Insurance status and SCORTEN are associated with mortality in Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis: a retrospective review comparing Black and non-Black patients

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BACKGROUND

- Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN) is a life-threatening mucocutaneous disease classically triggered by a drug. Most common culprits are allopurinol, aromatic anticonvulsants, antibiotics, and nonsteroidal anti-inflammatory drugs.[1]
- SJS is defined as <10% body surface area (BSA) detached, SJS/TEN overlap is defined 10% to 30% BSA detached, and TEN is defined as > 30% BSA detached.[1]
- Prompt identification and discontinuation of a culprit drug is critical to improving patient outcomes and preventing recurrence.[1,2]
- Hsu et al. studied the National Inpatient Sample and identified that SJS/TEN disproportionately affects Asian and Black patients.[3]
- This has been linked to use of certain medications and HLA haplotypes in these populations.[4] However, there is limited data on other factors which may mediate the outcomes of SJS/TEN in minority populations. Recent research has emerged linking factors such as comorbidities and kidney function to SJS/TEN severity.[2]

Prognostic factors	Points
Age > 40 years	1
Heart Rate >120 bpm	1
Malignancy	1
Initiate detachment >10%	1
BUN > 10 mmol/L	1
Bicarbonate <20 mmol/L	1
Glucose >14 mmol/L	1

SCORETEN	Mortality (%)
0-1	3
2	12
3	35
4	58
≥5	90

Figure 1: Score of TEN (SCORTEN) criteria and mortality percentage

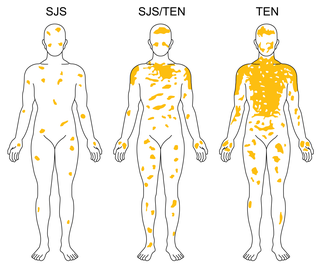

Figure 2: SJS, SJS/TEN, TEN based off BSA distribution

METHODS

- All adult (age ≥18 years) patients diagnosed with SJS/TEN between 2010 to 2021 at the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center were included in this retrospective cohort review. The diagnosis of SJS/TEN was established by a dermatology consultant based on compatible clinical and histological features.
- All patients were screened to ensure their diagnosis met the predefined clinical criteria (eg, presence of epidermal detachment, involvement of ≥ 2 mucosae, atypical target lesions, histologic evidence supportive of SJS/TEN, and exclusion of differential diagnoses).
- Variables listed in results were manually collected from patient charts and analyzed through univariate and multivariable regression models.
- Statistical analyses were performed with Microsoft Excel (2023). Nominal variables were compared with chi squared tests while metric variables were assessed with t tests. Logistic regression analyses were also performed.

OBJECTIVE

- The primary objective of this study is to identify differences in SJS/TEN presentation and disparities in management and outcome between Black and non-Black patients at a large, tertiary care medical center with a diverse patient population.
- The secondary objective is to identify factors associated with increased risk of mortality in SJS/TEN at a large, tertiary care medical center with a diverse patient population.

RESULTS

	All Patients N(%) or Avg	Non-Black N(%) or Avg	Black N(%) or Avg	p-value
N	89	38	51	
Female	53(60%)	21(55%)	32(63%)	0.47685
Age	54.0	53.6	54.3	0.88518
House Value	$314,918	$521,703	$155,130	0.00003
Race & Ethnicity				
Black	51(57%)			
White	26(29%)			
Asian	11(12%)			
Other	1(1%)			
Hispanic	2(2%)	2(5%)	0(0%)	
Type of Insurance				
Private	35(39%)	18(47%)	17(33%)	0.17999
Uninsured	11(12%)	8(21%)	3(6%)	0.03148
Non-Medicaid Public	38(43%)	12(32%)	26(51%)	0.00639
Medicaid	5(6%)	0(0%)	5(10%)	0.17651
Onset of symptoms prior to presentation (days)	3.6	3.9	3.3	0.24388
1st symptom				
Rash	70(79%)	29(76%)	41(80%)	0.64249
Systemic	7(8%)	2(5%)	5(10%)	0.43121
Both	12(13%)	7(18%)	5(10%)	0.23906
Time to dermatology consult (days)	0.6	0.3	0.8	0.02573
Biopsy performed	86(97%)	37(97%)	49(96%)	0.73873
Initial BSA%				
<10%	28(31%)	14(37%)	14(27%)	0.34531
10-30%	33(37%)	13(34%)	20(39%)	0.62871
>30%	28(31%)	11(29%)	17(33%)	0.65939
SCORETEN	2.5	2.2	2.8	0.04865
Age≥40	64(72%)	26(68%)	38(75%)	0.39732
BSA≥10%	61(69%)	24(63%)	37(73%)	0.34531
Malignancy	13(15%)	10(26%)	3(6%)	0.00694
Heart Rate (≥120)	19(21%)	4(11%)	15(29%)	0.03150
Bicarbonate (<20)	31(35%)	7(18%)	24(47%)	0.00503
Glucose (>250)	2(2%)	1(3%)	1(2%)	0.83273
BUN (>28)	40(45%)	13(34%)	27(53%)	0.06479
Risks				
Age	54.0	53.6	54.3	0.88518
Malignancy	13(15%)	10(26%)	3(6%)	0.00694
Heart Rate	99.9	94.1	104.2	0.01837
Bicarbonate	21.9	22.8	21.2	0.07046
Glucose	132.5	130.0	134.4	0.68606
BUN	33.1	28.1	37.0	0.13722
Cr	1.7	1.4	2.0	0.03354
eGFR	45.6	50.6	41.9	0.03269
HIV+	9(10%)	2 (5%)	7(14%)	0.19027
Hospital acquired infection (bacteremia, pneumonia, UTI, or fungemia)	35(40%)	11(29%)	24(47%)	0.08359
Offending Agent	No statistically significant difference			
Therapeutic Intervention	No statistically significant difference			
Length of admission (days)	16.9	15.3	18.1	0.46791
Deceased	18(20%)	5(13%)	13(25%)	0.15195

Table 1: Patient characteristics and outcome measures in Black to Non-Black patients.

	Dead N(%) or Avg	Alive N(%) or Avg	OR(95% CI)	p-value
N	18	71		
Female	10(56%)	43(61%)	0.81(0.29-2.31)	0.69901
Age	61.2	52.2		0.11228
Race & Ethnicity				
Black	13(72%)	38(54%)	2.26(0.73-7)	0.15195
White	4(22%)	22(31%)	0.64(0.19-2.15)	0.46522
Asian	1(6%)	10(14%)	0.36(0.04-3)	0.32610
Other	0(0%)	1(1%)	0(0-0)	1.00000
Hispanic	0(0%)	2(3%)	0(0-0)	1.00000
House Value	$210,969	$341,743		0.25156
Type of Insurance				
Private	3(17%)	32(45%)	0.24(0.06-0.92)	0.02756
Uninsured	5(28%)	6(8%)	4.17(1.1-15.72)	0.02606
Non-Medicaid Public	10(56%)	28(39%)	1.92(0.68-5.46)	0.21688
Medicaid	0(0%)	5(7%)	0(0-0)	1.00000
Onset of symptoms prior to presentation (days)	2.7	3.8		0.08505
1st symptom				
Rash	16(89%)	54(76%)	2.52(0.53-12.08)	0.23534
Systemic	1(6%)	6(8%)	0.64(0.07-5.66)	0.68361
Both	1(6%)	11(15%)	0.32(0.04-2.66)	0.27022
Time to dermatology consult (days)	1.0	0.4		0.04241
Biopsy performed	16(89%)	70(99%)	0.11(0.01-1.34)	0.04163
Initial BSA%				
<10%	2(11%)	26(37%)	0.22(0.05-1.02)	0.03738
10-30%	3(17%)	30(42%)	0.27(0.07-1.03)	0.04471
>30%	13(72%)	15(21%)	9.71(2.99-31.54)	0.00003
SCORETEN	3.8	2.2		0.00000
Age≥40	17(94%)	48(68%)	8.15(1.02-65.02)	0.02192
BSA≥10%	16(89%)	45(63%)	4.62(0.98-21.72)	0.03738
Malignancy	5(28%)	8(11%)	3.03(0.85-10.75)	0.07648
Heart Rate (≥120)	8(44%)	11(15%)	4.36(1.41-13.51)	0.00742
Bicarbonate (<20)	11(61%)	20(28%)	4.01(1.36-11.79)	0.00879
Glucose (>250)	1(6%)	1(1%)	4.12(0.24-69.22)	0.28901
BUN (>28)	15(83%)	25(35%)	9(2.37-34.12)	0.00030
Risks				
Age	61.2	52.2		0.11228
Malignancy	5(28%)	8(11%)	9(2.37-34.12)	0.07648
Heart Rate	114.3	96.2		0.00046
Bicarbonate	20.1	22.4		0.03667
Glucose	153.3	127.2		0.04520
BUN	55.3	27.4		0.00007
Cr	2.5	1.5		0.01104
eGFR	34.7	48.3		0.00592
HIV+	2(11%)	7(10%)		0.87496
Hospital acquired infection (bacteremia, pneumonia, UTI, or fungemia)	18(100%)	14(20%)		<.00001
Offending Agent	No statistically significant difference			
Therapeutic Intervention	No statistically significant difference			
Length of admission (days)	15.1	17.4		0.62513

Table 2: Sub-analyses of data based on mortality. (Avg, average; OR, odds ration; 95% CI, 95% confidence interval).

Cases	Correct assignments	In percent
89	79	88.76%

	Predicated Alive	Predicted Dead	Correct
Observed Alive	67	4	94.37%
Observed Dead	6	12	66.67%
Total			88.76%

-2 Log-Likelihood	Cox & Snell R^2	Nagelkerke R^2	McFadden's R^2
53.53	0.33	0.53	0.4

	Coefficient B	SE	z	p-value	OR	95% CI
Non-Medicaid Public Insurance	0.6	0.9	0.67	0.501	1.83	0.31 - 10.65
Medicaid Insurance	-18.49	6299.13	0	0.998	0	0 - ∞
Uninsured	2.69	1.15	2.34	0.019	14.77	1.55 - 140.32
SCORETEN	1.51	0.46	3.27	0.001	4.53	1.83 - 11.23
GFR	0	0.02	0.17	0.866	1	0.97 - 1.04
Time to consult	0.47	0.31	1.52	0.128	1.61	0.87 - 2.96
Constant	-7.16	2.25	3.18	0.001		

Table 3: Logistic regression analysis of insurance type, SCORTEN, GFR and time to dermatology consult on mortality.

CONCLUSIONS

- Black patients presented with higher SCORTEN, had a longer time to Dermatology consultation, and were more likely to be uninsured.
- Mortality (25% vs 13%, p = 0.15) and hospital acquired infection (47% vs 29%, p = 0.08) trended higher in Black patients vs non-Black patients, but did not reach significance
- Privately insured patients were significantly more likely to receive a dermatology consult on the same day of presentation (data not shown). This difference was observed despite that privately insured patients had significantly lower SCORTEN.
- Uninsured status and higher SCORETEN on presentation were associated with increased mortality in univariate and logistic regression analyses.
- Patient race/ethnicity was not significantly associated with increased mortality in logistic regression analyses.
- While delay in Dermatology consultation was associated with increased mortality in univariate analysis, this was was not observed in logistic regression analyses.

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