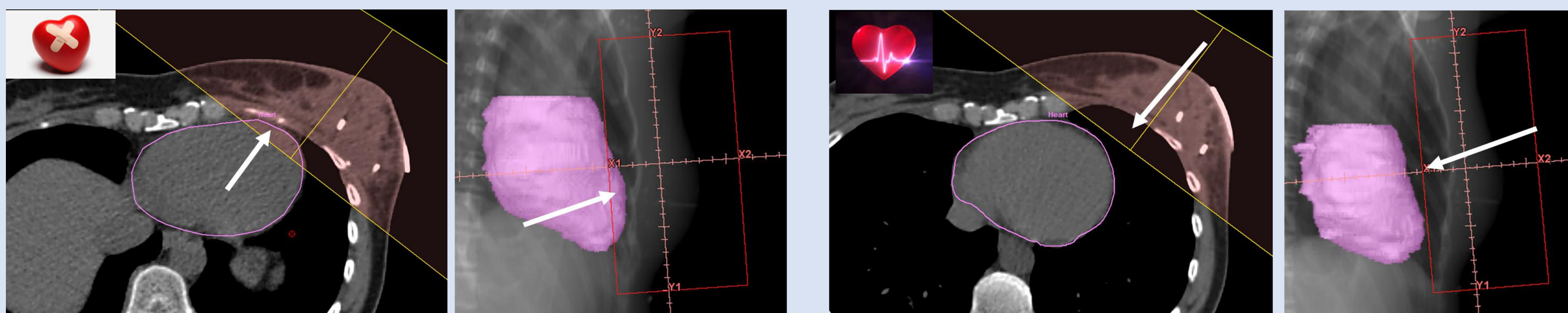


Visual Aid for Heart Sparing in Breast Radiotherapy

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Introduction

Radiotherapy is a critical component of breast cancer management. However, when patients with left sided breast cancer receive radiation to the heart, there is an increased risk of cardiac disease and mortality. The risk of cardiac toxicity increases 4-16% with each Gray (unit of dose) increase in mean heart radiation dose. At PCH we employ a technique to reduce this toxicity: voluntary Deep Inhalation Breath Hold (vDIBH) and was developed to reduce the risk of cardiac toxicity and possible death from coronary events. vDIBH uses the physiology of the respiratory cycle to increase the distance between the heart and the planned radiation therapy treatment and has been shown to decrease the mean radiation doses to the heart and left anterior descending coronary artery by approximately 20-70%.



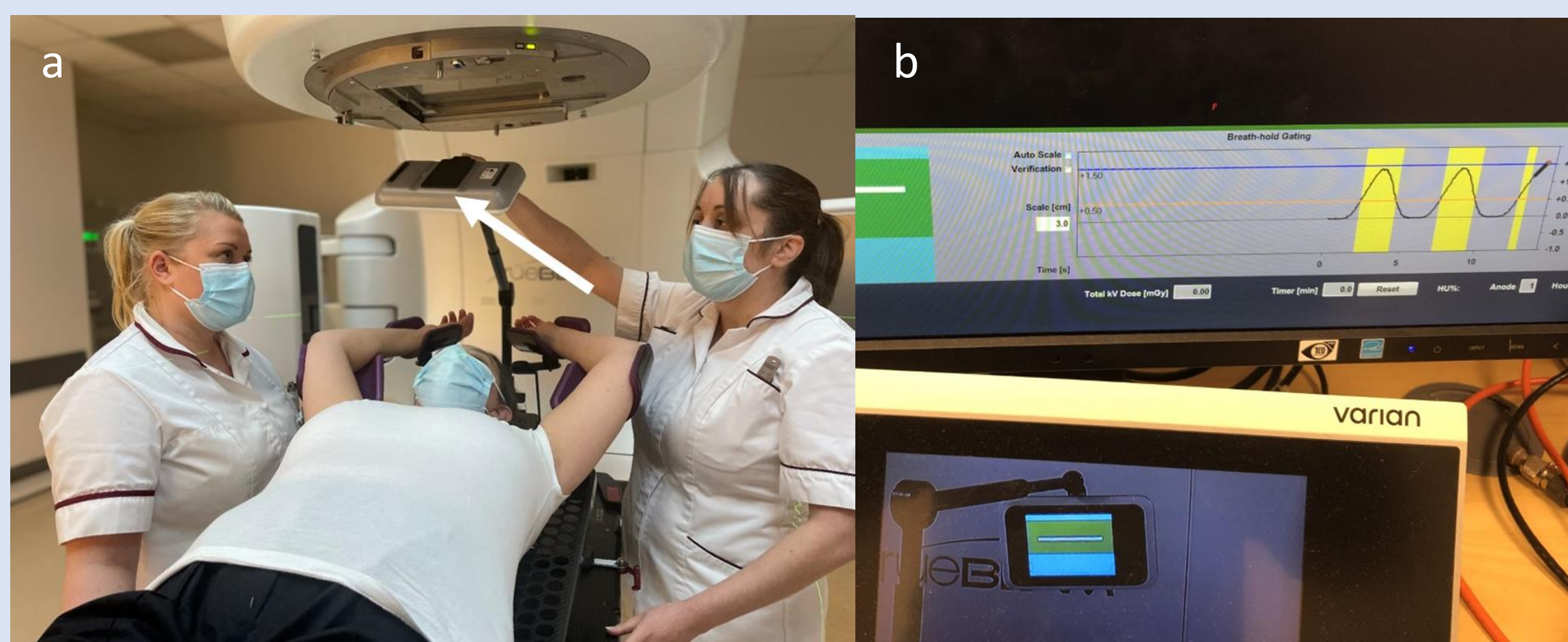
White arrow indicates heart in the treatment field without vDIBH. Pink blob is the heart. White arrow indicates heart out in the treatment field with vDIBH.

The Need for an improved intervention for patient benefit

Sadly, not all of our patients were able to access this heart sparing technique. Those that were missing out on this life saving treatment were mainly :

- Non- English-speaking patients who are unable to understand instructions
- Have a hearing deficit so are unable to follow instructions over the intercom

These patients were unable to follow instructions on how to achieve breath-hold and maintain it throughout treatment delivery. This resulted in an inequality of access. Investigation of available solutions highlighted a product that was available and funding secured to add this to our planning CT and treatment units.



vDIBH with Visual Aid

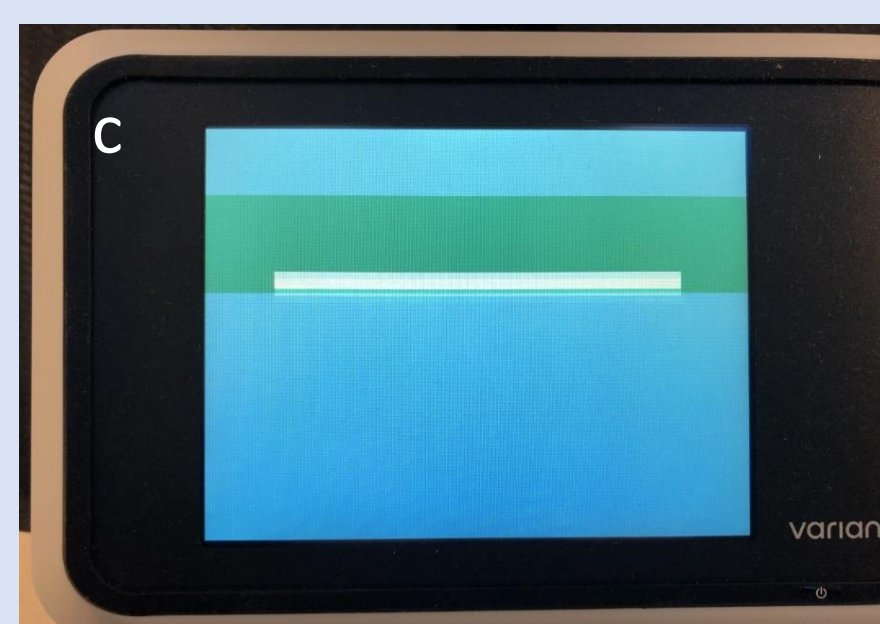
The visual aid is attached to the treatment couch and positioned over the patient so that they can clearly see the screen during their treatment, indicated by white arrow (Picture a). The patient controls their breath-hold to keep the white line in the green stripe (picture c below). When the white line is in the correct place, the treatment unit will turn on, delivering the patient's treatment (Yellow in picture b). The patient is empowered by having active control over their own treatment delivery.

Coaching

Patients are coached at treatment planning and on their first treatment using an appropriate interpreter cues. The patient is coached in holding their breath ensuring that the white line is within the green stripe. If the white line moves outside of the box, the treatment unit will turn off until the white bar is back in the green stripe.

Additional Sites

The vDIBH technique was initially used for patients with left sided breast cancer to spare the heart, it has recently been introduced to patients with right sided breast cancer to minimise the dose to the liver. The use of this technology for patients with lung cancer is being investigated where, the tumour moves significantly with breathing. Using the vDIBH technique with the visual aid will limit the movement of the tumour and reducing the amount of healthy tissue included in the treatment volume, reducing side effects, improving the patient experience.



Patients are able to hold their breath longer with the visual aid and reduce the time it takes to deliver treatment and hence, the time in the treatment room.

References

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