

SAGE Diagram Documentation in Burn Patients in New Mexico: Room for Quality Improvement

Mattalynn Chavez, BS, Barkat Ali, MD, Ryan Keffer, BS, Victor Andujo, BS, Whitney Elks, BS, Sydney Cooper, BS, Gregory Borah, MD, FACS, Eugene Wu, MD, FACS

OBJECTIVE

Burn injuries are a leading cause of morbidity and mortality accounting for 180,000 deaths per year. The management of burn patients includes accurate estimation of total body surface area burned (%TBSA). %TBSA dictates level of care and fluid resuscitation as well as predicts mortality.

The aim of this study is to characterize the functional utility of the Surface Area Graphic Evaluation (SAGE) diagram. The primary measure of interest was SAGE diagram documentation with secondary focus on associated outcomes.

METHODS

This is a retrospective chart review of 320 burn patients from 2014-2018 at the University of New Mexico Burn Center. Only patients undergoing surgical management were included. We recorded if patients had a SAGE diagram documented and compared complications between the groups. We also compared SAGE diagram %TBSA to clinical estimates.

RESULTS

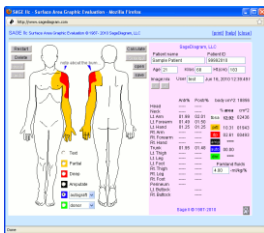
Demographics

Variable	Total patients n=320	No SAGE n=192	SAGE n=128	P-value
Age group				
Pediatrics	47	26	21	0.478
Adults	273	166	107	
Gender				
Male	234	142	92	0.680
Female	86	50	36	
Obesity				
BMI<30	199	119	80	0.995*
BMI>30	82	49	33	
Race				
White/Hispanic	208	129	79	0.130
Minority	75	39	36	
Comorbidities				
Diabetes	62	37	25	0.954
Hypertension	77	45	32	0.749
Hyperlipidemia	36	21	15	0.828
Coronary artery disease	15	10	5	0.788
Peripheral Vascular Disease	5	1	4	0.085
Renal Failure	5	2	3	0.393
Chronic Liver Disease	18	10	8	0.692
IV drug use	14	8	6	0.823
Smokers	94	62	32	0.164
COPD	19	11	8	0.847
Admission Level				
Floor	239	139	100	0.248
ICU	81	53	28	
Disposition				
Home	230	143	87	0.204
Other facility	90	49	41	

*Indicates some data was not available in documentation

Complications

	Total	No SAGE n=192	SAGE n=128	p-value
Any complication				
Yes	49	33	16	0.254
No	271	159	112	

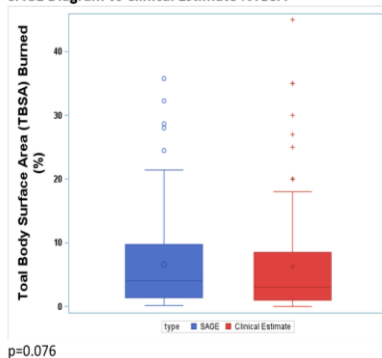


SAGE Diagram Sample
(SAGEDiagram.com—Screen Sample—
SAGE II Burn Diagramming)

Burn Characteristics

Variable	Total	No SAGE n=192	SAGE n=128	P value
Burn Mechanism				
Scald	81	42	39	0.665
Thermal	140	87	53	
Flash/Explosion	52	32	20	
Road Rash/Friction/De-gloving	24	14	10	
IV Infiltration/Chem/Electrical	23	17	6	
TBSA				
Minor (<20)	284	169	115	0.613
Major (>20)	36	23	13	
Burn cellulitis at admission	117	64	53	0.142
Involvement by body parts				
Face	54	34	20	0.626
Scalp	2	2	0	0.5185
Neck	25	14	11	0.671
Upper Torso	87	57	30	0.218
Anterior Extremity	152	91	61	0.964
Hands	125	82	43	0.102
Posterior Torso	41	30	11	0.065
Lower Extremity	204	116	88	0.129
Buttock	15	11	4	0.419
Perineum	9	6	3	0.746
More than 1 body part involved	107	63	44	0.772
Graft take				
<100%	138	91	47	0.059
100%	182	101	81	

SAGE Diagram vs Clinical Estimate %TBSA



SAGE diagrams were completed for 40% of our patient population. After comparing patients in SAGE group vs. No SAGE group, we found no differences regarding demographics, burn characteristics, and complications. There was no statistical difference between SAGE diagram %TBSA and clinical estimates.

CONCLUSION

The American Burn Association burn center accreditation process requires all burn patients to have %TBSA documented.

There is need for future prospective studies to validate the utility of SAGE diagrams in burn care.

Future directions to improve documentation of SAGE diagrams may include:

- Ensure every computer is capable of running the SAGE software
- Designate personnel to upload SAGE diagrams to patient charts
- Explore newer technology (3D %TBSA computer programs)