Skin Fails: Scoping the Evidence to Identify Who, What, When, Where, Why, & How

Rhonda Sullivan DNP, PhD, MSN, MBA, CWON, LNCC, NE-BC, CSPHA
Executive Director, iWOC Nursing Foundation • Villa Rica, GA

Introduction

Acute skin failure (ASF) is an elusive clinical phenomenon, commonly confused with other skin manifestations in the literature and in practice.[1] The absence of clear guidance regarding ASF assessment, differentiation, and documentation can have negative implications for the patient and hospital.[1,2]

Acute Skin Failure Defined

Although no standard definition exists, 6 of 7 included studies used a common ASF definition. For the purpose of this study, acute skin failure is defined as hypoperfusion of the skin resulting in tissue death in the setting of critical illness.

Purpose

The purpose of this scoping review was to map the use of ASF in the literature and use identified patient characteristics to create an assessment, differentiation, and documentation (ADD) tool for use at the point of care (POC).

Methodology

Scoping review using Arksey and O'Malley framework[3]

Data Sources: PubMed, Embase, CINAHL, Scopus and Directory of Open Access Journals were searched for full text articles in English.

Study Selection: Search terms included "skin failure" and "acute skin failure". Limiters were "chronic", "end of life", and "pressure ulcer or injury". Only primary studies, using quantitative research designs were included.

Data Extraction: Publication specifics, population, sample, setting, ASF definition, causes, characteristics, and primary outcomes were extracted.

Data Synthesis: Statistically significant patient factors were organized, categorized into adult and pediatric, and analyzed for trends.

Results

The search returned 2,147 records. After limiters, exclusions for irrelevance, and duplicates were removed, seven studies across 196,878 adult (n=6) and pediatric (n=1) patients were included in the final analysis. Due to variances in ASF presentation in adult and pediatric patients, two ASF-ADD tools were designed. One tool for adult patients, and one for pediatric patients.

Population	Sample	ICU Setting	Severity of Injury	Gender	Nutrition	Perfusion	Sepsis Septic Shock	MODS	APACHE	Mortality	Chief Complaint	Medication	Mechanical Vent	ICU Stay	Surgery	Immune Suppression	Laboratory
Pediatric[1]	19	1	1					1		1	1					1	
Adult[2-7]	196,859	2-6	5,7	4	3,5	2,3-6	2,3,5-7	3,5-7	4		2,5-7	4,5	2,3-7	4,5	3		4,5

References: 1. Cohen, 2017; 2. Delmore, 2015; 3. Delmore, 2020; 4. Greenway, 2021; 5. Curry, 2012; 6. Pittman, 2021; 7. Hill, 2020

ADULT ASF-ADD TOOL

Setting	• ICU
Severity of Injury	• Multiple Wounds
Gender	• Female
Nutrition	• General Edema • Albumin <3.5 g/dL
Perfusion	• PAD • Impaired Blood Flow • MAP <70 • Severe Anemia <7 g/dL • Peripheral Necrosis
Sepsis	• Sepsis/Septic Shock
MODS	• 2 or more systems (excluding skin) • Renal, Respiratory, Cardiac
Severity of Illness	• APACHE
Chief Complaint	• Respiratory, Liver, Renal, Cardiac, Endocrine, Hem-Onc
Medications	• Vasoactives • Fentanyl • Inotrope
Mechanical Vent	• >72 hours
ICU Stay	• 7-8 days
Surgery	• Vascular, Orthopedic, & General
Laboratory	• Creatinine • Higher Ferritin • D-Dimer • Inflammatory Biomarkers
Other	• High Risk for Pressure Injuries • Lower Braden Score

PEDIATRIC ASF-ADD Tool

Setting	• ICU
Severity of Injury	• Rapid Deterioration to Full Thickness
MODS	• MODS • 2 or more systems
Severity of Illness	• Mortality
Chief Complaint	• Cardiac, GI, Hem-Onc
Other	• Immune-Suppression

Discussion

These ADD tools are intended to help clinicians substantiate a diagnosis of ASF by incorporating evidence-based characteristics into assessment and documentation.

Conclusion

This study adds clarity to acute skin failure identification, but also reveals substantial literature and clinical decision-making gaps. The ASF-ADD tool is a small step towards filling the gap for the nurse at the POC, but more research is needed for ASF to be diagnosed, treated, and reimbursed with the same veracity as other organ failures.

References

1. Bain, M., Hara, J., & Carter, M. J. (2020). The Pathophysiology of Skin Failure vs. Pressure Injury: Conditions That Cause Integument Destruction and Their Associated Implications. Wounds : a compendium of clinical research and practice, 32(11), 319–327.
2. García-Fernández, F. P., Soldevilla-Agreda, J. J., Rodriguez-Palma, M., & Pancorbo-Hidalgo, P. L. (2022). Skin injuries associated with severe life-threatening situations: A new conceptual framework. Journal of nursing scholarship : an official publication of Sigma Theta Tau International Honor Society of Nursing, 54(1), 72–80. https://doi.org/10.1111/jnu.12716
3. Westphaln, K. K., Regoeczi, W., Masotya, M., Vazquez-Westphaln, B., Lounsbury, K., McDavid, L., Lee, H., Johnson, J., & Ronis, S. D. (2021). From Arksey and O'Malley and Beyond: Customizations to enhance a team-based, mixed approach to scoping review methodology. MethodsX, 8, 101375. https://doi.org/10.1016/j.mex.2021.101375