Audit of lung SABR treatment concordance with national guidelines, in the first cohort of patients at Portsmouth University Hospitals NHS Trust

Sudhan Rajan, Rowan Child, Gagan Bhatnagar, Yoodhvir Singh Nagar, Andrew Thorne, Hannah Bainbridge

NHS Portsmouth Hospitals NHS Trust

Background

Portsmouth University Hospital started a thoracic stereotactic ablative body radiotherapy (SABR) service in August 2021. The use of SABR treatment can produce local control rates which are similar to surgery, with low reported toxicity and patient convenience due to the reduced number of visits required for treatment, when compared with conventionally fractionated RT[1]. We have conducted a retrospective audit of the first 65 patients and compared their treatment against National guidelines. Treatment toxicity assessment was an important aspect of this audit, as it would serve as an indicator of how our service matched up to the anticipated low toxicity of this treatment modality.

Standard : SABR UK Consortium Guidelines v 6.1.0[2]

Ensure that all people with lung cancer who could potentially have treatment with curative intent are offered pulmonary function test (PFT) and positron-emission tomography CT (18F-FDG PET-CT) before treatment[3]. The diagnosis of malignancy is based on findings of positive histology, or when a biopsy is not possible, then a positive PET scan when predictive models (e.g. Herder, Brock[4]) indicate a > 70% risk of malignancy

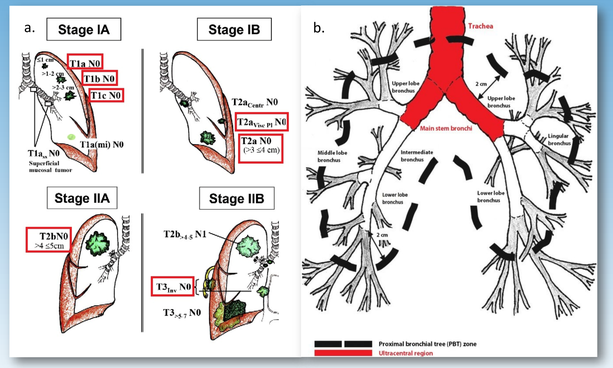
SABR eligibility

- Clinical stages of T1 N0 M0 or T2 (≤5cm) N0 M0 or a subset of T3 (by virtue of chest wall invasion only) (≤5 cm).
- Not suitable for surgery because of medical co-morbidity, lesion is technically inoperable or patient declines surgery after surgical assessment (or option of assessment)
- WHO performance status 0-2
- Age ≥ 18 years

Dose fractionation

The recommended dose fractionation schedules are:

- PTV (planning target volume) not abutting chest wall: **18 Gy × 3 fractions**
- PTV abutting or overlapping chest wall: **12 Gy x 5 fractions** or **11 Gy × 5 fractions**.
- For centrally located tumours abutting or within central zone but outside ultra-central zone: **7.5 Gy x 8 fractions**



a. Red boxes indicate SABR eligible clinical stages[5].
b. Central and ultracentral regions[6].

Indicators and Targets

Indicators

Proportion of patients having PET CT, PFT, biopsy pre-SABR, >/= Grade III toxicity

Targets

- 100 % patients to have a PET CT, PFT
- Herder's risk of 70% or above, if lesion not biopsied pre-SABR
- >/= Grade III pneumonitis not exceeding 1.8%[7] (and 10% - 32% in patients with lung fibrosis)[8,9]. Grade III chest wall toxicity in not more than 2%[1]

Methodology

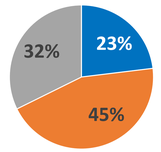
Following appropriate institutional review, the electronic records of 65 patients treated between August 2021 to March 2023 were reviewed. Data items collected were 1) Age, 2) Gender, 3) Radiological stage, 4) Herder's score, 5) If surgical candidate or not, 6) PFT values, 7) If biopsied or not, 8) Presence of lung fibrosis and 9) Toxicity >/= Grade 3

First audit results

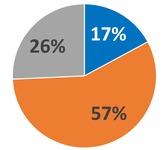
The mean patient age was 73 years (range 52 – 90 years), of whom 23% had PS0, 45% had PS1, 32% had PS2. All patients had PFTs, and FDG PET prior to treatment. 23% patients had biopsy proven disease, 7 cases of adenocarcinoma, 7 squamous cell carcinoma and 1 poorly differentiated carcinoma. Those who did not have a biopsy, (amongst whom 38% had history of prior cancer diagnosis), 100 % were radiologically diagnosed with a Herder score of > 70 %.

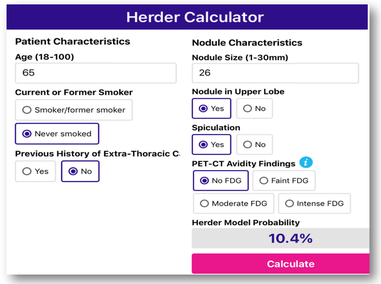
36% of patients had a Herder's score documented at the time of the lung MDT decision for SABR. 21% (14) of the patients were surgical candidates who opted to have SABR instead. All treated lesions were <5cm. The percentage of lesions treated with 3,5 and 8 fractions were 17%, 57% and 26% respectively. All patients completed the treatment. Rates of toxicity were low with 1.5% >/= grade 3 toxicity (in the form of rib fractures in 1 patient and pneumonitis in another patient) and zero grade 5 toxicity.

Performance Status



SABR Fractionation





Herder's model is used to reassess the malignancy risk in nodules that are evaluated with PET-CT after a prior increased risk for malignancy[10]

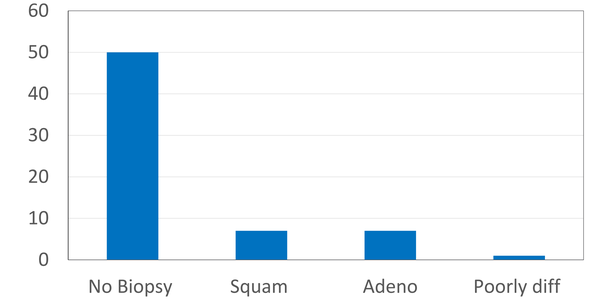
First action plan and conclusions

Rates of biopsy are lower (20%) than expected from the National Lung Cancer Audit (58 – 94% for early lung cancer with PS 0-1[11]). This needs local review and institutional discussion on feasibility to improve biopsy rates

Early toxicity rates are comparable with previous trial data. Longer term follow up of this cohort and subsequent patients will enable further analysis of toxicity and outcome data.

Portsmouth has successfully implemented a SABR service for early stage lung cancer and this has been done in a way which is consistent with National guidelines. Treatment has been well tolerated and toxicity rates are lower than expected.

Diagnosis



References

1. P Murray et al., 2017, *Br J Radiol*, DOI: 10.1259/bjr.20160732
2. SABR UK Consortium Guidelines v 6.1.0 https://www.sabr.org.uk
3. NICE Guideline NG122 https://www.nice.org.uk/guidance/ng122
4. MEJ Callister et al., 2015, *Thorax*, DOI: 10.1136/thoraxjnl-2015-207168
5. F C Detterbeck et al., 2017, *Chest*, DOI: 10.1016/j.chest.2016.10.010
6. R Timmerman et al., 2006, *J Clin Oncol*, DOI: 10.1200/JCO.2006.07.5937
7. J Zhou et al., 2016, *Int J Radiat Onc Biol Phy,* DOI: 10.1016/j.ijrobp.2016.03.024
8. H Bahig et al., 2016, *Pract Radiat Oncol*, DOI: 10.1016/j.prro.2016.01.009
9. N Ueki et al., 2015, *J Thorac Oncol*, DOI: 10.1097/JTO.0000000000000359
10. P-Nodule Risk mobile application - BTS Pulmonary Nodule Risk Prediction Calculator
11. National Lung Cancer Audit annual report published 2022 https://www.rcplondon.ac.uk/projects/outputs/nlca-annual-report-2022