Dietary Considerations of Wound Healing in Ayurveda

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Abstract

Wound healing has been the burning problem in a surgical practice because of a remarkable increase in the number of traumatic cases. A wound causes a number of changes in the body that can affect the healing process, including changes in energy, protein, carbohydrate, fat, vitamin and mineral metabolism. Various ayurvedic literatures, particularly, Sushrut samhita, is which is said to be a ancient textbook of surgery in Ayurveda, has mentioned about the diet for the person suffering from the wound, and the author said that diet plays a very important role in the wound healing process. Sushruta—The father of surgery has scientifically classified it in a systemic manner, whose wealth of clinical material and the principles of management are valid even today. Shalya Tantra (surgical branch in ayurvedic science) is one of the important branch of ayurveda, in which surgical and para-surgical techniques has described for management of various diseases. Vrana is the most important and widely described chapter of Shalya Tantra. Vrana (wound) is one of them, which have been managed by human being from starting of civilization. Under the circumstances, the first thing which the men came across was the injury from different sources which caused him thevrana. Vrana is seen as debilitating and scaring disorder, usually seen affecting the human being at any age. Well balanced nutrition plays an essential role in the wound healing.

Keywords: Ayurveda; Vrana; Wound healing; Diet; Nutrition

Overview

In this modern era, there is a remarkable increase in the number of traumatic cases, where the treating modalities like antibiotics, and local management is not sufficient for wound healing. Along with this, a well balanced dietetic pattern is needed. Diet and Health are more connected in the area of wound care. Balanced diet plays an important role in wound healing process, as it enables quick reaction to the wound or trauma itself, as well as enhanced the healing capabilities throughout the curative process. Wound management is a significant and growing health burden on the community [1]. Delayed wound healing and wound infection place a substantial financial burden on health care systems, as a result of increasing dependency and increased hospital admissions. Chronic wounds also have a very large social and quality of life impact on individuals and carers [2]. Nutrition plays an essential role in wound healing and wound care practices, and nutritional support needs to be considered a fundamental part of wound management. Attending to nutrition in wound care is also cost-effective [3]. Poor nutrition before or during the healing process may delay healing and impair wound strength, making the wound more prone to breakdown. Neglecting the nutritional health of an individual with a wound can compromise the entire wound management process [3].

Patho-physiology of wound healing in Ayurveda

“The destruction/break/rupture/discontinuity of body tissue/part of body, is called “Vrana” [4,5].”

Factors influencing wound healing

Certain factors will influence the wound during the healing process, which is explained in Sushruta samhita. They are General factors include vaya (Age), poshaka tatwa (Nutrients), and the diseases like madhumeha (Diabetic), paandu (Anemia), etc.

1. Local factors include twak sthaan (Position of skin), shalya vastu (foreign bodies), bhootha sanghaata (Infection), etc.

Healing process in open wound complete in 3 phases

In any type of open wound, three stages or phases are mandatory in healing process. They are as follows.

1. Inflammatory phase
2. Collagen phase or Proliferative phase
3. Maturation phase or regeneration phase/remodeling phase

Immediately following an injury, the healing process begins. A torn ligament or muscle is repaired, wounds heal, and bones mend. The healing process first involves getting rid of damaged tissue, then rebuilding healthy connective tissue in a step-by-step manner. The redness, swelling, heat and pain of inflammation are a natural part of the healing process. Many nutrients are involved in connective tissue repair and wound healing, such as amino acids, selective vitamins and minerals [6,7].

Diet and wound healing–An ayurvedic aspect

Ahara/Pathya (Food/Diet) plays an important art for wound healing, which may not heal well, if we cannot eat food, which is not having proper calories of proteins, vitamins and minerals, etc. The diet of a patient entertaining an open wound should preferably consists of laghu ahara (light dietetic articles) in small quantities. Food always should be taken freshly cooked with fatty articles (especially cow ghee). Above all digestive upsets should be avoided. Dietetic constituents, as prescribed by Sushruta, should be advised for quicker healing and avoiding the complications. Hot liquefied food (like manda/peya/vilepi type of gruel) prepared form old rice, mixed with cow ghee (Goghrita) in small quantity with meat soup (mamsa rasa), a good diet for wounded by which quick healing of wound occur.
Nutrients involved in connective tissue repair & wound healing

When there is damage to connective tissue, it is important to address the nutritional requirements for the stimulation of the nitric oxide pathway, which is in turn important for collagen deposition in wound healing [13-15]. L-Arginine is essential for the stimulation of the nitric oxide pathway, which is in turn important for collagen deposition in wound healing [13-15]. L-Arginine supplementation has also been shown to enhance the immune system and improve the secretion of growth hormone and insulin that are also involved in wound healing [3]. People with pressure ulcers who have been treated with supplements containing arginine show a significantly improved rate of ulcer healing [16,13]. L-Arginine is also effective in healing chronic ulcers in people with diabetes (ultimately helping to reduce leg amputations) [1].

Fats

Fats, including mono and polyunsaturated fats, provide fuel for wound healing. Fats are a safe and concentrated source of energy. Fatty acids are a major component of cell membranes, and demands for essential fatty acids increase after injury [2]. Essential unsaturated fatty acids must be supplied in the diet as the body cannot synthesize enough for the needs of wounds [2]. The benefit of omega-3-fatty acid supplementation in wound healing is still not clear, and there is some evidence this may reduce wound strength [9,17]. Good sources of fats to promote wound healing include meat, full-fat dairy products, such as milk, cheese, butter, cream, yoghurt, ice-cream and oils and fats used in cooking or as spreads.

Vitamin A

Vitamin A increases the inflammatory response in wounds, stimulating collagen synthesis. Low -A levels can result in delayed wound healing and susceptibility to infection [2,12]. It has also been shown that vitamin A can restore wound healing impaired by long term steroid therapy or by diabetes. Serious stress or injury can cause an increase in vitamin A requirements. Vitamin A is found in milk, cheese, eggs, fish, dark green vegetables, oranges, red fruits and vegetables [11].

Vitamin C

Vitamin C, or ascorbic acid, has multiple functions as a co-enzyme and co-factor in many of the body's biochemical pathways. As it relates to connective tissue, vitamin C is required for collagen fiber synthesis, a process vital for tissue repair and healing. Specifically, it is involved in the hydroxylation of proline to form hydroxyproline. Research by Patel [18] confirms that ascorbic acid acts as a specific inducer of the collagen pathway. A deficiency in vitamin C is associated with poor collagen formation and delayed wound healing [18]. Vitamin C is considered a very important water-soluble antioxidant. Additionally, vitamin C is capable of regenerating other antioxidants, especially vitamin E.

Vitamin E

Vitamin E is a major antioxidant and functions to quench free radicals in most tissues. They predominantly affect polyunsaturated fats that compose the lipid portion of cellular membranes. The main rationale for vitamin E supplementation is to reduce the damaging effects of free radicals [18]. A number of conditions, such as chronic inflammatory disorders, injury to the central nervous system and connective tissue damage, are associated with free radical damage. It is thought that excess free radical production may also delay or prevent adequate healing. Vitamin E supplementation may reduce free radical damage and benefit wound healing and connective tissue repair.

Role of minerals

Zinc, Copper and Manganese for SOD induction: Superoxide
Iron

Iron is part of the system that provides oxygen to the site of the wound; therefore iron (Haemoglobin) deficiency can impair healing. Iron deficiency can also result in impaired collagen production and strength of the wound [2,8,11]. Iron absorption from non-meat sources can be enhanced with vitamin C [11]. Zinc and iron compete for absorption, therefore, if someone is receiving supplements of both, the zinc and iron should be given with meals, but not at the same time [21,22]. Recommended iron intake for the general population is 8 mg/day and for females aged 19-50 years, this increases to 18 mg/day [22]. The best sources of iron in the diet are red meat, offal, fish, eggs, whole meal bread, dark green leafy vegetables, dried fruits, nuts and yeast extracts.

Energy

The main sources of energy for the human body and for wound healing are carbohydrates and fats. The main demand for energy from a wound is for collagen synthesis. Caloric needs for healing increase according to increasing size and complexity of the wound. For patients with wounds, energy requirements are estimated at 30-35 kcal/kg [11]. Energy requirements vary according to gender, age, activity and clinical status.

Other important factor– Fluid maintenance

Hydration is important in wound healing, as dehydrated skin is less elastic, more fragile and more susceptible to breakdown. Dehydration will also reduce efficiency of blood circulation, which will impair the supply of oxygen and nutrients to the wound [11]. One of the main risk factors for dehydration is poor oral intake. In long-term care, dehydration is one of the most common problems affecting good nutrition [21,22]. A general guide to providing fluids is 30-35 mL/kg/day, with a minimum of 1500 mL or 6-8 cups/day [23]. Sources of hydration include water, juice, milk, ice-cream, yoghurt and soup.

Cow ghee (Goghrita)

Cow ghee gets absorbed easily and cross the cell membrane. It is also a concentrated source of energy having dietetic value, easier for digestion and absorption. Nutrients present in the ghee delivered to tissue easily. "Cow ghee is sweet in taste and cooling in energy, rejuvenating, good for the eyes and vision, kindles digestion, bestows lustre and beauty, enhances memory and stamina, increases intellect, promotes longevity, is an aphrodisiac and protects the body from various diseases” [24]. Cow ghee is used in most ayurvedic formulations. Cow ghee's regenerative properties are also useful for healing wounds and promoting the growth of healthy cells. This wound healing ability has also been clinically proven [25,26]. Cow ghee's cold, oily qualities help protect the body's mucous membranes and ensure its usefulness in any condition with burning sensations. Finally, on a practical level, ghee is rich in antioxidants, and hence, does not go rancid for a long time.

Pathya ahara as mentioned in ayurveda (Diet to be taken/ followed)

Parana shastika Shaali (old stored rice), Jaangala mansa (less fatty chicken), Jeewantu shaaka (leafy vegetable called Leptadenia reticulata), Tanduleyaka shaaka (red variety of Amaranthus leafy vegetable), Vaastuka (green leafy vegetable, ie. Chenopodium album), Balaamaluka (tender radish), Vaartaka (Brinjal), Patola (bitter variety of snakegourd), Karavellaka (bittergourd/monordica charantia), Daadima (pomegranate), Gruthu brhusu amalaki (gooseberries fried in cow ghee), Saindhva lavana (potassium chloride), Purana sarpi (old stored cow ghee), Mung (Greengram/Phaseolus mungo), Vilepi (thick rice gruel), Srutha jala (cold water/potable drinking water). These vegetables and fruits are to be taken more during the wound healing process as mentioned in ayurveda.

Apathya ahara as mentioned in ayurveda (Diet not to be consumed)

Nava dhanya (newly harvested grain/cereals), Mashaa (blackgram), Tila (sesum oil), Vishama bhojana (intake of food at inappropriate time), Ati-bhojana (excessive eating), Arista bhojana (undesirable food), Upavasa (fasting), Viruddha bhojana (incompatible food), Adhyashana (eating when previous meal is not digested), Kalatthu (horsegram), Nishpava (variety of pea), Amla-lavana-katu rasa (sour-salty & pungent foods), Vattura mansa (dried meat), Shushka shaaka (dried vegetables), Vasaa (animal fat), Sheetodaka (cold water), Madya (variety of alcohols) Asuri (mustard seeds), Mulaka (radish, which is not tender one) are pooyavardhaka (suppurative) and Doshajananaka (increases tridosha/humour). So these are to be avoided during the wound healing time as mentioned in ayurveda.

Discussion

Optimising nutrition is important to best practice care in wound management. The overall goal for the healthcare team should be to make sure the patient is in the optimum nutritional state to give wounds the best chance to heal [2]. This can be achieved by providing the individual with adequate calories and nutrients, preventing protein-energy malnutrition and promoting wound healing [11].

Cow ghee's (Goghrita) widespread prevalence in ayurvedic medicines and treatments is due to its beneficial effects on the digestion, absorption and delivery of ayurvedic herbs, as well as its own healing properties. When the digestive capacity (agni) and life-essence (ojas) are weakened, the doshas (humours/tridosha) are disturbed, causing disease. Cow ghee's actions on both agni and ojas are, hence, at the heart of all ayurvedic treatment. Cow ghee also nourishes and regenerates the body and mind, improving the overall quality of treatment. Our body produces new cells and tissues in a day. If our body doesn't receive proper nutrition and the building material may delay the wound healing.

Diet is considered as one of important factor for proper wound healing. Implementing the nutritional plan and providing appropriate nutritional support to the individual, helps to enhance the process of wound healing. There is a growing body of evidence and research demonstrating the vital role our diet plays in the healing of all types of tissue damage and inflammation. Eating a diet rich in fresh fruits, vegetables, seeds, legumes and whole grains will also help to ensure an abundance of phyto-chemicals, natural plant based chemicals that may
promote health and healing. By combining knowledge of the wound healing process together with best practice provision of nutrition, healthcare professionals can help decrease the morbidity and mortality associated with chronic wounds, as well as reducing their cost and impact.

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