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Honey is an Ideal Biological Agent in the Management of Necrotizing Fasciitis: A Case Report

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ABSTRACT

Necrotizing Fasciitis is dangerous, spreading inflammation and necrosis of the subcutaneous tissue and fascia. The treatment of choice is immediate and radical debridement along with broad-spectrum antibiotics and supportive therapy. We present the case of a 63 years old man who came with Necrotising Fasciitis of the gluteal skin; following intramuscular injection. After the initial debridement, honey debridement was started, and the patient showed an excellent recovery. Honey is a gift of nature, available freely and throughout the globe. It is an excellent debriding agent with antibacterial properties, which promotes tissue growth at the same time. During the desperate times like COVID-19 when the routine surgery is not available, or in areas where the plastic surgery facilities are not developed, honey can still be an excellent alternative.

Keywords: Necrotizing fasciitis, COVID-19, Debridement, Honey Necrotizing fasciitis, COVID-19, Debridement, Honey.

INTRODUCTION

Necrotizing fasciitis (NF) is a rapidly spreading inflammation and necrosis of the subcutaneous tissue and fascia.[1] It results from synergistic, spreading, a polymicrobial infection caused most commonly by beta-hemolytic streptococcal species in combination with staphylococcus, E Coli, Pseudomonas, Proteus, Bacteroides and Clostridium species. Nearly 80% have the previous history of trauma/infection, and 60% commence in the lower extremities. Aerobic bacteria lead to tissue destruction, which further creates a favorable environment for the anaerobes to proliferate and carry the pathological process, forward. The patients are almost always immuno-compromised, mostly having diabetes mellitus. It is a surgical emergency that has got a very high mortality (median mortality 31%) despite best efforts. Treatment is liberal surgical debridement, along with broad-spectrum antibiotics and supportive therapy.[2] Postoperative wound management is also essential for the patient's survival. Honey is one of the most valued and appreciated natural substances known to humankind since ancient times. It is used in Ayurveda since ages for many purposes, including the management of burns and wounds. Due to its chemical composition, it is a best debriding agent, promotes wound healing, reduces inflammation, and also prevents microbial growth.[3]

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CASE REPORT

Figure 1: At the time of initial presentation to the hospital, showing black necrotic skin in gluteal region and lateral aspect of the thigh.

We report the case of a 63-year-old male patient who presented to the outpatient department (OPD) with necrotizing fasciitis of right gluteal region extending to thigh laterally. The patient had a history of receiving an intramuscular injection on the right gluteal region for pain. After 3-4 days, he had pain along with erythema at the injection site, for which he was prescribed oral antibiotics (Co-Amoxiclav) and painkillers at the local hospital twice. His condition kept getting worse, and the patient came to us after ten days with complaints of severe pain,

limb immobility, a fever, blackish discoloration of the skin with brownish discharge from the affected site. The patient was in poor general condition, with temperature up to 101 F, tachycardia (120 b/pm) BP-92/52 mm of Hg, and had not passed urine for the last 12-14 hrs. At the time of presentation to the hospital, Skin over the right gluteal region and lateral thigh was necrosed, with surrounding erythema and tenderness, with brownish discharge from the wound [Figure 1]. The right hip joint was in flexed position due to pain. Blood (Total Leucocyte Count) TLC count was 13,200/ mm3, serum C-RP was positive, erythrocyte sedimentation rate was – 85 mm/hr, serum creatinine- 1.0 mg/dl, HBA1C- 6.5 gm%. There was no history of diabetes mellitus, Tuberculosis, drug abuse, or alcohol intake. Patient was resuscitated, and taken for emergency surgery where radical debridement of all necrotic tissue was done, and healthy bleeding margins were obtained [Figure 2]. He was started on Piperacillin with Tazobactum, Gentamycin and Metronidazole. On the first postoperative day, honey dressing was initiated [Figure 3]. On day three, red granulation appeared in wound, and on day seven wound was red and free of any slough or discharge from wound and started contraction. Keeping the COVID-19 pandemic in view, the patient was discharged and advised to continue with the honey dressing at the nearby local primary health centre. The patient was then seen in the OPD after two weeks. The wound had healthy granulation tissue, free of slough or discharge and had started to show nearly 50% reduction in the size from the original wound [Figure 4]. Patient refused for any skin grafting because of the COVID-19 outbreak. He is in follow up and happy with the honey dressing, making an excellent recovery.

Figure 2: Showing the healthy bleeding margin after the initial debridement.

DISCUSSION

Necrotizing Fasciitis is a life-threatening infection of the skin, soft tissues, and muscles, which progresses rapidly through fascial planes causing necrosis of fascia at a rate of 2-3 cm/hr approximately. It has got a swift clinical course which can be correlated with polymicrobial infection & synergy of the bacterial species.[4] Trauma is the most common etiological factor, with the majority of patients having a history of some minor injury, surgery, or skin infection. The most frequent comorbidities found with NF patients are Diabetes Mellitus, Tuberculosis, Alcohol abuse, Drug abuse, Steroid intake, and immunodeficiency. The prevalence of diabetes mellitus in patients with any type of NF ranges between 40 - 60%.[5] In NF infection begins in the hypodermis and/or superficial fascia. The dermis and epidermis are not affected in the initial stage. Due to the synergy of different bacterial toxins and enzymes and specific factors of a host (cytokines), an extension of infection and necrosis occurs. The decay of the superficial fascia is directly related to bacterial enzymes that destroy the fascia and fat. Thrombosis of the nutrient vessels located in the hypodermis causes tissue ischemia, which is also aggravated by the presence of edema. Tissue ischemia further promotes bacterial spread, and causes intense pain due to ischemia of nerves. The fascial & hypodermic necrotic spread is far greater than the overlying skin changes.[6]

Figure 3: Showing the honey dressing, started on postoperative day 1.

Recent studies have classified NF into four types, according to microbiological findings.[7]

Type	Pathogen
Type I (Most frequent) (70- 90%)	Polymicrobial
Type II	Monomicrobial (Beta hemolytic streptococcus-A, most common)
Type III	Monomicrobial infection with Clostridium species or Gram-negative bacteria.
Type IV	Fungal infection (Candida species & Zygomycetes)

Figure 4: Showing the healthy granulating wound after two weeks of honey dressing.

Urgent liberal debridement of necrotic and affected tissue is the mainstay of the management of NF. Surgical intervention is of paramount importance, is life-saving and must be performed as early as possible. Debridement should be repeated during the next 24 hours and later, depending upon clinical assessment of necrotizing infection and patient's condition. Most patients of NF require repeated debridement to get rid of all the necrotic tissue and to promote granulation. Since the infection causes extensive tissue necrosis and ischemia, It compromises the adequate delivery of antibiotics to the infection site; therefore conservative management with antibiotics alone has little value in the management of NF. However, they play a significant role in the management of NF.[8] With time, and due to the rampant abuse of antibiotics in the past thirty years, the multidrug resistant strains are prevalent in the hospitals throughout the world.[3] Honey, aka Madhu, Makshika in Sanskrit, is a boon of nature to humanity. Honey has been in use since ages throughout the world for various medicinal purposes. Ayurveda scholars have done extensive studies on honey. According to Charak Samhita, honey is of four types – Makshika, Kshaudra, Bhramara, and Paittaka. Makshika is the best type of honey produced by reddish variety of honey bee. Whereas according to Susrutha Samhita, honey is of eight types. Pauttika, Bhramara, Ksaudra, Makshika, Chatra, Arghya, Auddalaka and Dala Madhu.[9] But unfortunately, we have ignored this ancient knowledge with advancement of modern science. Researchers have found that honey is effective against a wide range of pathogens, and its antimicrobial activity has been attributed to its magnesium oxide and hydrogen peroxide content.[10] Other factors like osmotic pressure, low protein content, bee defensin-1, hyper-osmolality, pH, Phenolic content, and flavonoids as well as high carbon: nitrogen ratio also contributes to its antimicrobial property.[11] There are recent studies which have indicated the antibacterial activity of honey in terms of MIC (minimum inhibitory concentration) to inhibit the microbial growth.[12] The MIC of honey is generally 5-10 % against most bacterias. Oxidase enzyme present inside the honey produces a low dose of hydrogen peroxide locally inside the wounds. In NF, after surgical debridement, honey can be used for dressing and chemical debridement of the wound. Its antimicrobial property prevents bacterial growth. This property is of particular importance in NF, where antibiotics cannot reach inside the wound due to tissue necrosis. It also prevents development of resistance by minimizing the use of antibiotics. Honey also provides good means of proteolysis, which is very helpful in debridement of necrotic tissues, and thus reduces the need for recurrent surgical debridement.[13] The lymph and fluid drawn by honey due to its high osmolality, provides a moist environment to wound. The lymph is rich in protease and cytokines, which further enhances proteolysis of dead tissue and helps with debridement. Growth factors present inside the lymph withdrawn into the wound by the osmotic action of honey, also promotes the growth of the granulation tissue, collagen formation, angiogenesis, and provides rapid wound healing. It also provides a suitable substrate to bacteria for metabolism, thus minimizing the use of protein and amino acid for metabolism by bacteria, which results in a decreased amount of gas formation, and hence it renders the wounds odorless in just a few applications.[14] Different studies conducted to compare the efficacy of honey dressing with other dressing materials like silver sulfadiazine, eusol, saline, hydrocolloid etc., suggest that honey is a suitable and more effective way of wound management.[15-17]

CONCLUSION

Necrotizing fasciitis is rapidly progressing and fatal soft tissue infections, which require extensive tissue debridement and antibiotics for its management. Honey is an excellent debriding agent that provides antibacterial activity and promotes tissue healing. It can save the unnecessary abuse of antibiotics and hence can prevent the emergence of multidrug-resistant bacterias. In desperate times like COVID-19, when surgery poses a high risk for patients as well as doctors, honey is no doubt a lifesaver.

Consent

Written informed consent was taken from the patient. A copy of the written permission is available for review by the Editor-in-Chief of the journal.

Author's Contributions

All the authors contributed substantially to the Conception, design, drafting the article, Critical revision of the article and final approval of the version published.

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