

# Involving patients in the monitoring of radiotherapy-induced skin reactions

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Radiotherapy is one of the mainline treatments for cancer, but less commonly understood are some of the side-effects, which include skin problems that range from being mild (dull erythema and tightening of the skin) to severe (moist desquamation with open wounds and oedema). This article highlights an ongoing study that aims to assess the implementation of a best practice skin guideline for the management of both dry and moist desquamation in patients with evidence of radiotherapy-induced skin reactions.

## KEYWORDS:

Radiotherapy ■ Skin reactions ■ Best practice skin guideline

In England, over 275,000 people per year are diagnosed with cancer and more than half of these receive radiotherapy as part of their treatment (Delaney et al, 2005). One of the most common side-effects arising from radiotherapy are skin reactions, which can range from being mild (dull erythema and tightening of the skin) to severe (moist desquamation with open wounds and oedema). Some patients cannot tolerate radiotherapy, and develop severe skin reactions which increase their risk of mortality (Delaney et al, 2005).

The increased use of advanced radical treatments, such as intensity modulated radiotherapy, can also result in a higher number of patients experiencing skin reactions. It is estimated that approximately 87% of patients will experience a moderate to severe skin reaction (Harris et al, 2011)

There are various factors which affect severity of radiotherapy skin reactions including area of the body treated, dose of radiotherapy, number of fractions of radiotherapy delivered, concomitant treatment (i.e. chemotherapy), age and other patient comorbidities.

Radiotherapy not only involves specialist clinicians, but frequently includes hospital and community nurses who are often left to deal with the side-effects (Trueman, 2013). However, many nurses outside of specialist treatment centres have little or no knowledge of the effect of radiotherapy on the skin.

This article presents the preliminary findings from an ongoing study that aims to assess a best practice skin guideline for the management of radiotherapy-induced skin reactions. The guideline incorporates the use of a polymeric membrane dressing (PolyMem®, Aspen Medical, Redditch). Currently, researchers are evaluating the benefits of the dressing in relation to exudate control, reduction of inflammation and reduction of pain in 20 patients from a cancer centre (Mount Vernon Cancer Centre, Hertfordshire), who are being treated with radiotherapy to the head and

neck and have either dry or moist desquamation.

The challenge for the radiotherapy team at Mount Vernon Cancer Centre is to reduce further skin damage where possible and encourage successful healing.

## SKIN REACTIONS

The Radiation Therapy Oncology Group (RTOG) acute radiation morbidity scoring criteria is commonly used to classify skin reactions, which range from 0–4 (Table 1) (Cox et al, 1995).

Before this evaluation, the majority of patients in Mount Vernon with a RTOG score of 1–2.5 took between four and six weeks to heal.

## AIM

This study aims to evaluate if a polymeric membrane dressing is effective for the management of patients presenting with a RTOG score of 1–2.5 over a four-week period. In particular, to assess its performance in:

- ▶ Improving skin integrity
- ▶ Managing dry and moist desquamation
- ▶ Relieving pain and inflammation
- ▶ Improving quality of life for patients.

## METHODS

Written and verbal consent was obtained and patients could withdraw from the evaluation at any time. A bespoke evaluation form was used to capture detailed information on the patient's age, gender, radiotherapy dosage, nutritional status, cancer type and location, RTOG score, wound pain score and pain at dressing change.

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Patients were provided with a diary to keep a daily record of their wound pain score using a numerical and Wong and Baker Face scale (Wong and Baker, 1988). Patients were asked to describe pain related to disease or dressing change — pain medication and sleep patterns were recorded by the patients themselves. Sleep patterns were monitored by staff. The patients were asked to complete a personal 'free text diary' during the evaluation with qualitative information to represent the patient experience.

The study recorded ongoing baseline data and continued for a maximum of four weeks. Each week, the clinician documented the RTOG score, wound size, location and description, pain score of wound, pain associated with dressing change, and dressing wear time (maximum of four visits), or, whether the patient had healed or had withdrawn from the study. Regular meetings and training support was provided by the local company representative or clinical manager as required.

## RESULTS

A total of 20 patients were recruited — 17 men and three women — with a mean age of 56.8 years. All patients had a primary diagnosis of head and neck cancers. All patients recruited into this study had baseline data recorded that included type and location of cancer — 30% of patients had a primary diagnosis of squamous cell carcinoma (SCC) of the larynx.

### Standard treatment

The standard treatment for radiotherapy skin reactions at Mount Vernon Cancer Centre is aqueous cream at the start of treatment, with the addition of paraffin gauze for moist desquamation. It was suggested by the authors that patients receiving standard care took between four and six weeks to heal.

It has long been established that good nutrition aids healing (European Wound Management Association [EWMA], 2008). The nutritional status of patients entering this study was important, particularly as some were receiving

**Table 1: RTOG Acute Radiation Morbidity Scoring Criteria**

Score	Skin reaction
RTOG 0	No visible change to skin
RTOG 1	Faint or dull erythema; mild tightness of skin and itching
RTOG 2	Bright erythema/dry desquamation; sore, itchy and tight skin
RTOG 2.5	Patchy, moist desquamation; yellow/green exudate; soreness with oedema
RTOG 3	Confluent moist desquamation; yellow/pale green exudate; soreness with oedema
RTOG 4	Ulceration, bleeding, necrosis (rarely seen)

nutritional supplements via tube or percutaneous endoscopic gastrostomy (PEG). Eight patients (40%) were considered to have good nutritional status, while seven (35%) were being fed via a PEG system.

Radiation therapy is specifically designed for each individual patient, taking into consideration the type and location of the tumour, weight and general health. Once prescribed, the delivery dose is normally administered for up to six weeks.

**'Interestingly, the dose of radiation did not appear to have an impact on the severity of the skin reaction.'**

The majority of patients in this study did not show any signs of radiotherapy-induced skin reaction before five days of treatment. It was assumed that patients receiving higher doses of radiotherapy would have a higher RTOG skin reaction. The majority of patients (55%) in this study received 65G in #30.

### Radiotherapy-induced skin grading scale

A total of 13 patients (65%) presented with a RTOG score of 2, two with an RTOG score of 1, and a further five patients (25%) with a RTOG score of 2.5. No patients were rated as 3 or 4.

At Mount Vernon Cancer Centre it is common practice that the RTOG rating reflects the current skin condition, even though the national guidelines emphasise that patients who are given an RTOG score are classed as a 'healing RTOG 3, 2.5, 2, or 1' (Horsby et al, 2005).

For consistency, all RTOG scores remained the same as defined on baseline observation.

### Tissue types

Skin damage does not present immediately (Horsby et al, 2005; Harris et al, 2011; Trueman, 2011). However, all patients entering the study had an RTOG score of 1–2.5 (moist desquamation) — patients entered the evaluation when the skin broke down, i.e. 4–5 days after treatment commenced.

The tissue types were documented over the four-week period of the study by the nurses at Mount Vernon. Some patients were rated using three or more categories, for example dry, flaky, macerated, sloughy and crusting skin — particularly in more severe examples.

Interestingly, the severity of the skin reaction appeared to be more directly related to the nutritional status of the patients, rather than the radiotherapy dosage.

According to patient notes and clinical observation, the use of the PolyMem dressing in both dry and moist desquamation demonstrated significant reduction in skin reactions within the first week of treatment. One patient withdrew within two days of the study starting, as he could not tolerate any dressing.

By week two, a further two patients had discontinued as the skin remained dry and they no longer required dressings and no alternative dressing regimens were documented. By week three, four patients had tissue type listed as: infected, erythematous and moist desquamation. By week four, 75% of patients' skin reactions had healed.

## Time for dressing changes

The non-adhesive dressings were used throughout the evaluation and were adapted to suit the patients' needs, particularly with regards to fixation techniques and wear time. For example, PolyMem Roll Dressing is adapted for neck fixation and secured with a tracheostomy tube holder or fixed using tape to ensure a comfortable fit (guidelines available from Aspen Medical Europe).

With regards cost effectiveness, with any dressing this involves the time it takes to remove the dressing, cleanse the wound and reapply (Panca et al, 2013). Within the four-week evaluation period, 25% of patients were listed as having RTOG scores of 2.5, which meant the skin was broken with blisters or sloughy, crusting tissue present.

PolyMem has a unique surfactant and is impregnated with glycerine, which is designed to clean the wound when in contact with moisture. Two of the patients' records had not documented the amount of cleansing required, whereas 13 patients (65%) had their skin irrigated by nurses to clean it before dressing change. By week three, only six patients required cleansing, as the majority of patients had healed.

## Pain

Pain is a subjective element of the patient experience, particularly in wound care where a clinician's perspective of pain may be very different from that of the patient (EWMA, 2002). PolyMem is designed to reduce inflammation and pain during wear time. The inclusion of the surfactant within the dressing continuously cleanses the skin and means additional manual cleansing is rarely needed, making for easy and pain-free dressing changes.

The provision of glycerine within the dressings soothes and hydrates, further decreasing discomfort and pain and assisting healing post-treatment. Polymeric membrane dressings have been used successfully for patients with skin reactions graded RTOG 2 and above, both during and after treatment (Trueman, 2011). Similarly,

research has demonstrated that sodium ions contribute to the body's pain response and that polymeric membrane dressings absorb these ions from the outer layers of the epidermis (Khan, 1999), thus helping to ameliorate background (somatic) pain (Davies and White, 2011).

In this study, analgesia and sleep patterns were considered important elements of measurement. Clinicians were asked to complete a numerical pain score that was disease-specific and then related to dressing changes both on entry to, and during, the evaluation. Patients were encouraged to take an active role in this evaluation and were provided with a diary to keep a daily record of their wound pain score using a numerical and Wong and Baker Face scale. This included description of pain such as sharp/stabbing, burning, etc. Patients were asked to record whether they felt the pain was related to disease or dressing change. Patients were also asked to document any analgesia taken, and this was related to the World Health Organization (WHO) analgesic ladder (WHO, 1986).

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## **'The success of this study is reflected by the patients' involvement, with the patient diaries demonstrating a reduction in pain.'**

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One of the most significant findings in this study included the rapid decline in wound pain scores between weeks one and three, both on the numerical rating description and the Wong and Baker grades as listed by clinicians and patients.

It must be remembered that by week one, eight patients had healed, and one had withdrawn, leaving a total of 11 patients. By week two, two further patients stopped using the dressing and three had healed, leaving a total of six patients. By week three, a further two patients had healed leaving five patients continuing into week four. *Figures 1 and 2* show a comparison of pain at week one and week four.

The success of this study is reflected by the patients'

involvement, with the patient diaries demonstrating a reduction in pain over the period (*Figure 3*). It was not within the remit of this evaluation to establish whether the reduction in pain was related only to the dressings, but the diaries revealed a consistency, with comments supporting that it played a key part in the patients' overall pain reduction.

## Analgesia

In 1986, the WHO presented the analgesic ladder as a framework that physicians could use when developing treatment plans for cancer pain. Utilising this tool, patients were asked to record the time and type of analgesia taken and whether it had an impact on perceived pain and pain management. The majority of patients took a combination of codeine, co-codamol and paracetamol during the first 14 days. Only 4/20 took opiates. It was interesting to note that after two weeks, 11 patients had healed and did not continue to document their medication. It was not possible to establish whether the use of the dressing reduced the need for analgesia, although patient free text diaries included observations about pain reduction.

Oral mucositis (inflammation and ulceration of the buccal mucosa) is estimated to occur in 95% of patients diagnosed with head and neck cancer (Trotti et al, 2003; Sonis, 2004). This can be an extremely painful condition, reducing the patient's ability to take oral analgesia, eat or tolerate fluids. Mount Vernon Cancer Centre introduced Caphosol mouthwash (EUSA Pharma, Oxford) in January 2013. This had a significant effect on the level of analgesia taken by patients, and may contribute to the reduction in the use of opiates in this study.

## Sleep patterns

Sleep patterns are rarely considered in dressing evaluations. Being diagnosed with cancer can have a psychological impact on the patient and their family, and sleep is an important process that aids healing and is often linked to pain and stress (Colin, 2008). It was felt that if the dressings were able to reduce inflammation and pain, sleep patterns would improve.

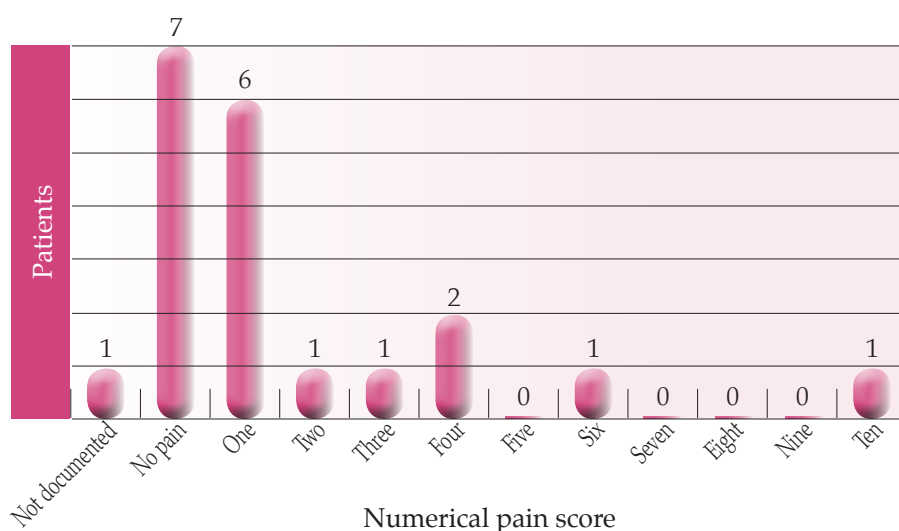


Figure 1.  
Dressing pain score, week one.

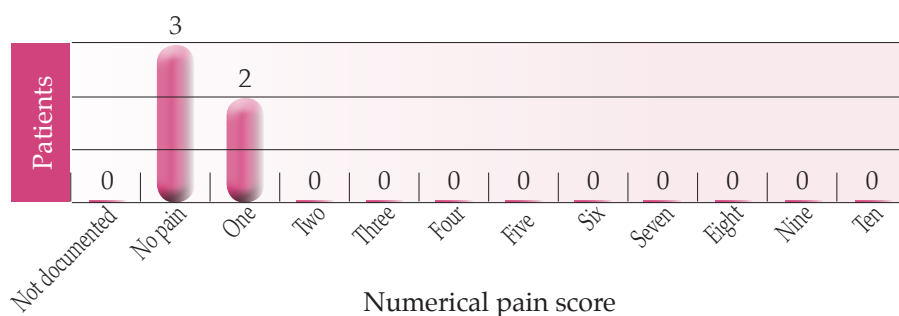


Figure 2.  
Dressing pain score, week four.

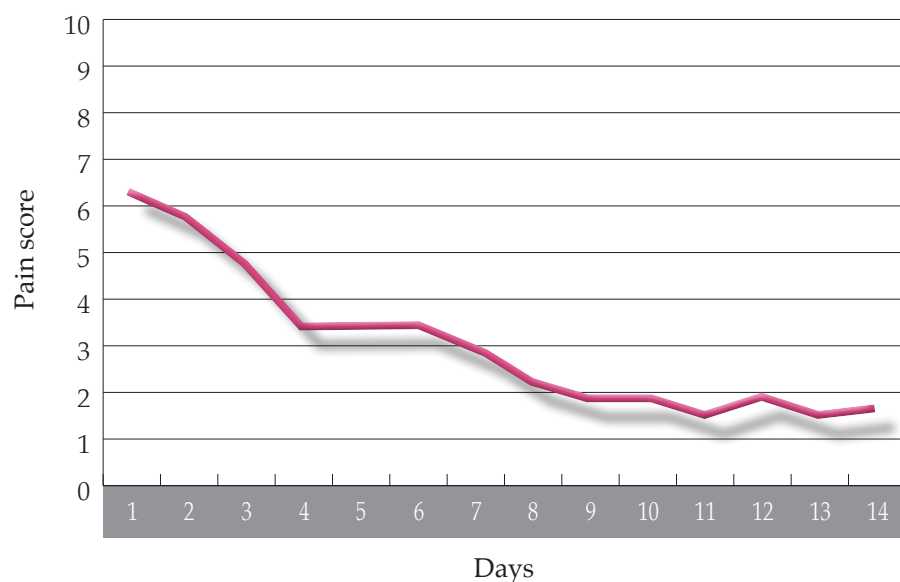


Figure 3.  
Mean patient score.

By day six, all patients that maintained the pain diaries were sleeping between four and eight hours. This record was reflected in the free text diaries.

### Free text diaries

The information gained from the free

text diaries gave a real insight into patients' experience. A total of 13/20 diaries were returned. The majority of patients were men with a mean age of 56. It was felt that these relatively young patients were keen to be part of the evaluation and to take an active role in the choice of dressings

applied. The main emerging themes (in addition to the pain diary scores) include descriptions of:

- ▶ Improvement in the skin
- ▶ Cooling effects when *in situ*
- ▶ Pain reduction.

Interesting comments related to adaption of the dressing and who applied it. The three women in this study all completed the diaries and documented their feelings more openly than the men, for example:

Patient 5; day three: *Bad in myself today, mostly weeping and sleeping, but neck feels a little better, left the dressing on.*

Patient 7; day 10: *Dressing changed by district nurse, some weeping, peeling skin, burning sensation when dressing removed.*

Patient 11; day 3: *When the dressing is removed within a short space of time the burn dries and hurts like hell, when the dressing is applied the relief is almost instant and the pain drops to 0.*

Patient 12; day 6: *As I said the dressing is a miracle when initially wet with sterile water it retains moisture throughout keeping the burn moist, pain unnoticeable except during dressing change my wife applied the dressing it was so easy.*

Patient 19: *I would highly recommend this dressing, when wearing for more than one day, used a small squirt of saline (2mls) this cooled the wound right down immediately great tip.*

## DISCUSSION

As previously stated, skin damage does not present immediately (Horsby et al, 2005; Harris et al, 2011; Trueman, 2011) and in this patient group, skin reactions were noted during weeks three to five. Also, the dose of prescribed radiation did not appear to have an impact on the severity of skin reaction, which was attributed to the underlying general health of the patients, although interaction with the dressing could not be ruled out.

Two patients withdrew, one by day two as he could not tolerate any



dressings on his neck; the second discontinued the evaluation at day six as the dressing was 'too hot'. There was no mention of whether the patients were offered an alternative dressing regimen.

At the start of this study, all patients had an RTOG score between 1 and 2.5 and 60% of patients had dry desquamation. By week two, 8/20 patients had completely healed and dressings were discontinued; by week three, 11/20 patients had healed and by week four, 15/20 (75%) of patients had healed.

Patient diaries were invaluable and provided an insight into the quality of life for these patients with common themes being:

- ▶ Increased sleeping hours
- ▶ Dramatic reduction in pain during wear time of the dressing
- ▶ Increased healing rates when compared to the standard treatment
- ▶ Patient and carers were able to change the dressings
- ▶ Reduction in medication.

Actively encouraging patients to take part in this project has given the authors valuable insight into the importance of involving patients from the start of any study. This is reflected in UK health policy, which has recently begun to focus on giving patients more choice in both the treatment and management of their conditions (Department of Health [DH], 2012).

The relatively low mean age of the patients who took part in this study was felt to be an important factor in their willingness and ability to play an active role in this evaluation of PolyMem.

## CONCLUSION

This study demonstrates the advantages of an advanced wound dressing for the treatment of patients presenting with radiotherapy-induced skin damage. In direct response to the evaluation, the use of aqueous cream and paraffin gauze for head and neck cancer patients (RTOG 2 and above) has been replaced by the polymeric membrane dressing (PolyMem) at

MountVernon Cancer Centre for patients presenting with radiotherapy-induced skin reactions of RTOG scores of 2 and above. This work forms part of an ongoing multicentre study to validate the efficacy of PolyMem within radiotherapy, the results of which can be used to develop a best practice guideline. **JCN**

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## KEY POINTS

- One of the most common side-effects arising from radiotherapy are skin reactions.
- The challenge for the radiotherapy team at Mount Vernon is to reduce further skin damage where possible and encourage successful healing.
- Many nurses outside of specialist treatment centres have little or no knowledge of the effect of radiotherapy on the skin.
- The information gained from the free text diaries gave a real insight into patients' experience.
- This ongoing study aims to assess a best practice skin guideline for the management of radiotherapy-induced skin reactions.
- This study details how the use of an advanced polymeric wound dressing in the treatment of radiotherapy-induced skin lesions can have benefits for the patient experience.