An audit of radiation-induced mucositis in a tropical cancer centre: the importance of adhering to a mouth care regimen

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Abstract

In order to reduce the incidence and severity of radiation-induced oral mucositis in patients with head and neck cancers, an oral gel product was added to the mouth care regimen in a regional northern Australian facility. An audit of the medical records of 20 patients who underwent radiation therapy was undertaken to assess the effectiveness of this more comprehensive mouth care regimen. All patients in this sample developed oral mucositis by the end of their radiation treatment: 21% had a low grade, 79% progressed to the higher Grade III. All patients who did not adhere with the full mouth care regimen experienced a Grade III oral mucositis; only half of the patients who adhered with the full mouth care regimen experienced the more severe Grade III mucositis. It is imperative that nurses actively support patients to follow the prescribed mouth care regimens to minimise oral complications associated with radiation therapy.

Introduction

Cancers arising in the nasal cavity, oral cavity, salivary glands, lymph nodes, epiglottis, larynx, and unspecified areas within the surrounding anatomical structures are collectively termed 'head and neck' cancers. Approximately 2,670 Australians are diagnosed with neoplasms of the head and neck region annually, representing 3% of the total Australian cancer diagnoses. The five-year survival prognosis varies according to the stage of the neoplasm and the treatment modalities available. Three-quarters of patients treated for small, localised cancers have at least a five-year survival prognosis[1].

Many patients with head and neck cancers undergo daily radiation treatments, over five to six weeks. There are several adverse and debilitating oral side effects of the intensive head and neck radiation treatments, including oral mucositis, xerostomia and dysphagia[2]. The risk of oral mucositis is related to the site, dosage and fractionation of the radiation therapy[3].

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Oral mucositis is characterised by recurrent, erythematous and painful ulcers that usually become apparent in the second week of radiation treatment. Negative clinical outcomes of oral mucositis include dysphagia, altered taste perception, infection, malnutrition, communication difficulties, pain and decreased social interaction, which necessitate increased resource utilisation[4-6].

Standardised grading scales, such as the World Health Organization (WHO) Mucositis Grading Tool[6] are used to assess a patient's degree of oral mucositis. The WHO Mucositis Grading Tool classifies mucositis into four grades, with Grade I characterised by redness, mild soreness or painless ulcers. At the highest grading, Grade IV, a patient will require parenteral or enteral nutrition. Since radiation-induced oral mucositis leads to considerable negative effects for individuals and organisations, mouth care regimens aim to prevent or minimise the degree of mucositis. Also, some emerging evidence demonstrates that oral mucositis is difficult to treat effectively once it develops[7]. The ability of patients to adhere to mouth care regimens aiming to minimise oral mucositis may be effected by several factors, including the fatigue associated with radiation treatment[2] and possibly the cost and availability of oral care products.

Anecdotally, by the completion of their treatment, a large number of patients with head and neck cancers attending a regional northern Australian radiation therapy unit experienced a WHO Grade III or IV oral mucositis. Patients attending this unit are advised on their first day of radiation treatment that they should follow a mouth care regimen to

Table 1. The six-step mouth care regimen.

Step	Product and action	Amount, strength	Rationale
1	Rinse mouth with bicarbonate of soda solution	1 teaspoon sodium bicarbonate to 500 ml water	Dissolve thickened saliva
2	Rinse mouth with salty water	1 teaspoon salt to 500 ml water	Remove debris; cleanse
3	Xylocaine viscous rinse	10–20 ml	Local anaesthetic; aids with intake of oral food, fluids, medication (only used if indicated)
4	Rinse mouth with salty water	1 teaspoon salt to 500 ml water	Cleanse
5	Nilstat drops	I drop	Prophylactic – minimise yeast infection
6	Gelclair, rinse around mouth for at least one minute	1 sachet mixed with up to 40 ml water	Provide protective barrier to oral mucosa

reduce the severity of oral mucositis. The regimen begins as a five-step process, to be undertaken four times daily. In early 2008, an oral gel product (*Gelclair*) was introduced as a sixth step in the unit's regimen, outlined in Table 1. Initially, *Gelclair* was provided to patients in their second week of radiation treatment, when mucositis was anticipated to occur. However, as use of the oral gel became more routine, nurses gave the product to patients on their first day of treatment, believing that this would assist in preventing oral lesions and maintaining patients' nutritional requirements. The product was then supplied for use by the patients throughout their entire treatment programme and for the first week after completion of radiotherapy.

The aims of the audit presented in this paper were to:

1. ascertain documented occurrence and severity of radiation-induced oral mucositis
2. explore relationships between documented oral mucositis grading and patients' adherence to the suggested mouth care regimen.

Literature review

Although descriptions of several mouth care regimens and products that have been used in an effort to reduce the occurrence and/or severity of radiation-induced oral mucositis are to be found in the literature, evidence for a single, general, definitive intervention is lacking[8-10]. Adams[2] describes the management of side effects of radiation therapy and mouth care regimens which generally include anaesthetic and anti-inflammatory products to lessen the pain of oral mucositis.

Recently, results of a randomised controlled trial comparing the effectiveness of a Thai herbal product (glycerin and payayor oral drops) with a proprietary mouthwash (benzydamine, or BZD) that is commonly used in Europe and Canada, were published[11]. The onset of oral mucositis occurred later, and mean pain severity scores and interruptions to radiation treatment were less for patients randomised to the herbal product group. However, payayor is not available outside Thailand; and a panel of experts previously agreed that there was high-level evidence for the use of benzydamine in the prevention of radiation-induced oral mucositis[3].

A viscous oral gel product, marketed under the name *Gelclair*, has been available for use in Australia since May 2007 (DiIanni M, personal communication, 3 February 2010). The gel, containing polyvinylpyrrolidone, hyaluronic acid and glycyrrhetinic acid[12], forms a protective barrier on the mouth's mucosal surfaces. Because this barrier makes swallowing easier, the gel has been proposed as a useful addition to mouth care regimens. Although Barber *et al.*[13] did not find *Gelclair* to be any more effective than standard treatment for radiation-induced oral mucositis over a 24-hour period, they recommended further investigations. Patients undergoing radiation for head and neck cancers in a Western Australian radiation unit were provided with a maximum of three days' supply of *Gelclair* if their reported pain scores were greater than 5/10. After using the oral gel, 85% reported lower pain scores, with the average reported pain score falling from 8.33 to 3.52[14]. This reduction in pain from using the gel enabled patients to maintain their food and fluid intake. The investigators were unable to ascertain if patients continued to use the gel at their own cost after the conclusion of the trial.

Method

A retrospective medical record audit was undertaken of a convenience sample of approximately 10% of patients who

underwent radiation therapy for head and neck cancers between March 2008 and March 2009 at a regional Australian facility located in the tropics. Demographic data collected included: diagnosis, age, marital status, radiation treatment plan, smoking history, alcohol consumption within one year of diagnosis, nationality and residential location. Details were collected about when the patient was advised to use the oral gel product and the weekly mucosal grading score. The audit was conducted in accordance with the organisation's processes for similar initiatives; no individual patient is identifiable within this paper.

Results

The charts of 16 male and four female patients were reviewed. The youngest patient was 41 years old and the oldest patient was 82 years old; eight were between 40 and 49 years old. Seventy per cent of the patients resided more than 50 kilometres from the radiation treatment facility. Patients underwent radiation that varied in dosage (between 48 Gy and 69 Gy) and number of treatments (between 20 and 35 fractions) for head and neck cancers.

Documentation pertaining to the mouth care regimen was complete for 19 of the 20 (95%) patients whose charts were audited. By the end of the fifth week of treatment, all 19 patients had some degree of oral mucositis. Two patients (11%) had the lowest grading of oral mucositis (Grade I), and another two patients (11%) did not progress past Grade II. The remaining 15 (79%) patients had a Grade III oral mucositis; no patient progressed to the most severe grading of IV. Four patients with a Grade III oral mucositis required the insertion of a nasogastric tube for nutritional support some weeks into the course of their radiotherapy treatment.

The highest grading of oral mucositis experienced was compared with when the *Gelclair* was introduced into the regimen (Table 2). These results indicate that the inclusion of *Gelclair* from the commencement of treatment did not reduce the overall grading of oral mucositis for this sample.

Nurses routinely document their weekly assessments of the patients. These assessments include how the patients are managing with their mouth care and their oral mucositis grading score. From the medical records reviewed in this audit, it was evident that not all patients adhered to the mouth care regimen. Reasons given by patients for not adhering to the complete mouth care regimen included: altered taste; nausea; regimen was too time-consuming; lack of energy; language difficulties. Table 3 compares the highest oral mucositis grading with whether or not the patients adhered to their mouth care. All patients who had the lesser grading (I or II) adhered to their mouth care regimen. All patients who did not adhere with their mouth care regimen progressed to a higher grading (III).

Discussion

Although it might be expected that 85%–100% of patients undergoing radiation therapy for head and neck cancers will experience some degree of oral mucositis, the 79% incidence of Grade III oral mucositis in this sample was considerably higher than the 25%–45% incidence cited in the literature[6]. An analysis of possible contributing causes of this, such as continued smoking or alcohol intake, would require a larger sample of charts.

Patients with head and neck cancers undergo radiation therapy and chemotherapy concurrently. Hence, they may already be very fatigued, and strict adherence to the repetitious mouth care regimen may just be 'too difficult'. Certainly, some of the patients in this sample identified that they had difficulty finding the time required to continue with their mouth care. The authors of this paper surmise it may be difficult for patients to adjust their established mouth care routines to prevent a side effect that they believe may not be too distressing; and perhaps patients may adopt a wait-and-see approach and be more willing to adhere to a regimen once oral mucositis has begun and they experience the associated pain.

Table 2. Comparison of oral mucositis grading with the time of introduction of oral gel into the patient's mouth care regimen.

	Oral mucositis Grade ≤II	Oral mucositis Grade ≥III	Total
Gelclair introduced into mouth care regimen at commencement of radiation treatment	1	10	11
Gelclair introduced into mouth care regimen after the first week of radiation treatment	3	5	8

Table 3. Comparison of oral mucositis grading with patients' adherence to mouth care regimen.

	Oral mucositis Grade ≤II	Oral mucositis Grade ≥III	Total
Patient adhered to mouth care regimen	4	4	8
Patient did not adhere to mouth care regimen	0	11	11

Patients attending this radiation therapy unit were supplied with the *Gelclair* free-of-charge for a minimum of four weeks, in contrast to the three-day supply in another recent Australian study[14]. Although the unit has incurred additional expenses by supplying the product, there may be considerable savings if the degree of oral mucositis is lessened and patients do not require additional interventions such as parenteral feeding. However, if the patients were to purchase *Gelclair*, it would cost them in the vicinity of $9 per day which may not be affordable for many of the patients attending this radiation therapy unit. This additional cost burden may further complicate their efforts to adjust their mouth care routines and adhere to a new regimen.

The most effective time in the patient's radiation therapy journey to introduce the oral gel product also warrants further consideration and investigation. Perhaps introducing it once "signs and symptoms of oral lesions appear"[15] would assist patients to progressively adapt their mouth care routines, and assist to contain organisational costs. In light of the results of this audit, and the product information, it is suggested that the unit investigates the effect of introducing the oral gel after the first week of treatment.

A close examination of the product literature located on the website of the distributor, Orphan Australia, reveals that the gel should be stored out of the refrigerator but below 25°C. Patients attending this radiation therapy unit have difficulty with these requirements because they live in a tropical location and do not necessarily have home air conditioning. The radiation therapy unit has not yet considered this aspect of the mouth care regimen.

Implications for practice and conclusion

Radiation therapy to the head and neck region is extremely intensive and side effects can be debilitating. It is essential that potential oral side effects, including radiation-induced oral mucositis, are well managed from the commencement of treatment. Patients need clear explanation of the consequences of not adhering to the oral mouth care regimen. Although the addition of an oral gel product to this regimen increases direct costs, if the more serious consequences of the higher grades of oral mucositis such as the need for nutritional interventions, hospitalisations or treatment delays can be reduced, then patients will benefit as will the health care system.

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