Successful Prevention of Heel Ulcers and Foot Drop in the High Risk Ventilation Patient Population

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Purpose

The aim of this project was to assess the impact of a clinical intervention on heel pressure ulcer rates and the prevention of plantar flexion contractures through the use of a heel protector in a high risk, sedated, intensive care unit (ICU) patient population.

Introduction

• ICU patients are a high risk patient population for development of heel pressure ulcers (PUs) and plantar flexion contractures.
• The prevalence of PUs in the ICU has been estimated to range from 14% to 41%.
• The incidence of PUs in the ICU has been estimated to range from 1% to 56%.
• Approximately 25% of pressure ulcers develop into heel pressure ulcers.
• The estimated cost of treatment for heel pressure ulcers is $3,000 per heel PU.
• Plantar flexion contractures are a negative outcome in sedated ICU patients resulting in reduced quality of life.

Methods

Study Inclusion Criteria:
• Sustained patient on the ICU ≥5 days
• May or may not be intubated
• Braden score ≤16
• Patients not eligible for Prevalon™ foot included in the study as control subjects with pillows used to elevate the heels.
• Passive ROM as ordered on all ICU patients was not withheld or viewed as a variable in the prevention of plantar flexion contractures.

Procedure:
1. Skin assessment and Braden scale administered to all patients upon admission to the ICU.
2. All ICU patients meeting criteria had an initial measurement of ankle ROM done with a goniometer upon admission and prior to application of the Prevalon™ boot. Braden scale, heel skin assessment, and Ramsay sedation scale were also documented.
3. All applicable patients then had ankle ROM measured every other day.
4. Heel assessments, Braden scale, and Ramsay sedation scale were done every shift, and recorded as part of the study every other day.
5. Measurements continued until patient was either transferred, died, or had a Braden scale of greater than 16.
6. Control patients also had ankle measurements, heel skin assessment, Ramsay sedation scale, and Braden scale done at admission and every other day.
7. Identified and trained ICU nurses and physical therapists performed the measurements.

Results

Process Improvement Efforts

• Establishment of a heel ulcer prevention protocol in a high risk patient population
• Establishment of a foot drop prevention protocol in a high risk patient population
• Earlier recognition of heel skin issues in a high risk patient population
• Effective prevention of heel pressure ulcer development in patient population [100%]
• Effective prevention of plantar flexion contracture development in patient population [100%]
• Standardization of care and ease of use promoted caregiver protocol compliance

9.4% of patients showed improvement in heel status from entry to discharge
11.3% of existing heel skin conditions stayed the same with no change or worsening in wound status

Data collection tool utilized on a frequent basis to ensure appropriate evaluation

Goniometer utilized by trained licensed clinician to assess for plantar flexion contractures

100% prevention hospital acquired heel PUs
100% prevention plantar flexion contractures

Assessment of Pressure Ulcer Prevention: Entry vs. Exit Status

Change in Heel/Patient Status

Assessment of development of plantar flexion contractures (foot drop)

Financial Benefits of Heel PU Prevention

Utilize a heel protector on all immobile sedated patients. The results of this study indicate that such use may reduce or eliminate the risk of heel pressure ulcers and help prevent the development of plantar flexion contractures

Establish an effective heel ulcer prevention protocol that incorporates accurate risk identification, early recognition of skin issues, and methods to maintain heel suspension. Heel pressure ulcers and foot drop may be prevented with standardized protocols designed to ensure consistent application of heel protective devices.

This preventative approach represents a shift in clinical paradigm from other traditional methods, and substantially reduces the risk of heel injury in the high risk patient, while concomitantly reducing the risk of plantar flexion contracture in this high risk patient group.

The clinical and economic outcomes of this intervention should be further studied. The estimated savings due to prevention of $1,904,220 are based on the literature. However, additional research into the cost benefit of heel ulcer prevention is needed.

References