

What the future holds for the primary surgical repair as treatment of a massive pressure ulcer?

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This is an interesting and well-written case report, representing a novel approach to treat a potentially difficult and complex condition (1). It will be useful to readers belonging to different specialties including plastic surgeons, orthopaedics, geriatricians and tissue viability nurses. It also has highlighted the importance of the basics of wound care and closure by clearly stating the structured, layer by layer closure technique after adequate debridement of the infected tissue (2). Pressure ulcers or injuries are seen predominantly in patients who belong to geriatric group, severely malnourished, paraplegic or neuropathic population. It can also be seen as a consequence of prominent implants/medical devices causing skin pressure. The condition becomes more complex and challenging to manage when it is associated with other comorbidities such as diabetes, infection, immunosuppression and poor tissue perfusion. Overall, pressure ulcer management is an ongoing problem despite the awareness and preventive measures taken globally. Prevalence of the condition up to 10.9% has been reported (3-6).

The aetiology of formation of pressure ulcers is multifactorial and involves intrinsic and extrinsic factors such as age, skin pressure due to prominent bony areas, trauma or medical devices, poor nutrition, compromised immunity with prolonged immobilization (7). The advanced pressure ulcers have significant consequences ranging from a longer stay at the hospital, multiple surgeries, financial burden on patients, families and healthcare system to the death of the patients. A meta-analysis on the impact of pressure ulcers on quality of life in older patients was published in 2009 highlighting the magnitude of the problem. The meta-analysis included 19 studies and recruited in total 9,522 patients. The prevalence

of pressure ulcer in this particular group was 18.9%, and this was found to be higher in women than men. Importantly, the prevalence of stage 1, 2, 3 and 4 was found to be 17%, 6.7%, 0.9% and 0.4% respectively. Prolonged duration of surgery, and postoperative urinary tract infections are also two important risk factors for pressure ulcer in this meta-analysis (8).

The National Pressure Ulcer Advisory Panel (NPUAP) in 2016 redefined the definition of pressure injuries and classified them mainly into 4 stages as (9) "Pressure Injury: A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense and/or continued pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, comorbidities, and condition of the soft tissue."

The four main stages are: (I) non-blanchable erythema of intact skin; (II) partial-thickness skin loss with exposed dermis; (III) full-thickness skin loss; (IV) full-thickness skin and tissue loss. Some additional categories of ulcers which are unstageable due to slough and eschar formation resulting in obscuring the overall extent of the ulcer are also mentioned in the classification. The website of the NPUAP has an extensive image library showing the different stages of pressure injuries. It is a helpful guidance tool in the overall management of pressure ulcers. The most important stages are stage three and stage four pressure ulcers which generally require multiple surgeries including debridements, washouts and wound closures. There are different surgical techniques described in the literature including myocutaneous flaps,

perforator flaps and muscular flaps to provide adequate tissue cover and to achieve satisfactory healing of the ulcers (10,11).

Along with surgical techniques, there are other measures such as the use of vacuum-assisted drainage, nutritional supplements and a variety of dressings which are in use and can play a role in achieving the aim of healing the ulcers depending on their stages and accompanying comorbidities of the patients. Despite an excellent surgical repair of the advanced stage pressure ulcer, complications can occur and sometimes result in failure of the primary procedure warranting further surgeries. The possible common post-operative complications include infection, seroma formation, necrosis of the flaps, hematoma formation with subsequent infection and wound dehiscence. The overall positive outcome of the management of such ulcers is dependent on multiple factors and as a result, needs multidisciplinary approach so as to address nutritional status, immune system of the patient, nursing care with appropriate equipment and training and, indeed, a well-planned and executed surgical procedure with focus to avoid any dead spaces so as to minimize the risk of seroma formation or exudate collection resulting in the formation of sinuses or fistulae leading to infection and failure of the repair (12).

In the literature, there are limited studies available lacking robust evidence-based criteria to demonstrate preference of one surgical option over another (13). There is a lack of consensus and number of studies to outline an algorithm for the best surgical repair option in the overall management of large stage 4 pressure ulcers. However, there is clinical practice guideline developed as a result of combined efforts of the NPUAP, European Pressure Ulcer Advisory Panel (EPUAP) and Pan Pacific Pressure Injury Alliance (PPPIA) (9).

Interestingly, the case report has denoted that primary surgical repair of a large pressure ulcer is an option following systemic and local wound care optimization. It is an example of the possibility of successful primary repair operation involving the use of inverted triangular tensor fasciae latae composite tissue flaps and adjacent fascial flaps following a meticulous debridement and washout of a large pressure ulcer in the hip area with exposed bone. In this particular case, it was more complex and challenging to treat with the fact that the patient was immunocompromised due to poor diabetes control, Systemic Lupus Erythematosus and poor nutritional status along with paraplegia. The key points which attributed to the successful outcome include adequate optimization of the patient's condition prior to the surgical procedure, careful dissection and establishment of the extent of the deep ulcer, haemostasis, avoidance of dead space, use of adjuncts such as vacuum sealing drainage to

help minimize the risks of complications including seroma formation and appropriate antibiotic cover.

We enjoyed reading this case report and found it interesting. However, there are few points worth mentioning. The authors did not mention what happened to the residual skin defect of 1.5×0.8 cm? Did it heal completely and if so, how long it took? Also, it will be useful to mention about the post-operative care details including type of dressings, if air suspension therapy bed and other adjuncts were used or not and any follow up of the patient was scheduled. In order to be able to generalize the technique of primary repair of such ulcers, it will also be relevant to mention the weight of the patient as perhaps, a similar type of ulcer in a bariatric patient may not be amenable to similar treatment.

In summary, stage 4 pressure ulcers are difficult to treat, and there is no consensus in the surgical approach and the use of tissue coverage techniques in the literature due to limited studies. This case report, among other available studies, not only mentions about successful primary repair of a massive hip ulcer without the need for multiple surgeries, as is the usual case in such complex deep pressure ulcers but also, can be taken as an indicator for a need of further future studies and establishment of evidence-based guidelines for the surgical approach to such pressure injuries. Perhaps, the next step forward for the authors is to consider recruiting more patients with varied co-morbidities to be treated with the same technique and compare the outcome with an appropriate follow-up plan. One important consideration is the management of pressure ulcer in morbidly obese patients. In the era of urbanization and fast food, obesity and morbid obesity become serious challenges for health authorities across the globe (14,15). Importantly, obesity was shown in several studies to be associated with an increase in the risk of pressure ulcer. For instance, Ness *et al.* showed that the prevalence of pressure injuries in morbidly obese patients was around 12%, and morbid obesity was found to be an independent risk factor for pressure ulcer (16). In intensive care patients, the prevalence of pressure ulcer was shown to be 9.9% in morbidly obese patients (17). While in nursing homes residents, pressure ulcer was likely to be higher in morbidly obese residents than non-obese residents (18). Drake *et al.* suggested that the increase in body mass index is an independent predictor of pressure ulcer (19). Therefore, we recommend pilot studies to assess the benefit of this technique in obese individuals. Management of pressure ulcer represents a huge burden on the budget allocated to the geriatric services. Therefore, it is reasonable to suggest that such interventional studies will also need to assess the financial implication of this method in decreasing the overall cost allocated for geriatric

services. One relevant question that future studies will need to address also is whether this method of pressure ulcer repair is effective in only a selected group of patients or can it be utilized successfully for a broader range of patients including those with significant co-morbidities. This is important in geriatric populations as the majority of these patients have serious co-morbidities like hypertension, advanced chronic obstructive pulmonary disease, advanced heart failure, and dementia. To answer the question of this editorial ‘What the future holds for the primary repair of a massive pressure ulcer?’ One can only say with certainty that this case report ignites our interest to learn and study more about what the future holds about the medical and surgical treatment of pressure ulcer.

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Footnote

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