

Promote growth of granulation tissue nursing essay



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Mr P was a 57 year old Indian man admitted in hospital H and diagnosed as severe pneumonia. He is known case of non insulin dependent diabetes mellitus and hypertension for many years. Two month ago, he did a surgery coronary artery bypass graft. Recently, he had stroke and became bedridden since a month ago. He was staying with his daughter and a maid to take care of him. On arrival in Intensive Care Unit (ICU), he looks frail and emaciated. Mr P not able to speech but only produce incomprehensive sound. According to his maid Mr P has loss of appetite and refuse to eat most of the time at home. He is able to move both hand with mild weakness and barely can move his both legs because of stroke. Both of his legs are with mild stiffness. His sternal wound and left saphenous vein harvest incision wound in the left leg had healed. Overall the skin is intact but very dry and fragile. No pressure sore are seen during admission.

After 3 days of admission Mr P condition deteriorated and intubated with mechanical ventilator support for 2 weeks before gone for tracheotomy surgery. He was partial sedated during intubation because sedative infusion Midazolam mixed with Morphine (Midamorphine) was given to him continuously as prescribed by the anaesthetist. According to Sessler and Varney (2008) the core principles of sedation in ICU are to provide comfort and relief from distress include pain, sleep deprivation, the presence of tubes in the nose and mouth. Nasogastric tube inserted for Mr P. Blended diet was served every 3 hour, 7 times a day suggested by dietician to ensure his nutritional requirement is met. According to Dorner, Posthauer and Thomas (2009) inadequate of calories, protein, vitamins and minerals increase the risk of pressure ulcer develops. Besides that, physiotherapist involved for

limbs exercise. Several studies suggest early mobilisation for prolonged bed rest ICU patient can improve muscle strength and prevent disuse muscle atrophy (Burtin, 2009; Needham, 2008; Martin, Hincapie, Nimchuk, Gaughan & Criner, 2005).

Mr P also put on a ripple mattress and reposition every two hours by the nurses. A draw sheet about 30 inches x 15 inches placed horizontally underneath the centre of patient for mobilisation purpose was a routine in ICU. For example, nurses used to carry the draw sheet to lift up Mr P when he slides down to the edge of bed after semi-recumbent position, from left lateral to right lateral or from right lateral to left lateral. After a week, a blister formed on Mr P's left heel is about 3 cm x 2 cm. The blister ruptured on the following day. It contained serous. The outer layer of the skin was debrided by the doctor and the wound bed presented clean, red-pink colour without slough or exudate. Wet-to-dry dressing with povidone iodine was performed as ordered by the doctor.

Two topics were chosen for this paper:

- 1) To promote growth of granulation tissue.
- 2) To prevent pressure ulcer.

Rationale

Pressure ulcer is a frustrating issue in all health care settings. It has been associated with increased duration of stay in hospital and contributes to mortality and morbidity (Grey, Enoch & Harding, 2006; Maklebust, 2005). In addition, pressure ulcer is considered nursing's greatest challenge and reflects

on the quality of nursing care. The European Pressure Ulcer Advisory Panel (EPUAP) and National Pressure Ulcer Advisory Panel (NPUAP) (2010) defines pressure ulcer is localised impair to the skin and underlying tissue common on bony prominence area result from pressure, shear or combination of these. NPUAP and EPUAP (2010) also review four stages classification of pressure ulcer. Stage 1 is skin intact with non blanchable erythema; stage 2 is skin loss involve of dermis, epidermis or both; stage 3 is skin loss, damage or necrosis of subcutaneous tissue and stage 4 is extensive damage or tissue necrosis to muscle, bone or supporting structures. However, a comprehensive treatment in early stages of pressure ulcer can avoid extent to stage 4 pressure ulcer. Furthermore, early recognition can significantly reduce comorbidities, mortalities and costs of treatment (Brem & Lyder, 2004). However, Gosain and Dipietro (2004) explain that aging process has been demonstrated delay the process of wound healing including haemostasis, inflammation, proliferation and maturation. Wicke, Bachinger, Coerper, Beckert, Witte and Konigsrainer (2009) study shows age related alteration result in reduce blood circulation and lymphatic drainage, diminish epithelisation, decrease collagen production and delay deposition connective tissue for older people.

In addition, chronic disease such as diabetes mellitus, chronic infection, peripheral vascular disease and cardiac disease will cause wound hypoxia thus delay wound healing (Stadelmann, Digenis & Tobin, 1998). The level of haemoglobin also plays an important role.

Prevention is better than cure. Patient in ICU are at high risk of pressure ulcer development because of most of them not able to signal pain and react

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accordingly due to receive of analgesic, sedation or muscle relaxant (Shahin, Dassen & Halfens, 2009; Nijs, Toppets, Defloor, Bernaerts, Milisen & Berghe, 2008; Bours, Laat, Halfens & Lubbers, 2001). Mr P was receiving sedation infusion throughout intubation period in ICU. Moreover, he has diabetes mellitus for many years and stroke becomes bedridden for a month. According to Dejgaard (2004) and Margolis, Taylor, Hoffstad and Berlin (2002) diabetes neuropathy is a common complication among diabetes mellitus patient it caused structural abnormalities and functional loss in nerve tissue lead to lack sensation especially in the feet and legs. Multiples factors are identified for Mr P unable to feel the pain and response to it when increase tissue pressure and friction on his left heel. He was at high risk of develop more pressure ulcer if without the quality nursing care and appropriate preventive measures in hospital.

Topic 1: To promote growth of granulation tissue

Mr P has a pressure ulcer over left heel classify as stage 2 and wound bed presented red pink colour. Defloor and Schoonhoven (2004) explain that stage 2 pressure ulcer also known as abrasion or blister and it is considers superficial skin loss involving epidermis, dermis or both. A superficial skin loss may accelerate penetrate to subcutaneous tissue, tendon and bone if without proper treatment especially for patient with diabetes mellitus are prone to wound infection and ischemia (Armstrong, Lavery & Harkless, 1998). The doctor ordered to perform wet to dry dressing with 10cm x 10cm plain sterile gauze and povidone iodine. The dressing secured with adhesive tape Micropore™ (3M™) and the dressing to change daily. This order was carried by nurses every morning and when the dressing not intact. The

dressing became dry after a day and the gauze was difficult to remove from the wound bed when dressing needs to be change. Most of the time wound might bleed after removed the gauze. Localise pressure applied for few minutes to cease bleeding. After a week found that the centre of the wound bed presented necrotic and surrounded with red pinkish tissue. In Mr P dressing, new granulation tissues form over the plain gauze and it removed together with the plain gauze when dressing change. In fact, the surrounding epidermis layer of the pressure ulcer was accidentally removed during removed of the adhesive tape due to Mr P skin was dry and fragile.

Mr P's wound bed presented clean, pinkish colour and without slough after blister ruptured and follow by surgical debridement. Therefore, wet to dry dressing may not an optimal dressing choice for Mr. P at the first place. However, mechanical debridement or autolytic debridement may need after the wound bed presented necrotic tissue. Ayello & Cuddigan (2004) explain that remove of necrotic can improve wound healing process. Autolytic debridement included occlusive or semi occlusive moisture retentive dressing promotes moist retentive dressing to soften eschar with natural wound fluids and allow proteolytic enzymes from wound fluids to digest and liquefy necrotic tissue (Falabella, 2006). Furthermore, the advantages of autolytic debridement are reduced pain during removal of dressing and reduced risk of infection but it slow progression (Eaglstein, 2001). However, mechanical debridement common uses for remove of foreign matter, infected or necrotic tissue by force potential for causing pain to patient (Singhal, Reis & Kerstein, 2001). Another, wet to dry dressing facilitate cooling environment for local tissue when the gauze drying out caused

vasoconstriction, tissue hypoxia, reduce mobility of leukocyte and phagocyte efficiency and increase the risk of infection (Ovington, 2002). However, Cowen and Stechmiller (2009) study documented 82% of the wound with wet to dry dressing were performed had greater than 50% granulation tissue in the wound bed instead of function as removal of devitalised tissue.

Successful wound treatment involves improving patient local and systemic condition in conjunction with an ideal wound healing environment. Oddo (2012) cited plain gauze is inexpensive, moderate absorptive, readily available and it can be combined with topical agents or other types of dressing. Yet, plain gauze allows desiccation, adhesion to new granulated tissue and failed to promote moist and warm environment to wound healing (Murphy & Evans, 2012; Cordrey, 2010) and it do not function as bacterial barrier (Seaman, 2002). A comparative study done by Chang, Alsagoff, Ong and Sim (1998) on stage 2 and stage 3 pressure ulcer dressing with conventional saline gauze dressings and hydrocolloid dressing DuoDERM®CGF® (ConvaTec Ltd.) result shows no statistically significant improve in wound size or cost effective but with hydrocolloid dressing less nursing time and effort needed because it can left for up to seven days or when leakage occurred. In contrast, saline dressings needed to change once a day or more frequent for pressure ulcer with heavy exudate. Ovington (2002) study shows advanced dressing like moisture retentive dressing are more cost effective than plain gauze because it requires less frequent dressing change, less use of dressing material such as gloves, protective sheet or adhesive tape, less labour cost and shorter the healing time. However, there was no exudate noted on Mr P's left heel but only oozing of minimal serous fluid.

The pressure ulcer treatment guideline from Agency of Healthcare Research and Quality presents data that antiseptic solution such as povidone iodine and hydrogen peroxide can damage healthy granulated tissue (Ayello & Cuddigan, 2004). Kammerlander, Andriessen, Asmussen, Brunner and Eberlein (2005) also suggest wet agent for dressing should be clinically effective and non toxicity such as saline and Ringer's solution. Povidone iodine was used as wet agent for Mr P's dressing. A comparison study done by Kaya, Turani and Akyuz (2005) occlusive hydrogel dressing with povidone iodine soaked gauze on pressure ulcer, the result shows more wounds are heals and faster healing rate in hydrogel group than the comparator group. Besides, Romanelli and Mastronicola (2002) found that povidone iodine can be use as primary dressing for infected wound and cover with another sterile dressing. Even though the pressure ulcer of Mr P did not have symptom of infection, the doctor ordered povidone dressing for him.

In addition, good nutritional status is essential to protect healthy tissue and promote healing for pressure ulcer. Brem and Lyder (2004) emphasise that blood test and body weight should be taken as routine to ensure patient maintain of proper nutrition such as serum haemoglobin level and albumin level are the good indicators of nutritional status. Kaya, Turani and Akyuz (2005) also explain that patient with sufficient nutrition, the serum albumin level should higher than 3. 5g/dl and without evidence of anaemia. A routine blood investigation was done weekly for Mr P throughout admission in ICU but body weight was not taken due to Mr P unable to stand (Figures 1). Wild, Rahbarnia, Kellner, Sobotka and Eberlein (2010) suggest that a healthy person require of 30 to 35kcal/kg/day but for a geriatric patient with wound

need to increase energy intake 35 to 40kcal/kg/day. Mr P was receiving 150ccof blended diet 300kcal every 3 hours for 7 times equivalent to 2100kcalin a day. The dietician estimated his weight was 60kg. The energy intake in a day for Mr P was parallel with suggestion of Wild et al. (2010). Secondly, the doctor ordered daily dose of tablet multivitamin and intravenous multivitamin for him. Nutritional supplement helps in reduction of ulcer area and improve wound condition regardless stage of the pressure ulcer (Soriano et al., 2004).

Figures 1

Date

22/9

30/9

9/10

16/10

23/10

30/10

6/11

13/11

Haemoglobin (g/dL)

9. 1

9. 8

11. 4

11. 5

13. 3

12. 9

12. 6

13. 8

Albumin (g/dL)

27

30

33

33

38

36

35

41

A study done by Schaffer et al. (1997) induced high glucose to rats; the data shows samples which received insulin treatment had decreased collagen deposition and mechanism of impaired wound healing.

Nevertheless, the choice of dressing related to the ultimate goal of patient care, aetiology and the nature of the wound, frequency of procedure, financial implication and availability (Figures 2). The cost of wet to dry dressing with sterile plain gauze, povidone and other materials is RM32. 20 each time. On other hand, wet to dry dressing need RM225. 40 for a week of daily dressing. However, weekly of hydrocolloid dressing only cost RM47. 20 included other materials. The only hydrocolloid dressing in Hospital H is DuoDERM® CGF®. Therefore, DuoDERM® CGF® were suggested to doctor for Mr P applied on left heel. The DuoDERM® CGF® left insitu for 7 days. After removed and clean by Normal Saline the pressure ulcer over left heel presented clean and red pinkish colour. Necrotic tissue from centre of the wound was removed by using autolytic debridement. The wound have improved and doctor ordered to continue dressing with DuoDERM® CGF® instead of povidone and gauze.

Figures 2

Products/Procedure

Cost

Frequency

Effect

Sterile plain gauze

7. 5cmx7. 5cmx12ply

RM6. 30

Daily and when necessary

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Adhesion of granulation tissue.

Adhesive tape

10inches

RM0. 30

Daily and when necessary

Adhesion of healthy skin and tissue.

Povidone iodine 20cc

RM2. 60

Daily and when necessary

Damage granulated tissue; suitable for infected wound.

DuoDERM® CGF®

4inchx4inch

RM18. 80

Weekly and when necessary

Moist environment and protect new tissue.

Normal Saline 30cc

RM5. 40

Weekly and when necessary

Non- toxic solution

Basic dressing set

RM7. 50

Non sterile latex gloves 1 pair

RM1. 00

Protective sheet

RM6. 50

Minor dressing

(Nursing procedure)

RM8. 00

Topic 2: To prevent pressure ulcer

During hospitalisation, draw sheet is used by nurses to lift up and re position Mr P, therefore, friction is generated throughout the procedure. Grey, Enoch and Harding (2006) emphasis frictional forces common caused formation of intraepidermal blister and may lead to superficial skin loss or accelerating pressure ulceration.