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ROLE OF NUTRITIONAL FACTORS IN WOUND HEALING

[1]*Dr. Pradip M. Godase and [2]Dr. T. Srinivas

[1]PG(Sch), [2]MD(Shalya), Prof. and HOD, Dept. of Shalyatantra, YAMC Kodoli Kolhapur.

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***Corresponding Author**
Dr. Pradip M. Godase
PG(Sch), YAMC Kodoli
Kolhapur.

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, which is said to be a ancient textbook of surgery in Ayurveda, has mentioned about the diet for the person suffering from the wound. 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 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 the Vrana. 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.

INTRODUCTION

Wound management is significant and growing health problem on the community. Nutrition plays an essential role in wound healing and nutritional support needs to be considered as a fundamental part of wound management. Poor nutrition before or during the healing process may delay healing and impair wound healing strength, making the wound more prone to breakdown. Neglecting the nutritional status of an individual with a wound can compromise the entire wound management process.

According to Ayurveda vrana is the most important part of shalyatantra and samhitas have emphasized a lot on wound and its care occurring due to trauma or vitiated doshas. Sushrut Samhita have elaborated description about vrana and its management. Acharya Sushruta mentioned, shashthiupakrama in chikitsa sthana of his samhita in reference to management of vrana he described almost all the basic principles of surgery in form of Saptoupakrama of vrana shotha. He shows very close and practical approach towards the patient of vrana shotha. He started shashthiupakrama with the apatarpan, that means langhana. Langhan is used probably to break the pathology in very initial stages as we know according to ayurvedic texts most of the nija vyadhi starts with the development of aama, later on that after association with doshas produces vyadhi.

In this shashthiupakrama, Acharya Sushruta mentioned Dietary regimen, that is aahara as 59 th upakrama which has very SIgniticant importance in wound management. Ahara is the most important part of management of any disease.

AIMS

To review how nutritional status of patients is one of the important factor in wound healing management.

MATERIAL

only literary material i.e. modern textual literature in different texts books of surgery and also sushrut samhita along with that articles published on internet were reviewed to collect the data.

METHOD

1) This is a review in which different aspect of nutritional deficiency leading to impaired or delayed wound healing, is discussed.
2) An overview of important nutritional factor required in wound healing.

Review of literature

For more than 100 years nutrition has been recognized as very important factor that affects wound healing. Most obvious is that malnutrition or specific nutrient deficiencies can have a profound impact on wound healing after trauma. The surgery patients with chronic or non healing wounds and experiencing nutrition deficiency often require special nutrients. Good nutritional status is essential for wound to take place. Ignoring nutritional status may

compromise the patient's ability to heal and subsequently prolong the stages of healing of wounds. Energy, carbohydrate, protein, fat, vitamins and minerals metabolism, all can affect the healing process.

Carbohydrates - Dietary glucose provides the body with its power source for the wound healing and this gives energy for angiogenesis and the deposition of new tissue, therefore its vital that the body requires adequate amount of glucose to provide additional energy for wound healing.

Fatty acids - fatty acids are essential for cell structure and have an important role in the inflammatory (phase) process. Lipids are used as nutritional support for surgical or critically ill patient to help meet energy demands and provides essential building blocks for wound healing and tissue repair. Polyunsaturated fatty acids (PUFA), which cannot be synthesized by mammals, consist of mainly two families, that is n-6 (omega -6) found in soya bean oil and n-3 omega-3) found in fish oil. Fish oil has been widely touted for health benefits of omega -3. Fatty acids such as Eicosa pentatonic acid (ERA) and Decosa pentatonic acid (DMA), they have been reported to affect proinflammatory cytokine production, all metabolism and angiogenesis in wound sites. They are also helpful in improving immune system. Protein deficiency has been demonstrated to contribute to poor healing rates with reduced collagen formation and wound dehiscence. Protein is one of the most important nutrient factor affecting wound healing. A deficiency of protein can impair capillary formation, fibroblast proliferation, proteoglycon synthesis, collagen synthesis and wound remodeling. A deficiency of protein also affects immune system with resultant decreased leucocyte phagocytosis and increased susceptibility to infection. Collagen is the major protein compound of connective tissue and is composed primarily of glycin, proline, and hydroproline. Collagen synthesis requires hydroxylation of lysine and prolin and co- factors such as ferrous sulphate and vitamin C impaired wound healing results from deficiencies in any of these co - factors.

Arginine - it is semi essential amino acid. Arginine has many effects in the body, including modulation of immune function and wound healing .it is also precursor to proline, and as such sufficient arginine levels are needed to support collagen deposition, angiogenesis, and wound contraction.

Glutamine - It is the most abundant amino acids in plasma and is major source of metabolic energy for rapidly proliferating cells such as fibroblasts, lymphocytes, epithelial cell and macrophages. the serum concentration of glutamine is released after major surgery trauma or sepsis and supplementation of this amino acids improves nitrogen balance and diminishes immunosuppression. Glutamine has a crucial role in stimulating the inflammatory immune response occurring early in wound healing

Vitamins, macronutrients and trace elements

They are also important in wound healing. Vitamin C (ascorbic acid), Vitamin A (Retinol). vitamin E (tocoferol) shows potent anti oxidants and anti- inflammatory effects.

Vitamin C - it has many roles in wound healing and deficiency in this vitamins has multiple effects on tissue repair, impaired wound healing and decreased collagen synthesis and fibroblasts proliferation. Its deficiency leads to impaired immune response and increased susceptibility to wound infection.

Vitamin A - Similarly vitamin A deficiency leads to impaired wound healing. The biological properties of vitamin A include anti oxidant activity, increased fibroblasts proliferation, increased collagen and hyaluronate synthesis and decreased mediated extracellular matrix degradation.

Vitamin E - An anti oxidant, maintains and stabilizes cellular membrane integrity by providing protection against destruction by Oxidation. It also has anti inflammatory properties. Topical vitamin E has been widely promoted as an anti-scarring agent.

Magnesium - It functions as a co-factor for many enzymes involved in protein and collagen synthesis.

Copper - It acts a co- factor for cytochrome Oxidase and for cross linking of collagen.

Zinc - It acts as cofactor for both RNA and DNA polymerase, and its deficiency causes a Significant impairment in wound healing.

Iron - It is required for hydroxylation of proline and lysine and as a result severe iron deficiency leads to impaired wound healing.

DISCUSSION

Different aspect of nutritional needs of the wounds are complex, suggesting that Composite nutrition support would benefit both acute and chronic wound healing carbohydrate, Fatty acids, Protein, etc the major Arginine components that affects wound healing. A recent study has been examined effects of high energy, protein enriched supplement containing arginine, vitamin C, vitamin E and zinc on chronic pressure ulcers and indicated that this high energy and nutrition enriched supplements improved overall healing of pressure ulcers.

In fact, Ayurveda puts a great stress on the diet and dietary habits which are called as pathya. it has been mentioned in ayurveda that if a person follows strictly the regulation of diet (pathya), he may not require medicine but if he does not follow the regulation of diet (pathya) medicine may be fruitless. Taking account of these, it is necessary to follow pathya in health as well as in diseases.

RESULTS

How different nutritional factors impact on wound healing from different process of pathophysiological perspective? All the above mentioned factors play key role in wound healing.

CONCLUSION

Wound healing is a complex biological process that consists of haemostasis, inflammation, proliferation and remodeling. nutritional deficit can cause impaired wound healing by affecting one or more phases of the process Ahara has its unique importance in wound healing management if it is taken as advised.

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