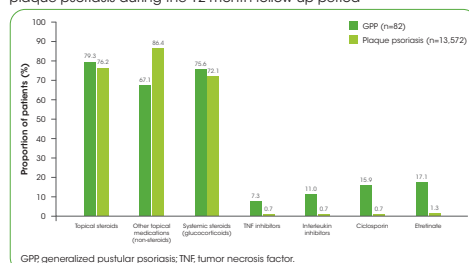
- Of the 82 patients with GPP who completed the 12 months' follow-up, 46 (56.1%) were treated with a systemic therapy, including biologic monotherapy, non-biologic monotherapy, and biologic and non-biologic combination therapies, with or without topical medications (Table 2)
- Patients with GPP were more likely to be treated with a biologic monotherapy than patients with plaque psoriasis (3.7% vs 0.2%, respectively), while patients with plaque psoriasis were more likely to be treated with a non-biologic systemic monotherapy (2.5% than patients with GPP (0.0%)) (Table 2)
 - Of the biologic therapies for the treatment of GPP interleukin inhibitors were the most commonly prescribed in patients with GPP (11.0%; plaque psoriasis: 0.7%) (Figure 4)
 - Of the non-biologic therapies, etretinate was the most commonly used therapy in patients with GPP (17.1%), plaque psoriasis: 1.3%), whereas in the plaque psoriasis cohort, the most commonly used non-biologic therapy was methotrexate (1.4%) (Figure 4)
- However, a higher proportion of patients with GPP (2.4%) received methotrexate than those with plaque psoriasis (1.4%)
- Forty-three patients with GPP (52.4%) were treated with combination therapies (topical and/or biologics and/or non-biologics) compared with 2040 patients with plaque psoriasis (15.0%) (Table 2)
- Fewer patients with GPP were treated with a topical medication monotherapy (28.0%) compared with patients with plaque psoriasis (61.4%) (Table 2)

Table 2. Total treatments received on or after the index date during the 12-month follow-up period

Medication, n (%)*	GPP n=82	Plaque psoriasis n=13,572
No treatment	13 (15.9)	2837 (20.9)
Topical monotherapy	23 (28.0)	8327 (61.4)
Non-biologic systemic monotherapy	0 (0.0)	343 (2.5)
Biologic monotherapy	3 (3.7)	25 (0.2)
Topical + non-biologic systemic	31 (37.8)	1873 (13.8)
Topical + non-biologic systemic + biologic	8 (9.8)	71 (0.5)

*Only medication groups with ≥ 5 patients in either cohort are included. Medication groups are mutually exclusive. GPP, generalized pustular psoriasis.

Figure 4. Medication use by class for patients with GPP and plaque psoriasis during the 12-month follow-up period



GPP, generalized pustular psoriasis; TNF, tumor necrosis factor.

Concomitant medication burden during the 12-month follow-up

- The most frequently prescribed medication across all cohorts was antibiotics, however, the proportion of patients with GPP requiring antibiotics was higher than in both the plaque psoriasis and general population cohorts (80.5% vs 55.2% and 45.9%, respectively) (Table 3)

- Patients with GPP were more likely to be prescribed medication for type 2 diabetes, asthma, COPD, and psychiatric reasons than patients with plaque psoriasis and those in the general population, whereas patients with plaque psoriasis were more likely to be prescribed statins, antihypertensives, and medication for hyperlipidemia than patients with GPP and those in the general population (Table 3)

Table 3. Most common concomitant medication burden during the 12-month follow-up

Medication, n (%)	GPP n=82	Plaque psoriasis n=13,572	General population n=327
Antibiotics	66 (80.5)	7491 (55.2)	150 (45.9)
Asthma medication	33 (40.2)	4425 (32.6)	66 (20.2)
COPD medication	23 (28.0)	2044 (15.1)	34 (10.4)
Psychiatric medication	20 (24.4)	2114 (15.6)	49 (15.0)
Antihypertensives	10 (12.2)	2222 (16.4)	48 (14.7)
Hyperlipidemia medication	8 (9.8)	1388 (10.2)	30 (9.2)
Statins	7 (8.5)	1249 (9.2)	23 (7.0)
Type 2 diabetes medication	5 (6.1)	741 (5.5)	12 (3.7)

COPD, chronic obstructive pulmonary disease; GPP, generalized pustular psoriasis.

Overall all-cause HCRU during the 12-month follow-up

- Overall, patients with GPP had more outpatient visits than the plaque psoriasis and general population cohorts (mean visits: 8.6 vs 6.2 and 5.0, respectively) (Table 4)
- A higher proportion of patients with GPP required inpatient stays (32.9%) compared with the plaque psoriasis (7.3%) and general population (6.1%) cohorts (Table 4)
 - The mean duration of hospitalization was also longer in the GPP cohort (12.7 days) compared with the plaque psoriasis (10.5 days) and general population (5.6 days) cohorts (Table 4)

Table 4. Overall all-cause HCRU during the 12-month follow-up period

HCRU	GPP n=82	Plaque psoriasis n=13,572	General population n=327
All-cause outpatient visits, n (%)	82 (100.0)	13,570 (>99.9%)	260 (79.5)
Mean visits (SD)	8.6 (5.5)	6.2 (4.5)	5.0 (4.0)
All-cause inpatient visits, n (%)	27 (32.9)	996 (7.3)	20 (6.1)
Mean visits (SD)	3.1 (5.9)	2.6 (3.1)	2.3 (1.6)
Duration of hospitalization, days			
Mean (SD)	12.7 (14.7)	10.5 (16.5)	5.6 (4.6)

GPP, generalized pustular psoriasis; HCRU, healthcare resource utilization; SD, standard deviation.

Conclusions

- The results of this study show that patients with GPP had higher rates of certain comorbidities than patients with plaque psoriasis and those in the general population cohort during the 12-month follow-up
- Overall, patients with GPP had differing concomitant medication burden for comorbidities compared with those with plaque psoriasis, suggesting that patients with GPP have a different clinical profile to those with plaque psoriasis
- HCRU was higher in patients with GPP than those with plaque psoriasis, suggesting that GPP and the associated comorbidities result in higher healthcare needs in this patient population
- This study is not without limitations. The study used administrative claims data, which are collected for the purpose of billing and reimbursement as opposed to research. These data may have coding errors and lack detailed clinical information. In addition, the overall study sample size for patients with GPP was relatively small
 - Also, the JMDC database is predominantly made up of corporate insurance providers, and is thus primarily composed of individuals of working age, and is under-representative of individuals > 65 years (i.e. those who are retired)
- However, data for treatments are generally considered to be accurate, reflecting the receipts submitted for insurance purposes
- The differing healthcare needs and clinical profile of patients with GPP compared with patients with plaque psoriasis, which have previously been under-reported, highlight unmet needs in this patient population in Japan

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Disclosures

This study was funded by Boehringer Ingelheim. At the time of the study, N Kotowsky, R Gao, AK Golembesky¹, and H Yamazaki¹ were full-time employees of Boehringer Ingelheim.

*AK Golembesky is now employed by GlaxoSmithKline. H Yamazaki is now employed by AbbVie GK.

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