

Holistic Care Approach for the Effective Management of Severe Radiation Dermatitis Using Neem (*Azadirachta indica*) and Honey after Head-and-Neck Radiotherapy

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Abstract

Head and neck cancer is the eighth common type among all cancer types around the world. Its treatment comprises surgery, radiation therapy, chemotherapy and /or a combination of restoration therapy and social support. Conventional fraction size ranges from 1.8 to 3 Grays (Gy) per fraction over 4–6 weeks. The accumulative dose of radiation for the primary treatment of head and neck cancer treatment is 60 to 70 Gy, depending on the irradiation of the tumor. Ionizing Radiotherapy is used along with concurrent chemotherapy which is the standard treatment in locally advanced head and neck cancers. Radiation treatment is commonly delivered in the form of high energy photons through an external beam. These results in ionization of electrons that cause direct strand breaks of cellular DNA and the release of free radicals, resulting in cellular damage to both normal and tumor cells. Radiation disrupts the normal process of wound healing at various stages.

Keywords: Holistic care, honey, neem, palliative care, radiation dermatitis

INTRODUCTION

Head and neck cancer is one of the most common cancers in developing countries.^[1] Most of the patients present with locally advanced stages and radical radiotherapy (RT) along with concurrent chemotherapy (CT) which is the standard treatment in these patients.^[1] RT is associated with radiation dermatitis (RD) which causes severe side effects on patient which finally leads to treatment breaks, decreases disease control rates and impairs the quality of life of the patients.^[2] The management of advanced RD is difficult and it causes consequential late morbidity to the patients.^[2] The patient was effectively managed with Neem (*Azadirachta Indica*) and Honey with remarkable results.

CASE REPORT

A 58 year old man was diagnosed as a case of carcinoma of larynx with bilateral neck nodes (Stage T4a N2c M0; AJCC 7th Edition). As it was locally advanced case, the patient was planned for radical chemoradiation with RT doses of 76 Gy in 30 fractions over 7 weeks along with weekly chemotherapy (Cisplatin 40 mg/m²). During the course of Radiation, the

patient was monitored twice a week and symptomatic care was done for RT induced toxicities. The patient presented with Grade III RD after 60 Gy in 29 fractions over 4 weeks [Figure 1]. The RD involved the anterior and bilateral neck with moist desquamation of the skin [Figure 1]. It was associated with moderate pain, difficulty in swallowing, salivation and oral mucositis grade - 2. The Patient was subsequently admitted and further treatment was initiated. Analgesics like injection Morphine 2 mg tds was administered for reducing pain and adequate hydration and nutritional support were maintained. The wound score assessed by Bates – Jensen wound assessment tool and which was 47 which falls in extreme severity status.

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In view of extreme severe status of the RD, after cleaning of the wound with Neem water and then applied honey. The wound cleaning was regularly done, two times a day. There was a gradual improvement in RD [Figure 2] at day-6th. By day 12th, the wound was healed significantly [Figure 3] and day 18th wound got almost complete recovery [Figure 4]. The status of wound score and pain score (Visual analog score) is tabulated in Table 1. Radiation therapy was withheld for 6 days and was resumed after the improvement of RD on day – 6 [Figure 2]. The patient was re-started on RT and he completed his scheduled RT doses of 76 Gy in 30 fractions over 7 weeks. We here in describe a case report of locally advanced carcinoma of larynx that developed grade III RD while receiving radical chemoradiation. The patient was effectively managed with Neem (*Azadirachta Indica*) and Honey home remedies with remarkable results. This brief report highlights the importance of raising clinical awareness on management of RD with Neem (*Azadirachta Indica*) and honey.

DISCUSSION

The significant problem associated with RT is acute RD which is dependent on the dose of radiation exposed to and it may develop within days to few weeks of exposure to external beam radiation therapy. The status of wound varies according to its severity as it may present as local erythema, dry or moist desquamation initially and ulcerated in a severe case. These can cause severe symptoms to the patient, leading to frequent treatment breaks, decreases disease control rates and impairs the quality of life of the patients.

A variety of topical agents and dressings are used to treat RD, but there is minimal evidence to support their use.^[3] The Multinational Association for Supportive Care in Cancer (MASCC) treatment guidelines for prevention and treatment of RD also concluded that there was a lack of sufficient evidence in the literature to support the superiority for any specific intervention.^[4] As there is no definitive treatment available for RD yet, practitioners use different kinds of options.

Numerous “lotions and potions” have been suggested for the prevention and management of radiodermatitis, such as ascorbic acid, vitamin D, aloe vera, chamomile and calendula creams, and almond ointment. Other common practices include avoiding zinc and aluminum based creams and deodorants, wearing loose cotton clothing, and applying non-adhesive dressings.^[5] However, there is limited scientific data to support these recommendations. The approach to the management of radio - dermatitis should be based on the severity of symptoms and patient comfort.

Neem can heal wounds without leaving any ugly scars. It also prevents septic infections. Neem is commonly used to heal wounds because of its antiseptic properties.^[6] Wound healing is a multi stage process. Neem directly affect the proliferation stage and helps to maintain the granulation integrity of wound.^[6] Neem has highly rich in essentials fatty acids, which plays an important role in maintaining moisture and soft texture of skin during the wound healing process.^[6] Neem has ability to restructures the skin during wound healing process.^[6] Neem leaves have active ingredients such as nimbidin and sodium



Figure 1: Acute grade III radiation dermatitis



Figure 2: Bio-burden with proliferative phase at day-6



Figure 3: Healing phases at day-12



Figure 4: Complete healed phase at day-18

nimbidate which possess anti-inflammatory, antibacterial, antifungal and antiviral properties that help in healing process and also contains an excellent nutrition which plays a vital role in formation of collagen and formation of new capillaries.^[6] Similarly, honey has high amounts of sugar, which plays an important role to stimulate the re-growth of blood vessels. In some parts of world, people cannot afford antibiotics. And there is another problem found in the UK, too, that once a wound is infected, at times it won't respond to antibiotics. Such persons were treated with sugar instead of costly antibiotics. Honey has ability to promote angiogenesis during wound healing. Honey have active ingredients such as anti-oxidant (Flavonoids and phenolic acids) may have anti-cancer effects against different types of tumors.^[7-9] Honey is a natural, non-toxic, cost-effective material and consists of carbohydrates, water, organic acids, enzymes, amino acids, pigments and pollens having antibacterial and anti-inflammatory features.^[7-9] Honey is an ultra-saturated sugar that due to high osmolarity, low level of hydrogen peroxide and hydroscopic property results in killing bacteria.^[7-9] Honey has been used thousands of years to treat various problems like wounds and burns.^[10]

Above mentioned patient was having severe grade 3 acute RD according to BWAT scale. we used Neem (*Azadirachta Indica*) and Honey, which has an anti-inflammatory, antibacterial, antifungal and antiviral properties that help in angiogenesis during wound healing processes. Home remedies is easily accessible, cost-effective and can found at every place. The outcome was shocking [Figure 2 and Table 2]. Then the client was able to undertake the remaining doses of RT as per prescription.

RESULTS

Head and neck cancer is one of the most common cancers in developing countries.^[11] Chemoradiation is considered to be the

Table 1: Wound and pain score

Day	Wound score	Pain score
1	47	7
6	38	5
12	22	3
18	9	2

Wound score based on bates jensen wound assessment tool (scoring range 5-65). Pain Score based on visual analog scale (scoring range 0-10)

Table 2: Radiation therapy oncology group scoring criteria for acute radiation skin reaction

Grade	Skin changes
0	No change over baseline
1	Follicular, faint or dull erythema/epilation/dry desquamation/decreased sweating
2	Tender or bright erythema, patchy moist desquamation/moderate edema
3	Confluent, moist desquamation other than skin folds, pitting edema
4	Ulceration, hemorrhage, necrosis

standard treatment regimen for such cancers as the majority of clients manifested with a locally advanced disease. However RT is always presented with a number of acute and chronic toxicities. The common RT toxicities are directed at skin and mucosa which leads to RD and radiation Mucositis respectively. These toxicities are graded as per radiation therapy oncology group (RTOG) criteria [Table 2].^[11] Currently, a variety of different skin assessment tools exists. Within a radiotherapy department, a single validated assessment tool and scoring criteria such as used by the Radiation Therapy Oncology Group / European Organisation for Research and Treatment of Cancer (RTOG/EORTC) should be agreed upon and adopted throughout.^[11] Preferably, a single assessment tool should be agreed for use across a whole cancer network.

Using the agreed validated tool and scoring criteria, radiotherapy departments should standardize the initial assessment and continued regular monitoring of skin reactions, and ensure that these are recorded.^[11]

Neem leaves are easily available at every place in India, especially in north-west region. Neem leaves is known for their several medicinal action since ancient times. Indian Ayurveda having lots of literature regarding properties of neem. For cleaning wound, freshly neem leaves washed with water then cut in to small pieces by help of scissor.

Those small pieces of neem leaves boiled in water in a steel container for 15 minutes until the leaves are soft and discoloured, and the water turns green. This solution was allowed to cool for a brief period (about 1 hour). Once it got cooled, gently shake it to make equally distribution of neem extract. This solution was ready for use to wash wound thoroughly. After washing, wound is prepared for topical honey paste application. A small thin layer of honey was applied over wound.

BWAT is another important tool used nowadays by the medical practitioners to assess the any types of wound such as RD. This tool has been validated across many studies to score initial wound status and monitor the subsequent status numerically.^[12] Both RTOG and BWAT scoring tools were used for the index case which is mentioned in the beginning of discussion to measure its scores.

It has been proved that treating an advanced RD is far difficult and besides which can increase the morbidity of patients as well.

The RD had an impact on psychological health of patients caused by cosmetic effects. Other psychological problems were that the patients knew he was about to die. Furthermore, the patient worried about her children. In our department, we provide palliative care to patients. we first assess the patient for stress and find out that if RD problem was solved for that patient and whether the patient was very relaxed, and that would have happened in all cases because as a part of palliative care we have to take care of both the domains of the patient like physical and psychological for that cure of the disturbing

RD has to be cured. We also gave palliative counseling and psychological support to the patient for psychological well-being that has huge impact on her psychological health.

This case has pointed out the effectiveness of home remedies in reducing the severity of radiation induced dermatitis. However, a more randomized and large scale studies are needed to make its use on a routine basis for management of RD.

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Conflicts of interest

There are no conflicts of interest.

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