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The Application of Highly Absorbent Antimicrobial Polyurethane Foam in the Management of Grade 4 Pressure Injury

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Wound healing is a cascade of physiological response in which the body reacts immediately after sustaining an injury. This dynamic yet well-coordinated process are divided into four phases (homeostasis, inflammatory, proliferative and remodelling) (Beldon 2010). Disruption in any of the phases will lead to chronic non-healing wounds (Young and McNaught 2011). Chronic non-healing wounds are burden to patients, family and the healthcare system.

Pressure injury (PI) is defined as localised injury to the skin and / or soft tissue over bony prominences due to pressure or a combination of shear, friction and pressure forces. Pressure injuries (PIs) are often chronic wounds with delayed healing due to disruption of the physiological process. The prevalence of PIs ranges from 8% to 54% throughout the world. PIs are associated with significant clinical and financial repercussions to the healthcare system.

Methodology

This case series demonstrated the effectiveness of using highly absorbent anti-microbial polyurethane foam (RTD©) in the management of grade 4 pressure injuries in a tertiary hospital.

Case 1

A 34-year-old lady with underlying diabetes mellitus was admitted due to back carbuncle in septic shock. The case was complicated by cardiorespiratory arrest. She was revived after 20 minutes of resuscitation but unfortunately had hypoxic ischemic encephalopathy and became bedbound. An unstageable pressure injury developed and did not heal with standard of care. Subsequently, autolytic and enzymatic debridement were used, and a thick necrotic patch was removed. The pressure injury was restaged to a stage 4 pressure injury. After 3 months of wound management using highly absorbent antimicrobial polyurethane foam dressing, the wound has started to heal and has almost achieved closure.

Case 2

An 82-year-old lady was admitted due to bacterial peritonitis resulted from ruptured diverticular disease. Her recovery was complicated with grade 4 sacral pressure injury due to immobility, with the application of standard nursing care and wound management using a highly absorbent antimicrobial polyurethane foam, the pressure injury started to heal over 4 months.

Case 3

A 40-year-old lady was admitted to the intensive care unit due to pneumonia with acute respiratory distress syndrome and underlying multiple sclerosis complicated by paraplegia. She required prolonged ventilation for 3 months. Her recovery was complicated with a grade 4 sacral pressure injury. RTD was then used with good healing progress after 2 months.

Discussion

Pressure injuries are commonly found around the sacral and heel areas due to the pressure and shear forces exerted onto the anatomical locations (Moore and Cowman 2012) PIs also lead to prolonged hospital length of stay and deconditioning. Standard of care includes identifying patients at risk, surface selection, regular turning, improved moisture and incontinence management, adequate nutrition and fluid intake (Gibbons et al. 2006). The usage of modern dressing, a highly absorbent antimicrobial polyurethane foam, commercially marketed as Retro-Tech Dressing© (RTD©) was used in these cases to successfully treat pressure injuries. The highly absorbent antimicrobial polyurethane foam is impregnated with Gentian Violet, Silver Zirconium Phosphate, Methylene Blue and Surfactant. It is effective for difficult-to-heal wounds from various aetiologies such as venous leg ulcers, neuropathic ulcers as well as pressure injuries. The foam matrix of the HAAP foam works via capillary action by drawing the excess exudates thus maintaining a moist wound bed to enhance the healing process. The antimicrobial action of Gentian violet, silver zirconium phosphate and methylene blue act effectively in reducing the bacterial load in the wound and creating a conducive wound bed for healing (Perni et al. 2009; Wilkins and Unverdorben 2013). Suitable patients were selected based on the principles of wound healing assessment and management.

Conclusion

Management of PIs includes standard nursing care and comprehensive wound management. The application of this highly absorbent antibacterial polyurethane foam dressing is effective in managing grade 4 pressure injuries as shown in this case series.

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Image 1-1:
Unstageable pressure injury size 25x16cm.

Image 1-2:
Grade 4 sacral pressure injury after necrotic patch removal.

Image 1-3:
Healing pressure injury with the size 6x5 cm.

Image 2-1:
Grade 4 pressure injury 9x7 cm .

Image 2-2:
Healing pressure injury 6x4cm after 4 months.

Image 3-1:
Grade 4 pressure injury 8x7 cm.

Image 3-3:
Healing pressure injury after 2 months (6.5x5cm).