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Literature review

Management of erythema and skin preservation; advice for patients receiving radical radiotherapy to the breast: a systematic literature review

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Abstract

Objective: To systematically review and critically appraise all evidence on skin care advice and products tailored for patients receiving radical radiotherapy for breast cancer and to determine an evidence-based conclusion regarding the most effective products.

Data Resources and Review Methods: Major healthcare databases were searched with additional efforts made to hand-search current journals. All relevant literature fulfilling the inclusion and exclusion criteria was subjected to quality assurance checks. Those that passed underwent a more rigorous appraisal and were included in the review.

Results: Ten studies were identified as fulfilling the review criteria with regards to aims and quality. All were randomised controlled trials; three were double-blinded, three were single-blinded, the remaining were not blinded. Two addressed washing regimes, two addressed deodorant use, whilst the six remaining studies investigated creams, gels or dressings.

Conclusions: The results suggest that there is a place for creams in the management and delay of radiation-induced skin toxicities; however, research fails to highlight one product which has a demonstrable benefit over others whilst still being cost effective and free from adverse effects. Patients should not be discouraged from washing with water or mild soaps and results suggest that the restriction of aluminium-free deodorant during treatment is unnecessary; however, more research in this area is needed with larger sample sizes.

Keywords

Skin care; breast; radiation; review

INTRODUCTION

Erythema, dry desquamation and moist desquamation are recognised skin reactions that can occur as a direct consequence of radiotherapy. Despite advancements in skin sparing

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Table 1. A table outlining the RTOG Acute Radiation Morbidity Scoring Criteria as described by Cox et al (1995).[4]

Grade	Clinical presentation
1	Follicular, faint or dull erythema or dry desquamation. Decreased sweating.
2	Tender or bright erythema or patchy moist desquamation. Moderate oedema.
3	Confluent moist desquamation.
4	Ulceration or necrosis of skin.

techniques, skin reactions are still the most common side effect of radiotherapy, with as many as 95% of patients experiencing some degree of skin reaction.[1,2] Erythema is defined as redness of the skin due to dilation of dermal blood vessels.[3] The Acute Radiation Morbidity Scoring Criteria, established by the Radiation Therapy and Oncology Group (RTOG) in 1981, is still the foremost method for assessing and reporting radiation skin reactions (Table 1).[4]

Radiotherapy-induced erythema is caused by radiation damaging the mitotic abilities of cells within the basal layer. This weakens the integrity of the skin as cells are unable to replicate sufficiently to replace damaged tissue which ultimately results in breakdown of the skin. Skin reactions typically become visible after the skin has received doses of 20 to 25 Gray (Gy),[5] usually within the second or third week of a course of radical radiotherapy, when the patient is receiving a maximum daily dose of 2 Gy. A peak reaction is reached approximately 1 week after treatment completion.[2]

The severity of skin reactions are dependent on factors including volume of tissue treated, total daily dose, fractionation and individual factors such as the patient's smoking habits and whether they are diabetic or obese.[2,6] The impact of a skin reaction on a patient's quality of life is often underestimated by healthcare professionals. Moist desquamation can occur in the infra-mammary fold following breast irradiation, often having a significant impact on the physical and psychological well-being of patients. The reaction can be painful, unsightly and may prevent patients from wearing a bra. The Society and College of Radiographers (SCoR) guidelines[7] for the management of skin reactions advises against the use of deodorants and recommends that only mild soaps are used during treatment. Such restraints can often lead to feelings of self-consciousness associated with body odour.[5]

Standard advice given to patients encourages the daily application of ointments such as Aqueous cream to moisturise the skin and delay the onset of erythema.[7] During treatment patients are encouraged to wash their skin using tepid water and mild soap, rinsing thoroughly and patting the area dry with a soft clean towel. No adhesive tape or perfumed products should be used in the treatment area peri- or post-radiotherapy. One percent Hydrocortisone cream can be applied sparingly to pruritic areas.[8]

SCoR guidelines are intended to prevent exacerbation of the inevitable skin toxicity of radiotherapy.[1] Despite guidelines being in place, there appears to be a wide variation in skin care advice given to patients in radiotherapy centres nationwide regarding the type of creams and dressings which should be used to manage skin reactions. There also appears to be a variation in the washing advice given to patients during treatment. The aim of this study is to systematically review the evidence on skin care products, washing regimes and advice tailored for patients receiving radical radiotherapy for breast cancer, and to determine an evidence-based conclusion regarding the most effective products to manage skin reactions for these patients.

METHOD

The method used was structured around a 5-step framework described by Khan et al.[9]

Framing question

This details the necessary components of research questions. It includes a population, (a group of participants and their clinical problem), the intervention (the main action being considered), the outcome, clinical changes in

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health state and the study design. This is known as the PICO framework.[10] It can be utilised for both the research question and as a search strategy for literature selection.

Identifying relevant literature

A comprehensive search was carried out using major medical databases including CINAHL, MEDLINE, AMED, CENTRAL (Cochrane Central Register of Controlled Trials), DARE (Database of Abstracts of Reviews of Effects) and the British Nursing Index. The search period began in August 2009 and continued throughout the writing process to ensure any new relevant studies were included. The final search was undertaken in September 2010. Reference lists of relevant articles were reviewed to identify further studies. Hand searching of key journals was carried out to help identify up-to-date applicable articles. Key journals included *Clinical Oncology, Radiotherapy and Oncology, European Journal of Cancer Care, International Journal of Oncology, Biology, Physics and the Journal of Radiotherapy in Practice*. All literature searches were carried out by the two authors. The basic search terms used are included in Table 2.

Table 2. *The basic search terms utilised, including truncation used during literature searching*

Components of the literature search	Key search terms
Population	Breast$, Mammar$, Neoplasm$, Tumo?r$, Cancer, Carcin$, Radiat$, Therp$, Irradiat$ Therap$, Radiotherap$
Intervention	Cream$, Ointment$, Lotion$, Gel$, Dressing$, Topical Agent$
Outcome	Erythema, Desquamation, Skin toxicity, Skin Reaction, Acute Toxicity, Radiation Dermatitis

The search method and the search terms used were based on the results of a preliminary search; additional search terms were included to ensure comprehensiveness.

Only articles published in English were included due to translation of non-English language articles not being feasible (Figure 1).

The inclusion and exclusion criteria were integral to the refining process. Amendments were made during the search as the original criteria was found to be too restricting and led to a shortfall in literature within the research field of interest excluding articles which would have strengthened the conclusion (Table 3).

Assessing literature quality

The literature acquired was chosen using a quality checklist, ensuring the literature used was reliable and robust enough to support the conclusion. Only one reviewer assessed the quality of each article; this decision was based on financial constraints and the original format of the

1. Identify potentially relevant citations from liberal searching of electronic databases and hand searching (*n*=68).

   Exclude irrelevant citations after screening titles and abstracts (x*n*=43).Exclusion factors include: small sample sizes, abstracts not fitting the basic inclusion criteria of this review regarding population, intervention and study design.

2. Retrieve hard copies of all potentially relevant citations (*n*=25).

   Exclude irrelevant studies after detailed assessment of full text (x*n*=14).Exclusion factors include: bias, lack of inclusion criteria's, lack of randomisation methods and weak skin assessment methods.

3. Include studies in systematic review (*n*=10).

Figure 1. Refining process for the literature search to aid identification of only relevant literature, it includes the number of articles acquired (n) *and excluded with each step* (x*n*) *(adapted from Khan et al. pp 22*[9]*)*

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Table 3. The final inclusion and exclusion criteria utilised

Question component	*Inclusion criteria*	*Exclusion criteria*
The population	• Females with clinically diagnosed breast cancer receiving external beam photon radiotherapy to the affected breast/s. • Patients receiving adjuvant chemotherapy.	• Males with breast cancer • Patients receiving electron treatment alone. • Patients receiving cobalt treatment. • Patients with already established moist desquamation.
The interventions	• The use of any soap and washing detergent or comparative studies where no washing agents are used. • The use of creams or dressings used as a skin care method during radiotherapy. • The use of deodorants during radiotherapy.	• Products used solely to manage moist desquamation.
The outcome	• Post-radiotherapy skin appearance. • Peri-radiotherapy skin appearance.	
The study design	• Qualitative research. • Quantitative research.	

Table 4. The Quality Assessment Checklist utilised

Area	Representation within the text		
	Adequate	Inadequate	Unclear/unstated
Clinical question definition			
Selection criteria definition			
Description of radiotherapy technique utilised			
Generation of a random sequence for patient allocation to the interventions			
Allocation concealment			
Blinding			
Description of withdrawal			

article, as a university dissertation piece. The reviewer was not blinded to the journals used or the authors; however, no journal or author was excluded from the search and no preferences or prejudice shown in either area (Table 4).

Each area within the table above was designed to address each of the known biases that commonly occur within systematic reviews including selection, performance, measurement and attrition bias. Any other points of interest found within the articles were noted to help strengthen the review; similarly, any other areas of weakness within the articles were noted.

Summarising evidence

The aim was to display the characteristics of the literature chosen, grouping it into relevant categories, thus allowing trends to be seen and the findings tabulated.

Interpreting findings

The validity of the main findings were considered. The quality of the studies and any bias observed was analysed. Consideration was given to how this review could be applied to clinical practice; this being the review objective, to clarify and aid the procedure within clinical practice with regard to skin care advice given to patients with breast cancer (Table 5).

DISCUSSION

An initial literature search provided 68 research articles; however closer analysis highlighted a number of methodological limitations which

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Table 5. A summary of the research studies reviewed

Study	Study design	Intervention	Radiotherapy technique	Method of skin assessment	Results	Clinical comments
Heggie et al. (2002) (11)	Double-blind, randomised controlled trial	98% Aloe Vera gel ($n = 107$) vs. Aqueous cream ($n = 101$).	•External beam radiotherapy	•Morbidity rating scale •The Kaplan Meier actuarial method. •The Kruskall-Wallis test.	Grade 2 pain was experienced by 1% of the Aqueous cream group vs. 28% of the Aloe Vera group with a 95% confidence limit (95% CI) of 1.08, 3.47 ($p = .03$). Grade 2 erythema was experienced by 66% of the Aqueous cream group vs. 51% of the Aloe Vera group (95% CI 0.50, 1.01 and $p = .06$).	Appropriate interventions, good sample size, adequate blinding, good detail for participants discontinuing with the study. The study also investigated the influence of other factors such as breast size and smoking habits. Radiotherapy technique not clearly stated. Poor follow-up, 90% over the phone.
Wells et al. (2004) (12)	Randomised controlled trial	Aqueous cream (breast $n = 75$) vs. Sucralfate cream (breast $n = 77$) vs. no cream each with dry dressings or hydrogel dressings (breast n = 74).	•39–50 Gy (1.6–3.2 Gy/fraction) •Tangential opposed photon fields. •Some patients also received an electron boost to the breast.	•Modified Radiation Therapy Oncology Group (RTOG) acute toxicity scale. •Diastron meter using reflectance spectrophotometry. •Patient completed quality of life questionnaire, dermatology life quality index, patient diary card and 4 Likert-type scale questions	The RTOG mean reading was 1.29 vs. 1.24 vs. 1.34 for patients using Aqueous cream vs. those using sucralfate cream vs. no cream ($p = .41$). The mean erythema readings were 91.8 vs. 87.3 vs. 84.6 ($p = .41$).	Appropriate interventions, good sample size, diverse skin assessment methods. Double-blinded Phase 1, Phase 2 difficult to blind due presence/absence of dressings therefore participants could not be blinded. The study also investigated skin reactions in the head and neck region and anorectal area.
Boström et al. (2001) (13)	Double-blind, randomised controlled trial	Mometasone Furote and Diprobase ($n = 24$) vs. Diprobase alone ($n = 25$).	•54 Gy in 27 fractions (#) with 5 megavoltage (mv) energy beams. •Tangential pair fields •Patient arms were elevated, elbows flexed with a vac bag to support and immobilise the patient.	•Punch biopsies of breast tissue before and after treatment. •Digital reflectance spectrophotometer •Visual description of the skin using a basic acute toxicity scale. •Visual Analogue Scale •Photograph of the skin after 24, 34, 44 and 54 Gy and 3 weeks after treatment completion.	The mean total patient melanin index for the cortisone group was 4.1 compared to the emollient group which was 3.4 ($p = .0033$). The mean total patient erythema index for the cortisone group was 7.2 compared to the emollient group at 5.4 ($p = .0033$). There was no significant difference in pain ($p = .42$) or itching ($p = .0069$) between the two study arms.	Appropriate interventions, regular skin assessments with diverse skin assessment methods. Adequate blinding, detailed graphs, tables and diagrams. Use of a placebo group. Small sample size.
Pommier et al. (2004) (14)	Phase III, single-blinded randomised controlled trial	*Calendula officinalis* ($n = 126$) vs. Trolamine ($n = 128$).	•56 Gy in 26 # using 5 mv beams. •Post-mastectomy patients received 46 Gy in 23 # •Large breasted patients	•RTOG acute toxicity scale. •Visual Analogue Scale	Calendula was superior to Trolamine in preventing Grade 2 or higher skin reactions, 41% of patients experienced Grade 2 reaction in the Calendula group vs. 63% of the Trolamine	Appropriate interventions and inclusion/exclusion criteria. Single blinding well justified. Appropriate outcome measures. Treatment interruptions identified.

Table continues

Table 5. *A summary of the research studies reviewed* (continued)

Study	Study design	Intervention	Radiotherapy technique	Method of skin assessment	Results	Clinical comments
			received 10 mv beams. •Tangential pair fields		group (95% CI 37–46. p= .001). Grade 3 skin reactions were experienced by 7% of the Calendula group vs. 20% of the Trolamine group.	
Szumacher et al. (2001) (15)	Randomised Controlled Trial	Biafine cream ($n = 60$).	•50 Gy in 25 # •6 mv beams •Minimum 10 x 10 fields to the breast and chest wall. •No bolus or electrons included in the study.	•Skin assessment questionnaire and scored according to the National Cancer Institute of Canada.	Of the sixty patients entered in the trial only 1 patient reported grade 3 skin reaction or above during treatment, this increased to 3 patients following treatment. At 4 weeks post-treatment 83% had grade 1 or below skin reactions, 17% had grade 2.	No placebo or comparative intervention. Poor statistical support, no p-values or confidence interval stated.
Schmuth et al. (2002) (16)	Double-Blind randomised Controlled Trial	0.5% Dexpanthenol cream ($n = 11$) vs. 0.1% Methylpr ednisolone Aceponate ream ($n = 10$).	•56 Gy in 28# •8 mv beams •Tangential fields to the breast and chest wall. •2 participants received a boost of 4 Gy to the tumour bed using 14 mega-electron volts (Mev) electrons.	•Measurement of transepidermal water loss (TEWL) in four different areas weekly within the irradiated field. •Quality of life questionnaire.	Neither product reduced the incidence of radiation dermatitis compared to the incidence seen in the control group, they were however able to delay its emergence. Increased TEWL was less pronounced with the Methylprednisolone Aceponate cream group (125%) compared to with the Dexpanthenol cream group (136%) ($p = .05$). The Dexpanthenol group reported greater feelings of depression, embarrassment and discomfort compared to the Methylprednisolone Aceponate cream group.	Appropriate interventions. A preliminary cohort of patient were used as a control group. Small sample size. Useful participant flow diagram.
Campbell et al. (1992) (17)	Randomised Controlled Trial	No washing ($n = 47$) vs. washing with water alone ($n = 24$) vs. washing with mild soap and water ($n = 24$).	•45–47 Gy in 20#. •5 mv beam •Tangential opposed fields to the breast (or chest wall) including the axilla and supraclavicular fossa. •Electron boosts were given in some cases, these were given as 9 Gy in 3#.	•Weekly skin reaction assessment using a modified RTOG acute skin reaction scoring system.	Patients randomised to the washing groups experienced less itching than the patients in the non-washing group. More erythema was observed in the non-washing group with little difference seen between the two washing groups. Bolus increased scores	Appropriate interventions. Clear washing instructions for each group. Concordance rate given for the two skin reaction assessors, this was 83%. It was not possible to blind the participants. It was not stated as to whether the assessors were blinded.

Table continues

					in itching, erythema and desquamation ($p = .05$).	Results would be better displayed in a table. The graphs used were very simple which showed general trends but provided little numerical data.
Roy et al. (2001) (18)	Single-blinded Randomised Controlled trial	No washing allowed ($n = 49$) vs. washing allowed with water and mild soap ($n = 50$).	•45 Gy in 20# or 50 Gy in 25# •6 mv beams. •External beam, tangential pairs to the breast or chest wall. •24 participants also received local boosts with a median dose of 9 Gy in 4#.	•RTOG acute toxicity scale used by a blinded radiation oncologist. •Patient completed questionnaire with analogue-visual scales used.	57% of the non-washing group experienced Grade 2 skin assessments and 41% experienced Grade 1 skin assessments (95% CI 2.9−3.8), whilst 34% of the washing group showed grade 2 and 64% experienced Grade 1 skin reactions (95% CI 2.8−3.5) ($p = .04$).	Appropriate interventions. Clear inclusion and exclusion criteria. Appropriate outcome measures and reporting of results, detailed trial profile. Wide variety of soaps used, not regulated or recorded.
Théberge et al. (2009) (20)	Single-Blinded Randomised noninferiority trial	No-deodorant ($n = 44$) vs. deodorant ($n = 40$)	•42.56−50 Gy in 16−25#. •6 mv beams. •Tangential pair fields. •12 in the deodorant group received an electron boost. 16 in the no-deodorant group received a boost.	•RTOG acute skin toxicity scale. •Photograph of skin at beginning, end and 2 weeks after treatment •National Cancer Institute Common terminology criteria for adverse events, version 3.0. •European organisation for research and treatment of cancer quality of life questionnaire	Grade 2 radiodermatitis of the breast occurred in 30.0% of the deodorant group vs. 34.1% of the no-deodorant group (95%CI 12.65% and $p = .049$). Grade 2 radiodermatitis of the axilla occurred in 22.5% of the deodorant group and 29.5% of the no-deodorant group (95% CI 8.64% and $p = .019$). General discomfort was self-reported in 30% of the deodorant group and 34.1% of the no-deodorant group (95%CI 12.65 and $p = .049$). Reports of pruritis were greater in the deodorant group; however, quality of life was similar in both groups during treatment and 2 weeks after.	Appropriate interventions. Detailed tables. It was not possible to blind the patients but the skin assessor was successfully blinded. Diverse skin reaction assessment methods.
Gee et al. (2000) (27)	Randomised controlled trial	No-deodorant ($n = 16$) vs. Deodorant ($n = 20$)	•45 Gy in 20# •5 mv photons •97% also received an electron boost to the primary site.	•Assessment form adapted from the study by Campbell and Illingworth. •Questionnaire featuring the Rotterdam Symptom checklist	60% of deodorant users experienced a mild skin reaction compared to 81% of the no-deodorant uses (95% CI 0.6 and 13.5. $p = .71$) and 40% of the deodorant users experienced moderate/severe skin reactions compared to 19% of the no-deodorant group ($p = 1.0$).	Appropriate interventions. Small sample size and response rate. Takes into account the psychological aspect of treatment and the interventions. Detailed tables used.

n = number of participants

reduced comparability and resulted in 43 articles not being suitable for inclusion. Twenty-five potentially useful articles were identified. Common limitations found included studies failing to set substantive inclusion and exclusion criteria, with some studies failing to report either entirely. Methods of randomisations, blinding and recruitment were also often reported in insufficient depth. Many studies did not provide reasons for non-attendance at follow-ups whilst some of the literature appeared to lack data and justification for chosen study methodologies. Consequently, of the 25 articles only 10 articles were included in the final review; the 15 that were rejected were done so on the basis of methodological limitations. All the studies chosen fulfilled the basic requirements of the quality assessment checklist. Small but acceptable limitations were evident in six studies. These limitations included unclear skin assessment methodology, justification of patient allocation and scope for potential bias. Blinding of patients and skin assessors was varied amongst the studies. Four studies were not blinded at all,[12,15,17,27] this was justified in three of the studies by the interventions being investigated, for example, it was not possible to blind patients from their intervention when they were either using deodorant or not or washing or not. Three studies were single-blinded[14,18,20] and three were double-blinded[11,13,16]. Organoleptic properties of some ointments and dressings meant neither the patients nor the skin assessor could be blinded. It was felt that some studies could have successfully blinded their skin assessors however they failed to, which could have led to a degree of bias. These studies were still included in the review due to their high standard of quality elsewhere, they helped strengthen the conclusion; however, their potential for bias was fully acknowledged. It is recommended that future research should pay careful attention to their blinding techniques to ensure their results are more reliable.

A number of alternative skin assessment scales have been developed in an attempt to compensate for the simplicity of the RTOG scale.[5] Five of the studies reviewed used the RTOG scale to assess skin[12,14,17,18,20] with two of these adapting the original scale to overcome simplicity and provide more detailed assessment[12,17]. Both provided detailed descriptions of the changes made. Five studies did not utilise the RTOG scale,[11,13,15,17,27] instead they used alternative tools including skin assessments scales unique to their nation, reflectance spectrophotometry and measurements of transepidermal water loss. These four studies all identified the scale system and provided details with varying rigour.

Acknowledgment is given to the five studies which used quality of life assessment questionnaires. These give insight into how skin reactions and skin management techniques affect a patient's quality of life. The intention of these studies and this review was to discover a best care technique for managing radiation-induced skin reactions thus improving a patient's quality of life; it seems justifiable therefore to ask patients their opinions of these techniques. If patients are unable to tolerate the skin management technique despite improvement in skin reactions, the level of compliance would be poor thus failing to benefit the patient and possibly making promotion of this technique in a department futile.

One of the studies investigated skin reactions in multiple treatment areas including the breast. Its inclusion within this review was based on the quality of the study. It clearly outlined the number of patients with breast cancer included within the study and outlined their radiotherapy treatment. Further, their results were differentiated from the others. This particular study fulfilled all the desired quality assurance criteria. It was felt that it was inappropriate to reject a well-written piece of literature on the basis that it also included other radiotherapy treatments aimed at treating other forms of cancer besides breast cancer.

The SCoR guidelines recommend the use of Aqueous cream during treatment to moisturise the skin and delay the onset of erythema.[7] However, alternative research carried out suggests Aqueous cream can be counterproductive for numerous patients. Cork et al.[19] found that 56% of episodes of exposure to Aqueous cream were associated with an immediate cutaneous

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reaction in children using the cream for management of atopic eczema. Interestingly, they noted patients reporting reactions to Aqueous cream obtained in one part of the United Kingdom and not another. One explanation might be that Aqueous cream is provided by a number of manufacturers who are permitted to use different preservatives. Aqueous cream was originally a wash product rather than a "leave on" emollient. Ingredients such as antiseptics and surfactants are important and safe constituents of wash products because of their transient contact with the skin.[19] This review encountered one incidence of an adverse reaction to Aqueous cream, whilst reactions were also seen with other products. The studies reviewed reported 7 incidences of adverse reactions to emollients prescribed and 3 incidences of adverse reactions to corticosteroid creams. Where departments follow SCoR guidelines and use Aqueous cream, it should be recommended that practitioners be made aware of the risks of adverse reactions and how to identify them. Future research could focus on the preservatives contained in Aqueous cream nationally to determine how much variation there is and how this impacts on skin care and skin reactions.

Both studies investigating washing regimes concluded that washing was beneficial to patients and should not be discouraged; there was no reported difference between washing with or without mild soap in terms of acute skin toxicity. Washing with soap appeared to provide psychological relief to many patients. This supported the recommendation by the SCoR that patients should be allowed to use mild soaps throughout treatment. The literature search highlighted a lack of studies within this area of skin care.

Another area of skin care found to cause psychological distress is the restricted use of deodorant.[20] This area of skin care is also under-researched and would benefit from further investigation. At present a literature search identified only five studies focussing on this area of skin care.[20–22,26,27] Only two were utilised in this review.[20,27] One study was rejected because the study design was a laboratory-based study, this could not have been compared to any other study and it did not place enough emphasis on patient judgement. The other rejected study had a number of methodological flaws including insufficient data regarding radiotherapy techniques used, a lack of statistical support and detail of inclusion criteria. The final study was a literature review and survey. The survey, which provided important feedback from patients, however, was not comparative to any other study. The literature review reported the same number of articles in this area as was found with this review. All five studies advocate the use of deodorant safely throughout radiotherapy treatment despite most radiotherapy departments advising patients against it.

Four studies investigated the use of creams or gels containing anti-inflammatory properties compared with emollient creams. They indicated a slight benefit in terms of acute skin toxicity within the anti-inflammatory groups. Products containing anti-inflammatory properties included *Calendula officinalis*, Aloe vera and corticosteroid creams such as Mometasone Furote and Methylprednisolone Aceponate.

The use of corticosteroid creams is not routinely recommended due to the side effects associated with their use. They can cause thinning of the skin, increasing the risk of moist desquamation and the introduction and spread of bacterial infections. Patients should be advised on how to correctly apply the cream and be monitored, assessing for signs of bacterial infection.[23]

Five studies investigated the use of emollient creams. Upon analysis, all emollients appeared to have similar results with no considerable difference between products. This conclusion correlates with similar reviews carried in the last decade.[2,24,25]

The choice of skin care products used within departments is influenced by many factors. One study highlighted the significance of cost. According to the British National Formulary (BNF)[23] 100 g of Aqueous cream costs £1.36 whilst corticosteroid creams are as expensive

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as £12.82 for 100 g. There is also a noticeable difference in price between emollients. Other factors motivating departmental choice include organoleptic qualities of the products. Three studies identified patient preference influenced by the smell, texture and colour of creams or gels.

CONCLUSION

Of the 10 skin care ointments investigated within the 10 research articles, no one product appeared to have an overall benefit over others. Although patients using corticosteroid creams had a slight increased benefit in terms of erythema, its use is not routinely encouraged due to side effects.

Evidence suggests that patients should not be discouraged from washing and mild soaps should be permitted. Similarly, the use of non-metallic deodorants does not seem to have a detrimental effect on patient's skin reactions; also, patient feedback suggests that the restriction of deodorant use can psychologically harm some patients.

Future research could be strengthened by developing universal methods of skin assessment and ensuring that wherever possible participants and assessors are blinded to the interventions being used.

Radiotherapy departments should be encouraged to follow evidence-based guidelines with regard to support and management of skin reactions rather than provide advice based on tradition and cost.

Recommendations for future areas of research include variations in Aqueous cream ingredients and more extensive research into the use of deodorants throughout radiotherapy for breast cancer.

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