



Disparities in Financial Burden, Outcomes, and Comorbidities Among Pediatric Patients With Pyoderma Gangrenosum With and Without Mental Health Disorders in a Multivariate Analysis of the 2016 Kids' Inpatient Database

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Introduction

Pyoderma gangrenosum (PG) is a neutrophilic dermatosis, with painful and rapidly progressing skin ulcers [1]. An association between PG and mental, behavioral, and neurodevelopmental disorders (MBNDs), including depression, has been described in adult patients [2] but has not been studied in pediatric or inpatient populations. We aimed to assess differences in demographics, severity of disease, comorbidities, and outcomes in pediatric inpatients with PG with and without MBNDs.

The 2016 Kids' Inpatient Database (KID), a database on hospital stays for children ages 0–20 years old, was queried for patients with PG (ICD10-CM: L88) with and without MBNDs (ICD-10: F01-F99). Univariate analysis with Chi-square and two-tailed t-test statistics, alpha-value of 0.05, and multivariable analysis were performed to identify statistical associations with MBNDs.

A total of 107 pediatric inpatients were diagnosed with PG, with mean age 15.6 years (SE: 0.5), 70.8% female, 46.8% White, and 26.6% Black. Age, race, household

Table 1: Demographics, management, charges, and outcomes of pediatric patients with pyoderma gangrenosum by mental health diagnosis status.

		No Mental Health Diagnosis	Mental Health Diagnosis	Total	P value
		n = 83	n = 24	n = 107	
		-77.70%	-22.30%		
Age	Age, years	15.05	17.37	15.57	0.001
	(mean [SE])	[0.61]	[0.37]	[0.49]	
Sex	Male	31.30%	21.70%	29.20%	0.371
	Female	68.70%	78.30%	70.80%	
Race	White	41.70%	63.60%	46.80%	0.012
	Black	34.70%	0.00%	26.60%	
	Hispanic	15.30%	18.20%	16.00%	
	Other	8.30%	18.20%	10.60%	
Primary payer status	Medicare	1.20%	0.00%	0.90%	0.09
	Medicaid	34.10%	33.30%	34.00%	
	Private insurance	59.80%	45.80%	56.60%	
	Self-pay	3.70%	8.30%	4.70%	
	Other	1.20%	12.50%	3.80%	
Comorbidity	Crohn's disease or ulcerative colitis	48.20%	87.50%	57.00%	< 0.001
	Skin and subcutaneous infections	38.60%	17.40%	34.00%	0.058
	Musculoskeletal & connective disease	21.70%	45.80%	27.10%	0.019
	Overweight and obesity	13.30%	33.30%	17.80%	0.023
	Hypertensive disease	8.40%	12.50%	9.30%	0.547
	Diabetes mellitus	8.40%	0.00%	6.50%	0.141
	Dermatitis & eczema	1.20%	12.50%	3.80%	0.011
Total Charges	Charges (US\$)	90,505.94	153,021.59	104,288.36	0.289
	(mean [SE])	[15,166.55]	[55,634.25]	[17,065.09]	
Length of stay	Number of days	8.27	21.48	11.22	0.207
	(mean [SE])	[1.08]	[10.12]	[2.43]	
Number of procedures	Number of procedures	2.6	5.73	3.3	0.014
	(mean [SE])	[0.31]	[1.15]	[0.37]	
Time until 1 st procedure	Number of days	2.27	11.98	4.41	0.15
	(mean [SE])	[0.30]	[6.41]	[1.48]	
Mortality	Mortality rate (%)	3.60%	0.00%	2.80%	0.345
Sepsis	Complication rate (%)	16.90%	21.70%	17.90%	0.59
Pneumonia	Complication rate (%)	3.60%	0.00%	2.80%	0.345
Acute kidney failure	Complication rate (%)	8.40%	4.30%	7.50%	0.512
GI bypass of ileum	Procedure rate (%)	3.60%	8.30%	4.70%	0.335
GI excision	Procedure rate (%)	14.50%	47.80%	21.70%	< 0.001

income, and severity of illness varied with MBND status ($P<0.05$). PG patients with vs. without MBNDs more often had Crohn's disease or ulcerative colitis (87.5% vs. 48.2%, $P<0.001$), musculoskeletal and connective tissue disease (45.8% vs. 21.7%), and were overweight or obese

(33.3% vs. 13.3%, $P=0.023$). On multivariable analyses, patients with vs. without MBNDs had greater total charges (\$153,022 vs. \$90,506, $P=0.019$), length of stay (21.5 vs. 8.3 days, $P=0.001$), and number of procedures performed (5.7 vs. 2.6, $P<0.001$) (Table 1).

Case Presentation

We found that pediatric PG patients with vs. without MBNDs had greater physical and financial burden. Similarly, in a 2002–2012 National Inpatient Sample (NIS) retrospective study of 7,569 adult PG inpatients, those with vs. without MBNDs had 30% greater inpatient mortality rates and \$9 million greater hospitalization costs annually [3].

In our study, PG patients with MBNDs had almost twice the prevalence of Crohn's disease or ulcerative colitis than PG patients without MBNDs. In a retrospective study of 259 PG patients from German dermatologic wound care centers, 25.8% had ulcerative colitis, 10.6% had Crohn's disease, 22.5% had GI disorders, 69.5% had diabetes mellitus, and 36.7% had another endocrine disorder, with the presence of multiple comorbidities being associated with more severe PG [4]. Therefore, our study and others highlight the connection between PG and MBNDs as well as consideration of the mental health status of PG patients, which may impact overall health outcomes [5].

KID may not be representative of all United States pediatric PG patients. The study was limited to inpatient data and did not include outpatient data. Cases were retrospectively reported without dermatologist or psychiatrist confirmation, clinical examination, or treatment information, limiting our analysis.

Conclusion

We conclude that pediatric PG patients with vs. without MBNDs have significant disparities in financial burden,

hospitalization outcomes, and comorbidities. Therefore, we recommend screening PG patients for MBNDs. We advocate for a multidisciplinary collaboration between dermatologists and psychiatrists to provide mental and behavioral support to PG patients with MBNDs, which may improve patient quality of life and reduce health care costs [6].

References

1. Fletcher J, Alhusayen R, Alavi A. Recent advances in managing and understanding pyoderma gangrenosum. *F1000Res*. 2019;8:F1000 Faculty Rev-2092. Published 2019 Dec 12. doi:10.12688/f1000research.19909.1
2. McPhie ML, Fletcher J, Machado MO, Carvalho AF, Piguet V, Alavi A. A Systematic Review of Depression and Anxiety in Adults with Pyoderma Gangrenosum. *Adv Skin Wound Care*. 2021 Aug 1;34(8):432-436. doi: 10.1097/01.ASW.0000755920.76330.21. PMID: 34260421.
3. Narla S, Silverberg JL. The inpatient burden and comorbidities of pyoderma gangrenosum in adults in the United States. *Arch Dermatol Res*. 2021;313(4):245-253. doi:10.1007/s00403-020-02098-7
4. Al Ghazal P, Herberger K, Schaller J, et al. Associated factors and comorbidities in patients with pyoderma gangrenosum in Germany: a retrospective multicentric analysis in 259 patients. *Orphanet J Rare Dis*. 2013;8:136. Published 2013 Sep 8. doi:10.1186/1750-1172-8-136
5. Sanchez-Melendez, SN, Malik, R, Patel, PM, Milosavljevic, S, Patel, S, Nambudiri, VE. Pyoderma gangrenosum and impact on quality of life: A narrative review. *Exp Dermatol*. 2023; 00: 1-6. doi:10.1111/exd.14876
6. Nusbaum KB, Ortega-Loayza AG, Kaffenberger BH. Health-related domains of quality of life in pyoderma gangrenosum: A qualitative analysis. *J Am Acad Dermatol*. 2022;86(6): 1382-1385. doi:10.1016/j.jaad.2021.05.040