Severity of Gasoline Burns: A Retrospective Review

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Introduction

- Gasoline burns represent a significant source of preventable morbidity and mortality each year.
- Gasoline is often used inappropriately as an accelerant (e.g. burning brush, starting bonfires).
- Gasoline is substantially more volatile than other commonly used accelerants due in part to its' low flash point (45°F) and high vapor pressure.
- **Hypothesis**: Burns caused by gasoline accelerated flame carry higher morbidity and mortality than burns from any other cause.

Methods

- IRB exempt retrospective review
- Consecutive patients presenting from 2010-2017
- Single ABA verified institution
- Exclusion criteria: other dermatologic manifestations (e.g. allergic reactions, Steven Johnson Syndrome, Toxic Epidermal Necrolysis, ultraviolet burns)
- Primary clinical endpoints:
  - Total body surface area (TBSA) burned
    - Percent of second-degree burns
    - Percent of third-degree burns
- Secondary endpoints:
  - Length of stay (LOS)
  - Days admitted to the intensive care unit (ICU)
  - Mortality
- Kruskal-Wallis Test, Wilcoxon Rank Sum Test, and Fisher's Exact Test with Bonferroni corrections were used for statistical analysis.

Results

- Gasoline burns resulted in higher overall percent TBSA than burns of all other etiologies ($p < 0.001$) except radiation burns, where no statistically significant difference existed ($p = 0.52$).
- When further delineated into second- and third-degree burns, gasoline burns resulted in higher percent TBSA second-degree burns than burns of other etiologies ($p < 0.001$) except radiation burns, where no statistically significant difference existed ($p = 0.15$).

Conclusions

- Patients with burns caused by gasoline accelerated flame sustain a higher percent TBSA of second-degree burns and overall percent TBSA than all other etiologies of burns except radiation burns.
- Our results underscore the importance of public education efforts to reduce the inappropriate use of gasoline as an accelerant with the ultimate goal of reducing the significant morbidity associated with these burns.

	# of Patients	Mortality Rate	LOS	95% CI	ICU	95% CI	2nd Degree	95% CI	3rd Degree	95% CI	TBSA	95% CI
Gasoline accelerated flame	**256**	**0.39%**	**5.40**	**4.22 - 6.58**	**1.00**	**0.38 - 1.63**	**4.37**	**3.62 - 5.12**	**0.57**	**0.23 - 0.90**	**4.94**	**3.99 - 5.88**
Abrasion/Friction/Degloving	680	0.44%	5.72	4.97 - 6.48	0.70	0.46 - 0.95	2.20	1.97 - 2.42	0.35	0.26 - 0.43	2.54	2.29 - 2.80
Chemical	290	0%	2.45	1.90 - 3.01	0.13	0 - 0.35	1.43	1.08 - 1.79	0.22	0.12 - 0.31	1.65	1.28 - 2.02
Contact with Hot Object	1223	0.16%	1.98	1.71 - 2.25	0.05	0.01 - 0.10	0.43	0.39 - 0.47	0.11	0.09 - 0.13	0.54	0.49 - 0.59
Electrical	123	1.63%	2.30	1.52 - 3.08	0.21	0.04 - 0.38	0.65	0.26 - 1.04	0.43	0 - 0.96	1.08	0.21 - 1.96
Flame without accelerant	502	4.98%	6.72	5.34 - 8.10	2.08	1.27 - 2.89	2.84	2.20 - 3.48	1.73	1.03 - 2.42	4.57	3.56 - 5.57
Flame with another accelerant	389	0.77%	5.78	4.62 - 6.95	1.40	0.80 - 1.99	3.01	2.47 - 3.56	0.67	0.32 - 1.03	3.69	3.01 - 4.36
Frostbite	181	0%	6.15	4.49 - 7.82	0.21	0 - 0.53	1.08	0.79 - 1.37	0.24	0.13 - 0.36	1.32	0.98 - 1.66
Radiation	7	0%	7.57	0 - 17.85	0.00	-	1.33	0.30 - 2.36	0.92	0 - 2.91	2.25	0.53 - 3.98
Scald	2343	0.13%	2.74	2.51 - 2.96	0.16	0.07 - 0.26	1.46	1.35 - 1.58	0.21	0.15 - 0.26	1.67	1.54 - 1.80
Total Patients	**5994**											