Assessment and management of hypergranulation

'at a glance clinical review article for commissioned series'

This article will:

- Provide guidance on wound assessment for hypergranulation
- Increase knowledge of factors that cause hypergranulation
- Increase knowledge of treatment options for hypergranulation

The maintenance and protection of skin and its integrity is one of the major components of nursing care. Wound care in clinical practice continues to be considered a high-cost, complex activity and recent studies have recommended that the treatment and management of wounds is viewed as a specialism and requires regular updates and training (Guest et al., 2015).

The wound healing process follows four distinct phases: Haemostasis, The Inflammatory Phase, The Proliferation phase and Maturation. Barriers to wound healing often occur in one of these fours stages consequently delaying the healing process (Mitchell, 2020). Hypergranulation also called overgranulation is a common issue in wounds and often inhibits healing. The number of hypergranulation cases in wounds is relatively unknown and limited knowledge from healthcare practitioners can lead to underdiagnosis (Vuolo, 2010). Additionally, the absence of best practice guidance for managing hypergranulation can lead to a disparity in treatment and nursing practice.

Hypergranualtion

Granulation tissue, forms in the proliferation phase of wound healing. Granulation is comprised of newly growing capillaries from the base of the wound and leads to the formation of new

blood vessels (angiogenesis) which deliver nutrients and oxygen to the healing tissues (Mitchell, 2020). During this phase Fibroblasts from the surrounding tissue are activated by growth factors released in the inflammatory phase. These rapidly replicate and produce a collagen-rich matrix which builds strength and elasticity into the wound. Healthy, granulation tissue presents as a highly vascular, moist, pink/red tissues that creates the appearance of a red velvety carpet on the bed of the wound (Vuolo, 2010). This is an essential phase of wound healing and when complete leads to the Maturation phase. (Editor please add picture of the proliferation phase in wound healing)

In some wounds, the production of granulation tissue will 'over grow' beyond the wound surface. This is commonly known as 'proud flesh', 'hypergranulation' or 'overgranualtion'. Hypergranulation is defined as an excess of granulation tissue and usually presents in wounds healing by secondary intention (box 1). Unhealthy granulation (hypergranulation) is characterised by a dark discolouration, raised or swollen tissue (Peate & Stephens, 2019). It bleeds easily and tends to produce higher levels of exudate, inhibiting epithelisation and increasing the risk of infection. For example, the longer the wound is open the greater the risk of infection (Vuolo, 2010; Brown, 2019). This protruding red, friable tissue can be distressing to patients and creates challenges for healthcare professionals. Hypergranulation can inhibit wound closure by creating a barrier to epithelial cells migrating across the wound surface. It has also been suggested that hypergranulation can increase the risk of scar formation by forcing wound edges further apart.

Box 1: Primary and secondary intention healing in wounds

Primary intention: wound healing occurs in wounds that have dermal edges that close together for example a scalpel incision

Secondary intention: wound healing occurs from the bottom up where there is tissue loss for example extensive burns and deep ulcers. This process takes longer than healing by primary intention because large amounts of dead tissue must be removed and replaced by viable cells

Tertiary intention: wound healing occurs after a delay in closing the wound as a result of

There are several causative and predisposing risk factors for over granulation. These relate to three areas: inflammation, occlusion or celluar imbalance. These are catagorised as three types of hypergranulation (Vuolo, 2010)

Type 1	Hypergranulation which is inflammatory in nature resulting from high levels of bacteria, or persistent friction to the wound bed.
Type 2	Hypergranualtion which is a result of an occluded wound environment. This creates a hypoxic environment, which increases moisture and stimulates angiogenesis and prolonged inflammation.
Type 3	Hypergranulation which is a result of cellular imbalance. For instance, an imbalance of the collagenase and matrix metalloproteinases (MMP's) a group of enzymes responsible for removing excess collagen.

Hypergranulation is precipitated by an aberrant inflammatory phase caused by infection or foreign bodies. The inflammatory phase in wound healing is responsible for vasodilation, allowing white blood cells to migrate into the area and engulf harmful foreign bodies (Peate and Stephens 2019). Prolonged inflammation caused by infection or fibre irritant can hinder the healing process, increase fluid loss and contribute to hypergranulation. Foreign bodies and/or persistent irritation result in a prolonged inflammatory phase as the body perceives this as a risk to skin integrity (Brown, 2019).

Friction is a physiological risk factor which has been linked with hpergranulation. For example, with patients with suprapubic catheters and/or gastrostomy tubes. Frequent rubbing of the tube against the skin creates a persistent inflammatory response resulting in hypergranulation (McGrath 2011). Friction or inflammation can also be caused by an allergic reaction to dressing adhesive or traumatic removal of dressings.

Trauma to the granulation tissue which leads to a PH imbalance can prevent the wound from progressing and causes a relapse back to the inflammation phase of wound healing. Links between occlusive wound dressings and hypergranualtion have been made (Falanga, 1988). Over use of occlusive dressings can influence hypergranulation by creating a hypoxic environment that causes the body to produce more immature blood vessels to compensate (Dealey, 2007). Occulsive dressings are prone to keeping the wound surface wet causing oedema and swelling in the wound bed. Occlusivity induces cytoxic effects detrimental to wound healing (Van Luyn et al., 1992)

Social risk factors can be a causative factors for hypergranulation this may include malnutrition. Protein is composed of amino acids, which is essential for tissue repair and regeneration. Any deficiency in protein impacts the formation of granulation tissue (Medlin 2014). Patients often report difficulties regarding the uncertainty on timescales and prognosis, which causes significant psychological distress. Stress stimulates the hypothalamic-pituitaryadrenal (HPA) axis to produce stress hormones (cortisol and catecholamines), which activate a fight or flight response and prolong inflammation (Samele et al 2018).

Wound assessment

A holistic wound assessment is essential to identify causative and contributory factors, support diagnosis and highlight factors which may contribute to delayed wound healing (Mitchell, 2020). A holistic assessment should include specific questions relating to the patients' health and wellbeing. In addition to a full holistic wound assessment for hypergranulation nurses should consider the following:

- Review the wound including history. How was the wound caused?
- Assess the stage of wound healing? Does the wound appear to be in the inflammatory phase?
- Examine the wound bed for dressing fibres and other potential irritants. (This would be an indication of type I Hypergranulation) (Vuolo, 2010)
- Assess for wound infection. Wound infection is a key contributing factor to inflammation in wounds
- Assess levels of exudate. Is an occlusive dressing used? Is the dressing coping with the exudate? Is there strike through on the back of the dressing? (An occlusive environment indicates type II hypergranulation)
- Assess for causative factors such as friction and remove if possible. Make sure all external devices such as gastrostomy tubes and central lines are secured around the wound site to minimise friction
- Assess for cellular imbalance. Is this caused by an external or internal factors?
- Assess for signs of malignancy. Has the over granulation been present for many months? Does it have a cauliflower appearance or is hard to touch? Is it growing outward beyond the wound margins? Is it unresponsive to treatment? If the hypergranulation tissue looks suspicious further advice should be sought urgently from a dermatologist (Vuolo 2010)

- Assess nutritional status using the Malnutrition Universal Screening Tool (MUST) (BAPEN, 2018). Consider the need for nutritional support if the patient is malnourished
- Assess the patient for psychological and social factors that may inhibit wound healing such as stress
- Assess the patients perception and understanding of the hypergranulation. This will help when considering treatment options

Treatment

The recommended treatment for hypergranulation varies depending on classification of the type of hypergranulation . Wound infections should be treated with topical antimicrobials, and systemic infections treated with oral or intravenous antibiotics as indicated (Vuolo, 2010)

If hypergranualtion fails to respond consider the use of licenced topical steroids (McShane and Bellet 2012; Lateo and Langtry 2013; Jaeger et al 2016). Steroids work by dampening down the inflammatory response (NICE 2004; Lyman 2019). However, according to the British National Formulary (2019), topical steroids are not licensed to treat over-granulation, and precaution must be taken. Haelan tape is a topical steroid product that has been used for hypergranulation (Johnson, 2007 and Oldfield, 2009). More evidence is required to understand whether Haelan tape would be suitable for large areas of hypergranulation which have moderate levels of exudate. Most recent studies on Haelan tape focus on closed wounds and target keloid and hypertrophic scar management (Goutes and Ogawa 2017) and are therefore not relevant to open wounds.

Historically, caustic products, such as silver nitrate sticks, were used to reduce hypergranulation by burning the tissue. There are several documented disadvantages of using

silver nitrate: damage to the peri wound area; increased pain, potential tissue necrosis and infection, and can cause systemic problems if used over a wide area (Jaeger et al, 2016; Brown, 2019). These products are therefore no longer recommended and should only be considered under specialist instruction and local policy guidelines as a last resort when all other treatment options have been tried and failed.

For type II hypergranulation consider a more permeable dressing type for example a film or polyurethane dressing with a higher moisture vapour transmission rate. Some foam dressings improve gaseous exchange at the wound surface and increase vapour loss through the back of the dressing (for full dressing selection guidance, see NICE, 2016). For hypergranualting wounds with higher exudate levels a more absorbent dressing will be required. Ensure that the dressings are secured in such a way that allows for vapour loss (Vuolo, 2010). Whenever possible apply moderate pressure to with wound without compromising the blood supply. Pressure to the wound may inhibit hypergranualtion tissue.

Mechanical removal of hypergranulation is not recommended as this may cause the return of the inflammatory phase. Leaving the wound open is also not recommended. This could lead to cell death through tissue dessication which impacts on the healing process.

Summary:

Hypergranulation can be caused by several risk factors, triggering a prolonged inflammatory response. Potential physiological, psychological and social factors that influence over-granulation include infection, friction to the wound region, nutritional deficit and stress.

Topical steroid ointment is a recognised off-license product, for treatment of hypergranulation by dampening down the inflammatory response. Overall, studies seem to support this treatment, but there are limitations in their design. This calls attention to the dearth of experimental studies on the use of topical steroid products for over-granulation treatment, highlighting the urgent need to examine its safety and efficacy given that this is an off-label use. Staff need to ensure they have the correct knowledge to identifying and treat hypergranualtaion the condition.

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