An audit of the Chabner Bra breast immobilisation device for large breasted patients who require external breast radiotherapy treatment

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Introduction

Despite the increasing complexity of breast radiotherapy planning and delivery techniques in recent years, progress of breast patient positioning to compliment this has largely remained absent (1). Patients with large or pendulous breast tissue often present both technical and skin toxicity radiotherapy challenges, predominantly due to the increase in breast tissue overhang in the infra-mammary fold (2). Specifically designed radiotherapy bras have recently been developed to address such challenges, whilst also aimed at improving patient experience and dignity.

Intervention

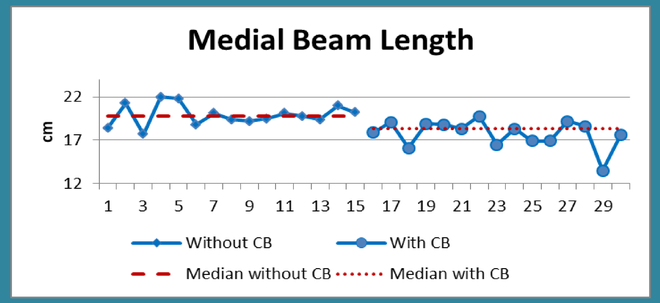
The Chabner Bra (CB), a specifically designed radiotherapy bra, was implemented for large breasted women. An audit was undertaken to assess the impact of the CB on radiotherapy breast immobilisation.

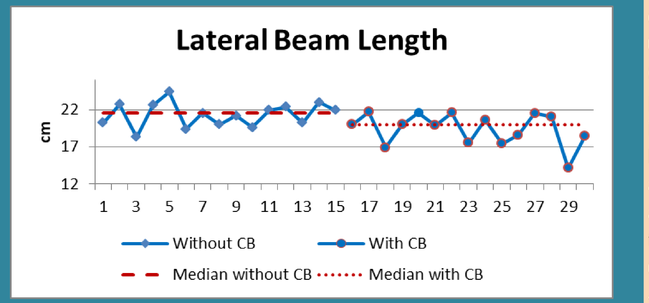
Quality Measure Indicators (QMI)

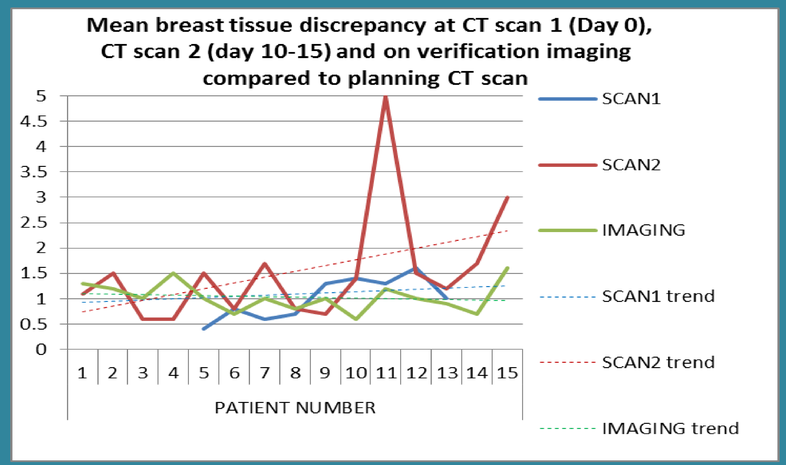
QMIs were collected for patients before and after the CB was introduced.
QMI 1: Field length (cm) of breast radiotherapy tangent fields.
QMI 2: Reproducibility and integrity of CB from CT planning scan to end of radiotherapy treatment.
QMI 3: RTOG skin toxicity score throughout radiotherapy treatment.

Method

The following quantitative metrics were collected retrospectively using patient records for 15 patients with no immobilisation device and 15 patients with the CB: average field length, reproducibility and skin toxicity. For patients wearing the CB, 2 additional CT scans were scheduled (scan 1 on day 0 and scan 2 between fractions 10-15). Women were eligible for inclusion in the audit if their breast tissue overhang was measured as 1.5cm or greater in any direction. Local ethical approval was obtained.







Results

QMI 1: Mean field length was reduced by 2.1cm for the medial tangent and 1.9cm for the lateral tangent, in patients who received radiotherapy with the CB (see graphs).
QMI2: CT scan 1 (day 0) mean breast tissue discrepancy (measured in any direction) was 0.7cm, increasing to 0.8cm at the CT scan 2 (fraction 10-15), when compared with the CT planning scan. Twice as many verification images were taken for patients with the CB. Mean breast tissue discrepancy of 0.87cm and 0.57cm was measured for patients with and without the CB (respectively) on treatment verification imaging.
QMI3: RTOG2.5 skin toxicity was recorded in 4 patients with the CB and 3 patients with no immobilisation device.

Conclusion

The use of a specifically designed radiotherapy bra can significantly reduce field length without increasing skin toxicity. Whilst reproducibility with the CB was slightly inferior compared to where no immobilisation device was used, it still met local imaging protocols and overall, the integrity of the CB throughout the radiotherapy treatment was considered acceptable. Variations in reproducibility may be improved by additional staff training in both CB fitting and online image review.

Limitations

Two entirely separate patientcohorts were used to gather the data on CB compared to no immobilisation device (predominantly due to ethical constraints). The demographic differences between the 2 patient cohorts could have affected the results.
Staff training on CB fitting was limited initially. Adjustments to fitting practice evolved over the course of the audit and this may have influenced reproducibility.

References

1. Probst, H., Bragg, Green, D. and Hart, J. (2014) A systematic review of methods to immobilise breast tissue during adjuvant breast irradiation. Radiography. 20 (1), pp.70-81.
2. Montgomery, L., Flood, T. and Shepherd, P. (2020) A service evaluation of the immobilisation techniques adopted for breast cancer patients with large and/or pendulous breasts receiving external beam radiotherapy. Journal of radiotherapy Practice, pp. 1-6.