

Implementing Oesophageal Brachytherapy at Imperial College Healthcare NHS Trust

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A new treatment pathway for the palliative treatment of oesophageal cancer with HDR brachytherapy was developed and commissioned at Imperial College Healthcare NHS Trust, with the first clinical patient treated in March 2020.

As part of the implementation of this treatment, commissioning of the applicator and planning process was performed by the physics team and a training program was developed by the treatment radiographers to ensure competency in the treatment process.

Planning and Treatment Technique

- The treatment is delivered using a bronchial catheter (Lumen Care Azure 5F x140cm for Flexitron) inserted into a nasogastric (NG) tube.
 - A measurement of the length of NG tube outside of the patient is done after the insertion and before any imaging.
 - To confirm the position of the applicator (making sure that the NG tube has reached the stomach) a Phillips Pulsera C-arm is used.
 - A CT scan (1.0mm slices) is performed with a marker wire inserted, which determines the dwell positions during the planning process into the catheter for planning.
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- ❑ The standard dose prescription is 10Gy in a single fraction to 1cm from the source axis.
 - ❑ The catheter is reconstructed in the Oncentra Brachy treatment planning system using the marker wire
 - ❑ Non-weighted dwell positions are chosen appropriately to cover the PTV with a cigar shaped dose distribution (see figure 2).
 - ❑ The dose is normalised at an array of four points 1cm from the centre of the catheter, located at the mid-point of the PTV.
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- ❖ Before treatment the measurement of the NG tube outside the patient is checked to ensure that there has been minimal movement since the CT scan
 - ❖ The plan is delivered by the Flexitron HDR Brachytherapy system

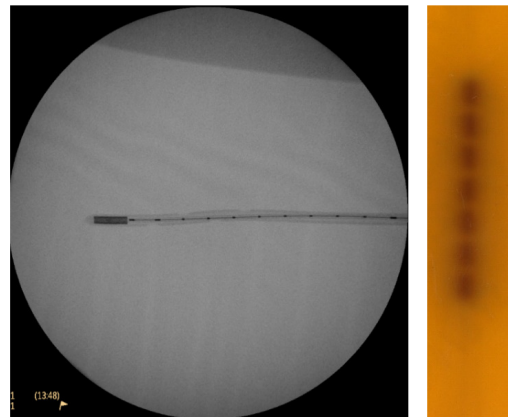


Figure 1 – C-arm image of marker wire in NG tube (left) and gafchromic film of end to end testing

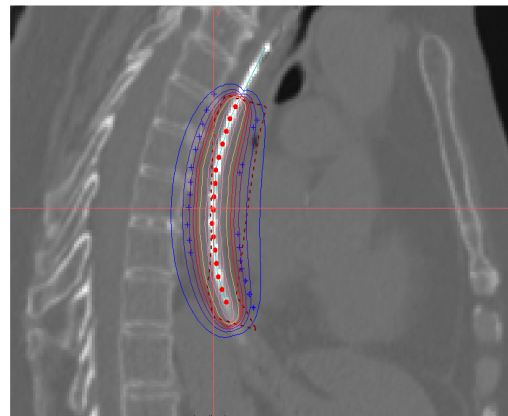
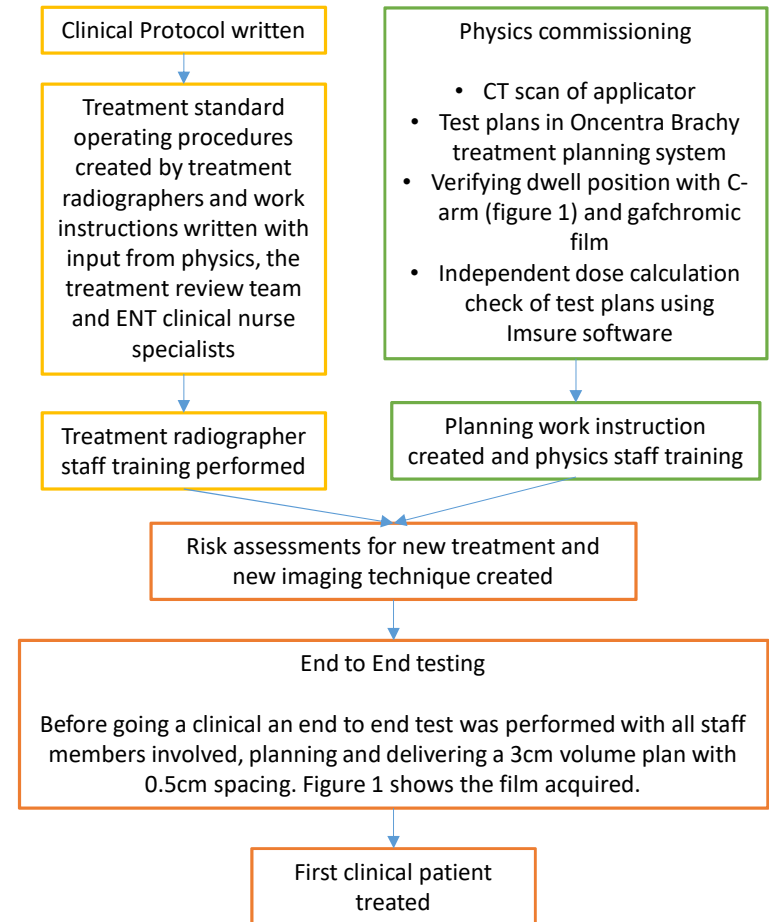


Figure 2 – Cigar shaped dose distribution oesophagus plan

Implementation Flowchart



Radiographer staff training program

The core radiographer brachytherapy team received training for clinical use of the C-arm from a Phillips clinical application specialist. They also undertook e-learning on NG tube placement and completed an assessment to ensure they were competent in identifying the correct placement of an NG tube from images. For radiographers rotating through brachytherapy, a comprehensive training package was revised to include observing and demonstrating competency under supervision for this technique before being signed off as competent.