Is mid-treatment imaging appropriate for 3 fraction SABR lung patients? An audit.

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Aims and Objectives

•To assess mid and post treatment CBCT image registration results.

• To determine if mid-treatment images are appropriate for 3# SABR lung treatments in a set of patients.

Background

• Despite national recommendations and evidence in literature, still suggestions that mid treatment imaging is not ubiquitously employed.

• Local audit to inform practice.

Method

- Difficult to measure effect of mid treatment imaging accurately
- Theoretical quantity used;

$$\text{TUPI result} = \Delta\text{Mid} + \Delta\text{Post}$$

- TUPI – Theoretical Uncorrected Post Image
  - Gives good measure of effect of omitting mid treatment images

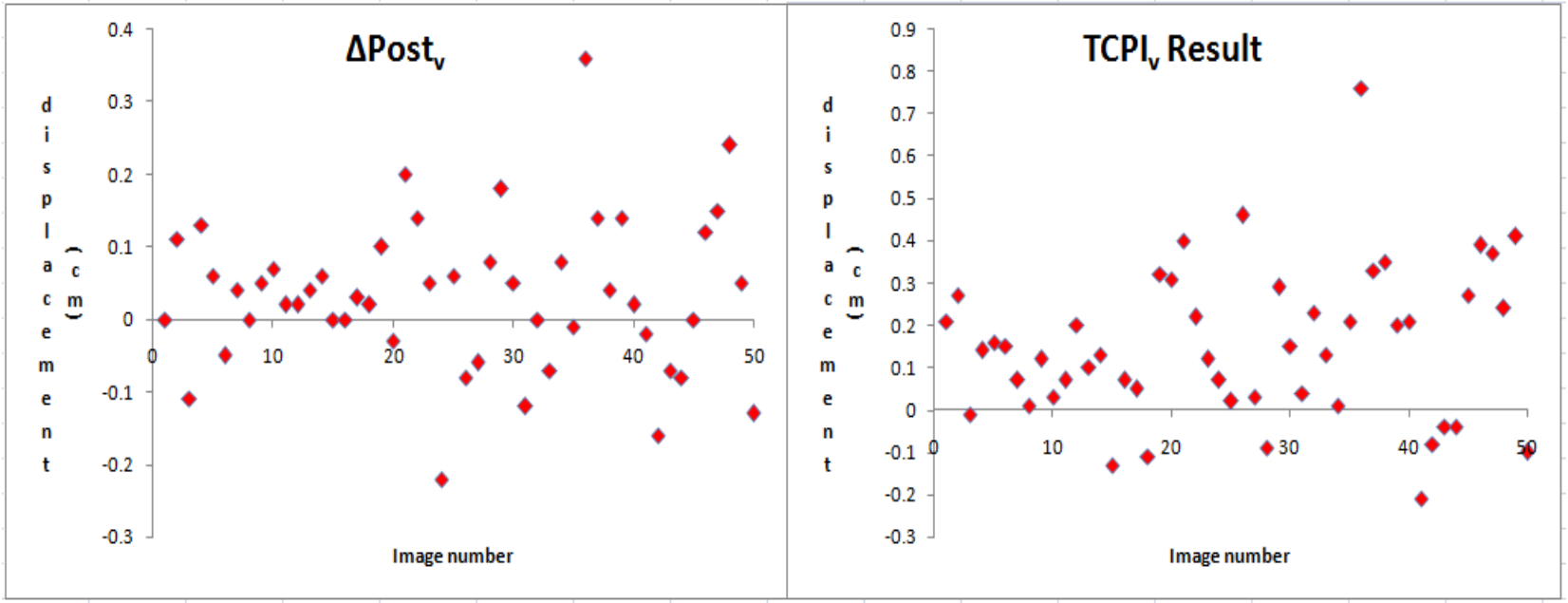
Method

- 25 patients – 50 CBCT Image results used in analysis
  - All 3 fraction lung SABR patients

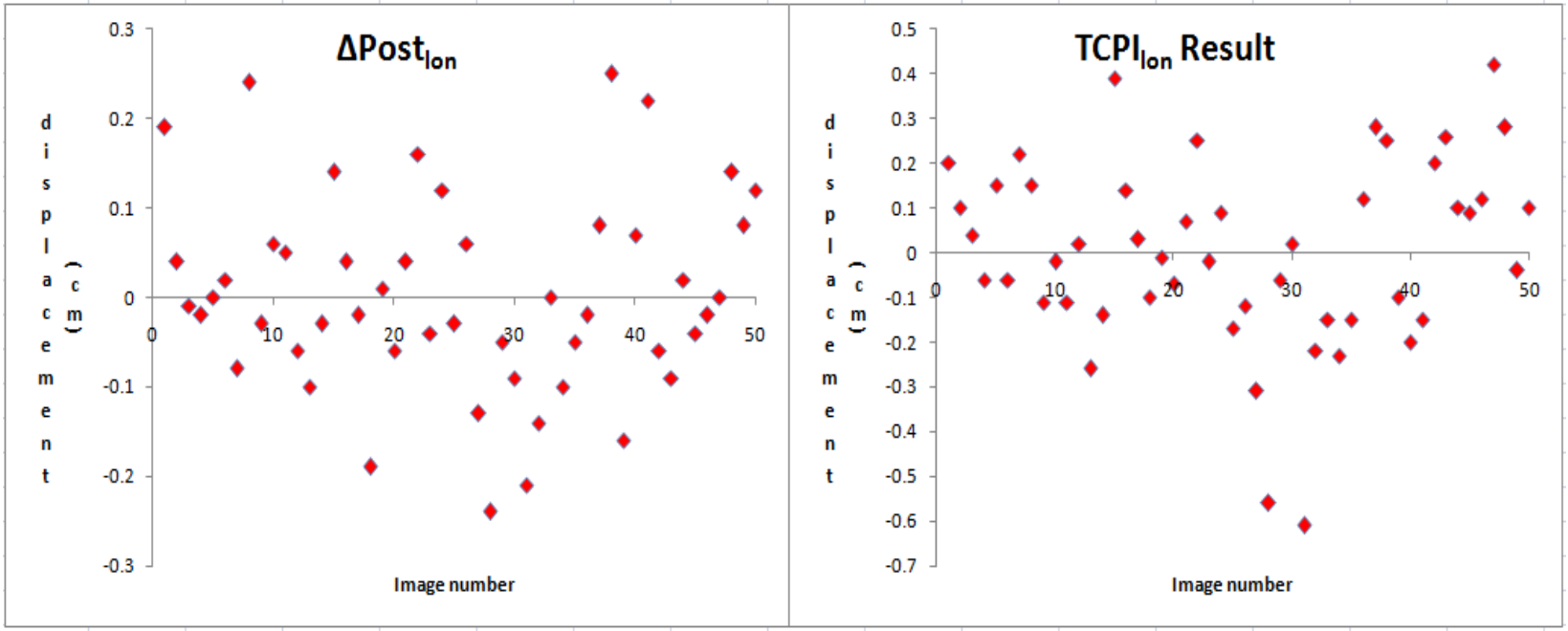
- Calculated TUPI for vertical, longitudinal and lateral shifts.

- Counted number of theoretical results where deviations were < 2mm, and < 5mm.

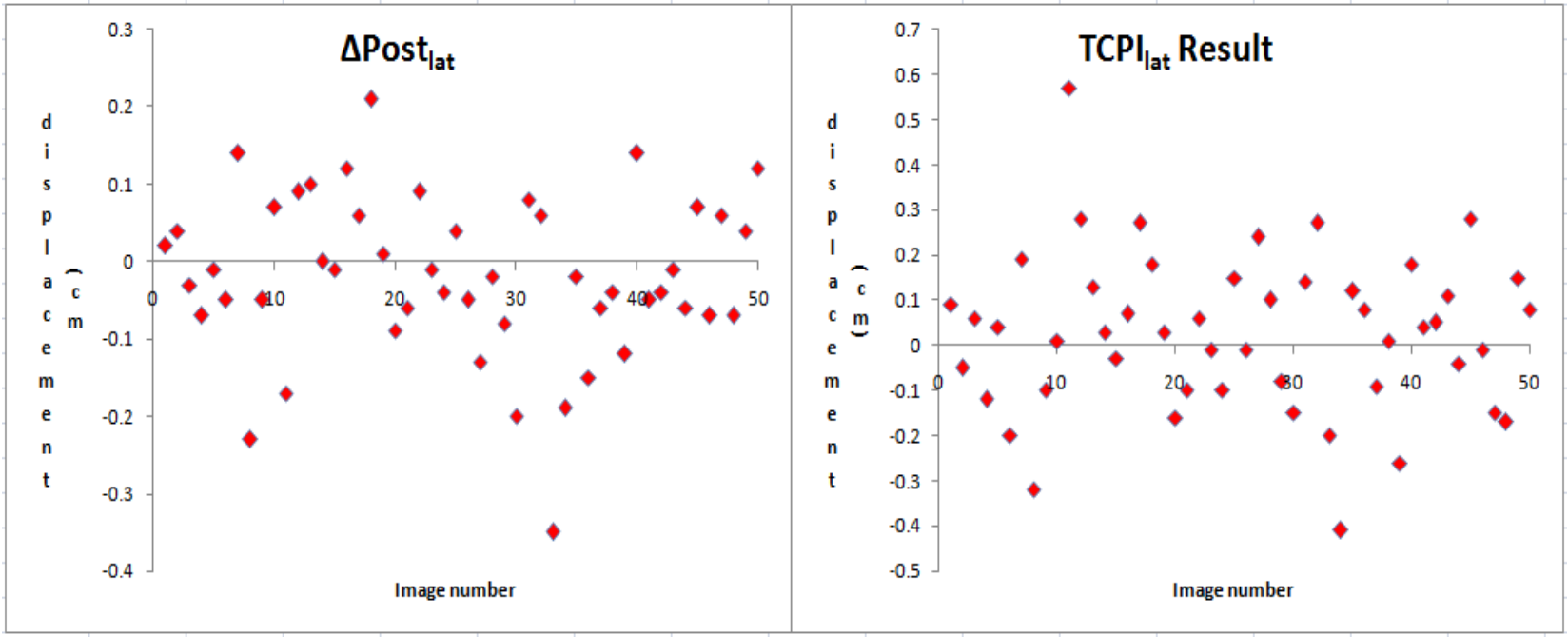
Results


ΔPost$_v$
displacement (cm)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
10
20
30
40
50
Image number
TCPI$_v$ Result
displacement (cm)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
10
20
30
40
50
Image number

Results


ΔPost_lon
displacement (cm)
Image number
TCPI_lon Result
displacement (cm)
Image number

Results


ΔPost$_{lat}$
displacement (cm)
Image number
TCPI$_{lat}$ Result
displacement (cm)
Image number

Results

Threshold	No of images out on TUPI in any direction	% of dataset	CI 95%
2mm	33	66	51.2 - 78.8
5mm	4	8	2.2 - 19.2

Threshold	No of patients out on post image in any direction	% of dataset	CI 95%
2mm	10	20	10.3 - 33.7
5mm	0	0	0 - 7.1

Discussion

- Results show mid treatment imaging has benefit in 3 fraction lung SABR patients
- Small sample size should be noted
- TUPI gives good indication of effect of mid treatment imaging, but it is theoretical.
- Flattening filter free (FFF) delivery modes will reduce fraction time and intrafraction motion.

Conclusions

- Mid treatment imaging is appropriate for 3 fraction SABR lung patients.
- Assessment of these images is required to justify and validate
- FFF delivery may reduce need for mid treatment imaging

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THANK YOU FOR LISTENING

Any Questions?