The ability of the society for vascular surgery Wound, Ischemia and Foot Infection (WIFI) classification system to predict risk of amputation in patients with non-healing ulcer during the first year at Ain Shams University Hospitals

Thesis

Submitted for partial fulfillment of Master Degree in General Surgery

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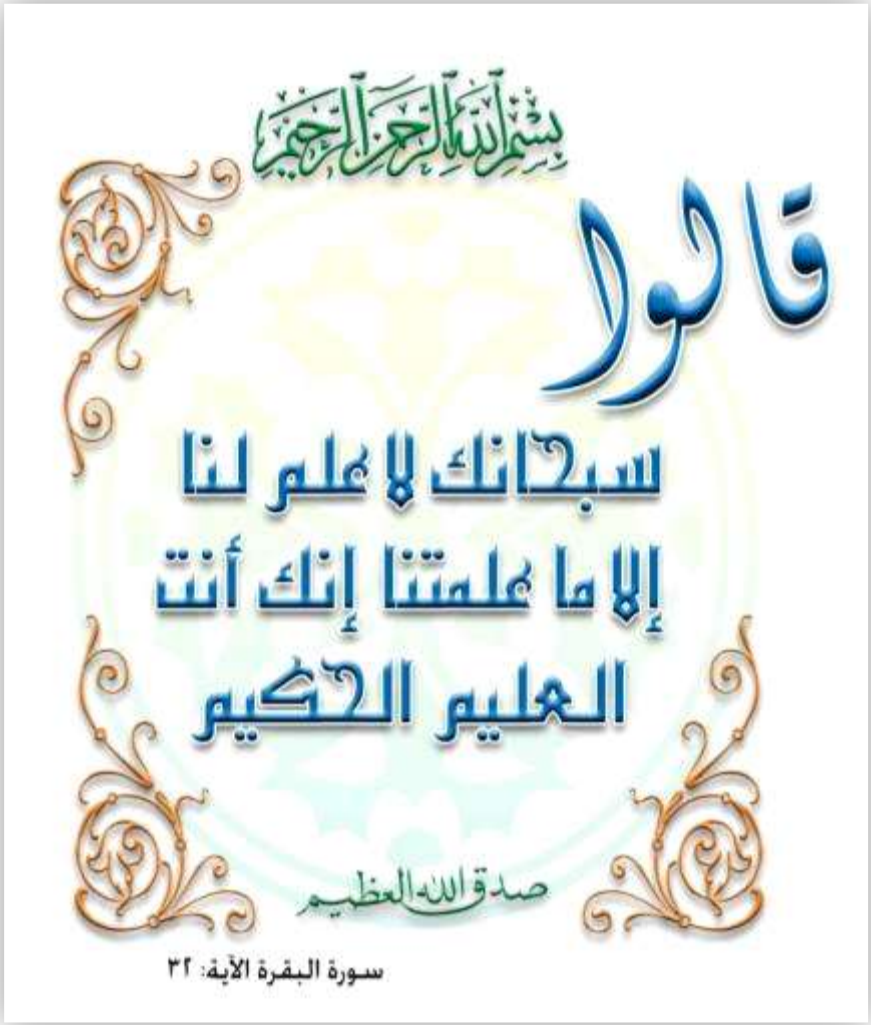
2019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Acknowledgments

First and foremost, I feel always indebted to **Allah**, *the* ***Most Beneficent*** *and* ***Merciful*** *who gave me the strength to accomplish this work.*

My deepest gratitude to my supervisor, **Prof. Wafi Fouad Salib,** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his valuable guidance and expert supervision, in addition to his great deal of support and encouragement. I really have the honor to complete this work under his supervision.*

I would like to express my great and deep appreciation and thanks to **Prof. Atef Abdel Hameed Desokey,** *Assistant Professor of Vascular Surgery, Faculty of Medicine, Ain Shams University, for his meticulous supervision, and his patience in reviewing and correcting this work.*

I must express my deepest thanks to my **Dr. Ramez Mounir Wahba,** *Lecturer of Vascular Surgery, Faculty of Medicine, Ain Shams University for guiding me throughout this work and for granting me much of his time. I greatly appreciate his efforts.*

Special thanks to my **Parents** *and my* **Family,** *for their continuous encouragement and pushing me forward in every step of my life.*

Last but not least, I would also like to thank my colleagues, my patients and everyone helped me in this study.

✍ *Mohammed Osama Ahmed Al Gharib Zayed*

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List of Abbreviations

Abbrev.	Full-term
ABI	**:** Ankle brachial index
AGE	**:** Advanced glycosylated end-products
CLI	**:** critical limb ischemia
IDSA	**:** Infectious disease Society of America
IFN-γ	**:** interferon gamma
MMP	**:** Matrix metalloproteinases
PAD	**:** peripheral artery disease
PDGF	**:** Platelet-derived growth factor
PEDIS	**:** Perfusion, extent/size, depth/tissue loss, infection, sensation
PKC	**:** Protein kinase C
RAS	**:** Renin-Angiotensin System
ROS	**:** Reactive Oxygen Species
TNF	**:** Tumor necrosis factor
WIFI	**:** Wound, Ischemia, and foot Infection

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Abstract

Background: Classification systems are powerful tools for health care providers to use when managing patients with threatened limbs. The ability to define and delineate a heterogeneous group into fine-grained cohorts not only aids communication between providers, it allows for a more accurate analysis of outcomes across treatment strategies. Thus, classification systems are essential for clinical decision making as well as setting meaningful goals and expectations with patients and their families. **Aim of the Work:** to evaluate the predicative ability of this classification in a real world selection at Ain Shams University at period of 1 year depending on the Society for Vascular Surgery Wound, Ischemia and Foot Infection (WIFI) classification system. **Patients and Methods:** This study included 60 patients with non-healing wound ulcer at Ain Shams University hospitals during year 2017 and 2018. **Results:** As our study showed WIfI classification was predictive of 1 year limb amputation and wound non healing and correlated significantly with outcomes predicted by the SVS consensus panel. The study showed 1 year amputation rates were 0% for stage 1, 7.7% for stage 2, 18.75% for stage 3 And 64.7% for stage 4. It also showed among the 60 patients studied 15 patients had done amputations where 6.7% were stage 2, 20% were stage 3 and 73.7% were stage 4. **Conclusion:** WIFI classification can be very useful in predicting the possibility of amputation during 1 year; also the study showed the benefit of using WIFI to plan management of patients presented with foot ulcer.

Key words: WIFI Classification system, amputation non-healing ulcer

Introduction

Classification systems are powerful tools for health care providers to use when managing patients with threatened limbs. The ability to define and delineate a heterogeneous group into fine-grained cohorts not only aids communication between providers, it allows for a more accurate analysis of outcomes across treatment strategies. Thus, classification systems are essential for clinical decision making; as well as setting meaningful goals and expectations for the patients and their families **(Behan et al., 2017).**

Old classification schemes fall short in capturing the full spectrum of disease for threatened limbs. The Fontaine and Rutherford classifications, commonly in use for threatened limbs and PAD, are purely ischemic models. Neither classification includes infection or provides sufficient detail of wound severity **(Fontaine R et al., 1954).**

Similarly, the widely used Wagner and University of Texas wound classification systems lack proper assessment of perfusion status and infection. The Wagner system does not account for severity of PAD nor does it delineate gangrene due to infection versus ischemia. The University of Texas system includes PAD and infection, but lacks severity gradation for either category **(Oyibo et al., 2001).**

The Society for Vascular Surgery Lower Extremity Threatened Limb (SVS WIFI) classification system has three components: Wound, Ischemia and Foot Infection. Each component is graded on a spectrum from 0 (none) to 1 (mild) to 2 (moderate) to 3 (severe) based on grades assigned to each of the three individual components, a WIFI class is assigned. Each Class is categorized to certain stage:

- Stage 1: Amputation risk: very low
- Stage 2: Amputation risk: low
- Stage 3: Amputation risk: moderate
- Stage 4: Amputation risk: high
- Stage 5: Unsalvageable foot

(Mills et al., 2014)

The Society for Vascular Surgery WIfI system is intended for any patient with a diabetic foot ulcer, non-healing foot ulcer present for two or more weeks, foot/lower extremity gangrene, or ischemic rest pain. It is not meant for patients with acute ischemia, emboli, trauma, non-atherosclerotic diseases such as vasospastic disorders, or pure venous ulcers.

Wound: The first category accounts for the degree of tissue loss and anticipated level of intervention/amputation required for healing.

- Grade 0: No ulcer, no gangrene. Ischemic rest pain.
- Grade 1: Minimal tissue loss. No exposed bone (unless limited to distal phalanx). Intervention requires no more than a toe amputation or soft tissue covering. No gangrene.

- Grade 2: Moderate tissue loss. Ulcer extends to tendon, joint, or bone. Localized gangrene to digits only. Intervention requires transmetatarsal amputation (TMA) or less.

- Grade 3: Extensive tissue loss. Gangrene to forefoot, midfoot and hind foot. Intervention requires more than a transmetatarsal amputation and/or complex soft tissue rearrangement.

(Mills et al., 2014)

Ischemia: The second category assesses perfusion status to the foot using objective hemodynamic indices such as ankle brachial index (ABI), transcutaneous oximetry, pulse volume recording, skin perfusion pressure or toe pressure.

- Grade 0: No ischemia. ABI ≥ 0.80; toe pressure ≥ 60 mmHg.
- Grade 1: Mild ischemia. ABI ≥ 0.6–0.79; toe pressure 40-59 mmHg.
- Grade 2: Moderate ischemia. ABI ≥0.4–0.59; toe pressure 30-39 mmHg.
- Grade 3: Severe ischemia. ABI ≤ 0.39; toe pressure <30 mmHg.

(Mills et al., 2014)

Foot infection: The last category describes the foot infection and derives from the IDSA and PEDIS clinical staging systems.

- Grade 0: No infection.
- Grade 1: Superficial infection. Localized cellulitis ≤ 2 cm. Moderate (deep) infection. Erythema > 2 cm. Abscess present or infection extends to joint or bone.
- Grade 3: Severe infection. Local infection with systemic inflammatory response syndrome (SIRS).

(Mills JL, et al 2014)

Aim of the Work

The society for vascular surgery wound, ischemia and foot infection (WIFI) classification was proposed to predict amputation risk and potential benefits from revascularization. The goal of this study is to evaluate the predicative ability of this classification in a real world selection at Ain Shams University hospitals at period of 1 year.