Background

After reproducibility issues and BDS fit issues with several H&N patients it became a departmental goal to improve these set ups. We found regularly that due to tension during BDS making, patients would often pull their shoulders up, however when on treatment and more relaxed their shoulder position varied within the BDS. As a result leading to reproducibility issues with H&N setups.

Several improvements were identified. One of these being Hand poles which are designed to help pull patients shoulders down as far as comfortably achievable at the BDS manufacturing stage. This should then prevent patients from being able to relax their shoulders down any further during treatment.

Due to various reasons other potential solutions were discounted and Hand poles were identified by this group as the most cost effective, readily available improvement that could be manufactured in house.

The Hand poles have been successfully used within the department already and a robust prototype made. To justify larger scale use of the Hand poles, this study has been set up to further identify the potential benefits to reproducibility when using Hand poles.

Method

The inclusion criteria was patients diagnosed with H&N cancer and requiring Radiotherapy planned using local protocol TP CP-20 and H&N imaging decision tree TV GD-14. These protocols dictate that patients receive Volumetric Arc Therapy (VMAT) planned treatment using Kilovoltage (kV) and Cone Beam Computed Tomography (CBCT) daily image verification.

Patients who met the criteria were identified at their CT localisation appointment and approached to participate in the service development project by a member of the research team. This was done via an information sheet and written consent form. Verbal consent was also accepted initially to minimise disruption to the CT appointment with written consent being obtained post CT.

It is already normal practice for patients to pull their shoulders down as far as comfortable during BDS making. This is currently only achieved by the patient using no aids what so ever, allowing for the possibility of patients raising their shoulders during the making of the BDS. In this project 10 patients were setup using the Hand poles to aid in achieving reproducible shoulder positioning (see Figure 1).

The effectiveness of this was measured by checking the BDS fit at the CT Planning scan using a 1-10 scale (1 being a good fit and 10 being a poor fit) with a comments box being provided to highlight specific issues. Additionally, any gaps visible on the CT planning scan were measured by the study radiographers. The same process was then repeated on the participants first day of treatment using half fan CBCT imaging (see Figure 2) and the same 1-10 assessment scale, thus giving numerical data for comparison.

Results

The results obtained from CT & treatment were compared and tabulated to check Hand poles reproducibility (see Figure 3). These were then compared to 10 anonymous non-Hand poles patients of comparable treatment site and technique in order to provide further evidence and comparison data (see Figure 4).

Discussion

With the importance of reproducibility in H&N Radiotherapy it can be argued that the results show an improvement in shoulder position consistency when using Hand poles. Based on this, the use of hand poles has become part of normal practice locally with larger scale data to be audited at a later date.

Aims

The principle aim of this service evaluation project is to provide quantitative evidence that using Hand poles improves reproducibility and the BDS fit in H&N Radiotherapy patients. As a result of this, we aim to further improve the accuracy of our local Radiotherapy techniques. Which we hope going forward will enable us a workforce to reduce the requirement for further BDS production/rescans, reducing the concomitant radiation dose and its associated risks.

References