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Original article

An investigation into the use of a non-metallic deodorant during radiotherapy treatment: a randomised controlled trial

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Abstract

Introduction: Many patients in the United Kingdom having radiotherapy for breast cancer are recommended not to use a deodorant during treatment. The advice is not evidence based, it is solely thought as deodorants contained metals, which would react with radiation and cause an increased skin reaction. Hence this research was undertaken to establish whether patients having a course of radiotherapy for breast cancer could use a deodorant as part of their daily routine.

Method: The research took place between May 2004 and February 2005. A total of 192 breast cancer patients were recruited. This included breast or chest-wall patients with or without axilla involvement. The study was designed with two groups. Group 1 used no deodorant and Group 2 a specific deodorant. The researcher reviewed patients weekly, assessing skin reactions and recording the researcher and patient's observations.

Results: Most patients experienced no reaction or mild erythema and dry desquamation in the axilla. This was observed in both groups. Therefore, findings of this study indicate that future breast cancer patients should be given the choice of using this deodorant.

Further recommendations: Test the reliability of the skin assessment form, extend the research to include other patient groups who have their axilla treated, test different deodorants.

Keywords

Breast cancer; radiotherapy; non-metallic deodorant; axilla; skin reactions

INTRODUCTION

A course of radical radiotherapy for breast cancer can last between 4 and 5 weeks. During this period patients are advised not to use a deodorant. This advice still given by many radiographers, nurses and doctors to patients in the United Kingdom is not evidence based but stems from the knowledge that many deodorants contain metallic particles (such as zinc) and when these deodorants are irradiated it may increase a skin reaction due to the photoelectric effect.[1] Since the development of linear accelerators that work at megavoltage energies, the photoelectric effect is not prevalent.[2,3] Also at megavoltage energies it is thought damage would occur in a forward direction and not at the skin surface[4] and therefore these deodorants should not increase a skin reaction.

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Nevertheless, many deodorants that are widely used contain other chemicals such as perfumes which can cause irritation thereby potentially increasing a patient's skin reaction regardless of the radiotherapy treatment. Therefore, the researcher chose a deodorant that was 'natural' and non-perfumed as well as non-metallic with the hope that it could be used during radiotherapy without causing an increase in skin reaction as well as appealing to patients. The deodorant used was a crystal, made of the mineral Tschermigite (also known as ammonia alum). The manufacturer advertised the deodorant as having excellent deodorant protection, did not block pores, contained no aluminium chlorohydrate or aluminium zirconium, non-perfumed and suitable for sensitive skin. The action of the deodorant is to inhibit bacterial growth on the skin, which causes odour, unlike antiperspirants that block the pores and mask the odour.[5]

Gee et al.[6] had previously carried out similar research; however, this researcher aimed to recruit a larger number of patients to get results of statistical significance.

PATIENTS AND METHOD

Patients

When ethical approval was granted, the researcher targeted all women receiving post-operative radical radiotherapy for cancer of the breast (including ductal carcinoma in situ) with or without treatment to the axilla. Patients not having their axilla treated were deemed valuable by the researcher because the superior border of treatment fields is usually at the level of the suprasternal notch and with a divergent beam it was possible that axillary reactions may have been seen.

Inclusion criteria included that the women could speak English and understand the written word in order to give informed consent for the study. Convenience sampling was used as it meant that all patients in the researcher's department who matched the inclusion criteria were given a Patient Information Sheet about the study at the start of their treatment.

A power calculation was performed using computer software to indicate how many patients were needed in the study. The calculation showed that up to 100 patients needed to be recruited for each group (deodorant and no-deodorant) to achieve 83 complete sets of data in each group. This number of patients was sufficient to provide 80% power to detect a difference between the two groups. The power calculation was based on the results by Gee et al.[6]

Method

The present study was a randomised controlled trial which had two groups: one group that used no deodorant (current department protocol) and another group that used a specific non-metallic deodorant. Randomisation was carried out before recruiting patients. Patients were consented to be in the study and then informed of their randomisation group. Patients in the deodorant group were given instructions for its use.

It is worth to note that in this study patients were recruited regardless of potential risk factors for skin reactions such as chemotherapy, use of bolus and breast size. The researcher made a decision that equal amounts of different variables would be in each group with a large sample.

The researcher reviewed patients weekly under similar conditions aiming to reduce intra-observer reliability. The rooms had bright lighting so the researcher and patient could clearly see skin reactions. The researcher was 'blind' as to which group each patient had been allocated to also reduce bias.

Skin reaction data were collected by the researcher and recorded on a skin assessment form. The form was double sided for the researcher's observations and the patients. The assessment form was recording the levels of erythema, desquamation, area of skin reaction, any additional symptoms and skin products used. The highest level of reaction was recorded for each category. The levels of erythema and desquamation were based on the Radiation Therapy Oncology Group (RTOG) scale.[7] In the final review the patients received a short questionnaire about their deodorant usage.

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Analysis

Data collected from the skin assessment forms were entered into a spreadsheet. The SPSS version 11 computer software was used to perform statistical analysis (χ^2-test) and produce p values. The p value was set at 0.05. The researcher entered the quantitative data from the deodorant questionnaire into a spreadsheet and descriptive statistics were produced. The qualitative data produced by the 'additional comments' on the questionnaire were analysed into themes, in this case positive, negative and ambiguous themes about the study.

RESULTS

The research took place between May 2004 and February 2005. During this time 192 patients were recruited and subsequently consented into the study. Two patients withdrew from the study after consenting. Data from 190 patients were analysed. There were 99 patients in the no-deodorant group (Group 1) and 91 patients in the deodorant group (Group 2). Within each group were 15 patients who were also having prescribed axilla treatment.

Skin reactions

The researcher analysed the maximum grade of reaction experienced during the course of treatment. The skin reactions were graded either as Grade 0 = no reaction, Grade 1 = faint erythema and dry desquamation, Grade 2 = tender/bright erythema and early signs of moist desquamation or Grade 3 = moist desquamation.

Tables 1 and 2 show the maximum skin reactions in the axilla as rated by the patient (Table 1) and the researcher (Table 2). They include all of the patients regardless of whether the axilla was treated and also the results were separated out to show those patients who had prescribed axilla treatment. There appears to be higher grades of reactions in the no-deodorant group; however there is an insufficient number of patients. *P* values have not been included because of the small sample size.

Patients scoring of their maximum grade of skin reaction in the axilla (Table 1) shows Grade 1 to be the predominant reaction seen in both groups in the patients who had prescribed axilla treatment (no-deodorant group = 60% and deodorant group = 46.7%). The patients rated grade 2 as their maximum reaction, with 27% of the no-deodorant users (within the prescribed axilla treatment group) compared to 6.7% of the deodorant group.

Table 2 shows the researcher's ratings for the maximum level of skin reaction in the axilla. Grade 1 was the most common experienced skin reaction in the no-deodorant group and grade 0 in the deodorant group. Grade 3 was experienced more in the no-deodorant group (6.7%) than the deodorant group (0%) for prescribed axilla treatment.

Areas of skin reaction

The areas of skin reaction were recorded as either the whole breast or chest wall, under breast, axilla or other. The scores given to the areas corresponded with the grading of erythema and desquamation, e.g., Grade 0 = no skin change.

The axillary reaction results were particularly important for this study, as this was the area where the deodorant was applied. However, it is worth noting that 30 patients in this study also had prescribed axilla treatment. Figure 1 shows the patient and researcher ratings for the 'no-deodorant' and 'deodorant' groups; it includes all patients regardless of whether the axilla was specifically treated. The axilla, in both the deodorant and no-deodorant groups, scored predominantly Grade 0 and 1 reaction. Although patients did not receive many moderate or severe reactions in the axilla, the no-deodorant group as rated by the patient and researcher experienced more than the deodorant group. The χ^2-test could not show significant difference between the axilla reaction in the deodorant and no-deodorant group.

Deodorant questionnaire

Sixty-three questionnaires were given out, and 27 (43%) patients had used the deodorant. The feedback given by these patients was they all found it easy to use, they would use it again and they would have preferred it to none. The

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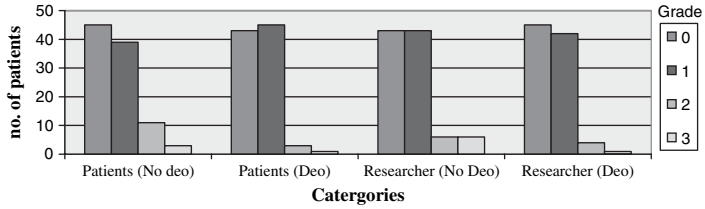

Figure 1. Graphical representation of axillary reactions (with or without axilla treatment) for deodorant and no deodorant users (Patient and researcher ratings)

additional comments were categorised into positive, negative and ambiguous themes. Patients made 14 comments in the no-deodorant group and 30 comments in the deodorant group. Patients in the no-deodorant group made 57% positive comments, for example 'would have liked to use the deodorant', 'deodorant boosts morale and smelling bad is just one more thing to get you down' and 'I am very self conscious and I missed the feel good factor which I'm sure would have helped me cope better over the last 5 weeks'. Fourteen percent were negative comments such as 'coped without using a deodorant'. Twenty-nine percent were ambiguous comments such as 'in future would only use aluminium free deodorant'.

Eighty-three of comments made by patients in the deodorant group were positive such as 'excellent deodorant', 'no stickiness', 'no stains left on clothes', 'keeps you dry' and 'fragrance free yet still effective'. One patient was 'pleased to have had the opportunity to participate in the study'. Negative comments (7%) made by the deodorant group were 'having to dampen the deodorant with water made it messy' and 'study deodorant hard even when made wet'. There were some ambiguous comments (10%) such as 'not easy to find in shops'.

DISCUSSION

The majority of patients in the study experienced a Grade 0 reaction or Grade 1 in the axilla.

Both the researcher and patients' scorings demonstrated that the majority of patients experienced Grade 0 or Grade 1 reactions in the axilla for both the deodorant and no-deodorant groups. The present study results do support previous researchers' work[6,8–9] that also found that Grade 1 skin reactions were most commonly seen in breast cancer patients. Comparisons with other skin reaction studies would be made easier if the same skin assessment tool was used throughout.

Since the development of linear accelerators and the subsequent skin sparing effect, the skin receives less than the 'Orthovoltage era' where skin received 100% of the dose.[10–11] Therefore, less severe skin reactions were expected.

Added to this knowledge, Burch et al.[12] showed when topical agents such as deodorants were irradiated and there was no significant bolus effect. Some countries such as Canada have used this evidence so that in clinical practice patients can use deodorant. However, as Burch et al.[12] acknowledged, chemical irritants may be in topical agents which could cause an increased skin reaction but as their study was not undertaken on humans this effect is not known. The present study used an esoteric natural deodorant suitable for sensitive skin to help reduce the chemical irritant factor.

Findings showed that severe skin reactions were mainly seen under the breast and any severe reactions in the axilla were more in the no-deodorant group. Similar results were seen in washing studies[8,13] that showed a higher level of skin reaction in those patients not allowed to wash during radiotherapy. It was suggested that washing the treatment area eliminated the bacteria, which could potentially cause a skin reaction.[8,13] The non-metallic deodorant used in the present study has bacteriostatic properties, thereby eradicating the bacteria that cause odour.[14] This may also have had an effect on the skin reaction. However, Gee et al.[6] found that the deodorant group experienced worse

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reactions than the no-deodorant users. Nevertheless, those results were from a much smaller sample size (36 patients) and a different deodorant was used.

As patients were not allowed to use a deodorant, they may have compensated on cleanliness by increasing the frequency of washing. Although all patients were advised to wash the area carefully, if the no-deodorant users washed more frequently it could have caused increased friction and irritation to the skin. Patients knew whether they were in the no-deodorant group because there was no placebo. Unintentionally some patients may have felt they had a worse reaction because they were not using the deodorant. However this did not explain the researcher results, as the researcher was 'blind' to the groups.

The researcher separated out the data for patients also having prescribed axilla treatment (Tables 1 and 2) as it could be argued that patients having just their breast or chest wall treated are not having the axilla treated. However, it is justifiable to use these patients and gain valuable data about axillary reactions because the superior border of the treatment field lies at the level of the suprasternal notch and also with beam divergence axillary reactions could possible be seen.

Researcher versus patients scoring

The researcher and the patients scored reactions differently. The researcher would have had a better view of the reaction and also had professional knowledge and experience which was drawn upon when assessing patient's skin. Conversely, patients had no prior training on assessing skin reactions and therefore would have based their scores on their own perception such as how long it had lasted, how bad they felt it was and how much it affected their lives.[11] If patients perceived it not to affect them greatly they may have reduced the scores. Some individuals felt better using the deodorant; one patient called it 'a feel good factor' therefore may not have rated their skin reactions as highly. Wells et al.[15] found breast

Table 1. *Patient ratings for the maximum level of skin reaction in the axilla where the deodorant was applied*

	Grade 0	Grade 1	Grade 2	Grade 3
No Deodorant				
All patients (axilla + no axilla treated)	45/98 (46%)	39/98 (40%)	11/98 (11%)	3/98 (3%)
Axillary treatment (all patients who also had prescribed axilla treatment)	2/15 (13%)	9/15 (60%)	4/15 (27%)	0/15 (0%)
Deodorant				
All patients (axilla + no axilla treated)	43/92 (47%)	45/92 (49%)	3/92 (3%)	1/92 (1%)
Axillary treatment (all patients who also had prescribed axilla treatment)	7/15 (46.7%)	7/15 (46.7%)	1/15 (6.7%)	0/15 (0%)

Table 2. *Researcher's ratings for the maximum level of skin reaction in the axilla where the deodorant was applied*

	Grade 0	Grade 1	Grade 2	Grade 3
No Deodorant				
All patients (axilla + no axilla treated)	43/98 (44%)	43/98 (44%)	6/98 (6%)	6/98 (6%)
Axillary treatment (patients who had prescribed axilla treatment)	1/15 (6.7%)	10/15 (66.7%)	3/15 (20%)	1/15 (6.7%)
Deodorant				
All patients (axilla + no axilla treated)	45/92 (49%)	42/92 (46%)	4/92 (4%)	1/92 (1%)
Axillary treatment (patients who had prescribed axilla treatment)	8/15 (53%)	6/15 (40%)	1/15 (7%)	0/15 (0%)

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cancer patients in their study also assigned a better score to the skin reaction than the researcher. The researcher observed how patients often could not feel moist desquamation unless it was a large sore area, especially when it was located under the breast. If they could not feel a severe reaction their perception of their skin must have been positive one, as it was not affecting them. However, levels of symptom distress or quality of life were not measured to obtain more information about patients' perceptions of their health. Had this information been collected it may have reinforced the perception that 'radiation skin reactions are relatively inconsequential'.[3] If patients had been given a mirror for the examination they may have scored differently.

CONCLUSION

For many people deodorant is part of their daily routine because it is associated with cleanliness, personal hygiene and therefore social acceptance. In this study, patients commented they 'would have liked to use a deodorant' (patient 6) and 'it was a stressful time and deodorant would have helped' (8) and those who used deodorant said 'excellent' (15) 'effective' (21) and 'will continue to use in future' (16). Comments like those are encouraging because the present study has demonstrated that the deodorant used on breast cancer patients during their treatment has not caused an increased skin reaction.

The results of this study are useful because it was a large (190 patients) single-blinded randomised controlled trial. Although no statistical significant difference was proven between the two groups, this implies there was no difference between those who used the deodorant and those who did not. Those patients who also had their axilla treated, although only a small sample showed a similar result to the 160 patients who had their breast or chest wall treated. Therefore, the non-metallic deodorant could be offered to future breast cancer patients.

Further findings from the study can add weight to advocating the use of deodorant. First, the majority of skin reactions seen were Grade 0— no reaction or Grade 1 (faint/dull erythema and dry desquamation). Patients did not typically experience moderate or severe reactions (Grades 2 or 3). Second, when Grade 3 was observed, it was predominantly under the breast not in the axilla where the deodorant was applied.

Radiotherapy skin care protocols, written information and advice can now be changed in UK practice for breast cancer patients so that they receive up-to-date information when they start radiotherapy. The researcher questioned the original anecdotal information (no deodorant to be used during radiotherapy) and the results produced can now make skin care advice evidence based.

Although this was a large study, which answered the research question, further work could look at the reliability and sensitivity of the skin assessment form. Researchers could also test the possibility of using the deodorant for other patient groups who have their axilla treated. Furthermore, as this study has shown that this deodorant can be used during radiotherapy; further research could trial the use of any deodorant which may be more accessible and at a lower cost.

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