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Emergency guideline for treating patients requiring adjuvant internal mammary chain radiotherapy in 5 fractions during COVID-19 pandemic

International consensus¹ has already agreed that patients undergoing radiotherapy to the breast, chest wall or partial breast should be offered 5 fractions (weekly or daily) as per FAST and FAST-Forward due to acceptable toxicity data combined with low anticipated local relapse rates. Publications of 10-year FAST trial results and 5-year FAST-Forward trial results are imminent.

Given equivalent 3-year toxicity for 5 versus 15 daily fractions in FAST-Forward, it can be extrapolated that treatment of breast/ chest wall and level 1-4 axillary nodes in 5 daily fractions should also result in equivalent arm/ shoulder toxicity. Of note, assuming alpha/beta of 2Gy for brachial plexus: 40Gy in 15 fractions is equivalent to 46.8Gy in 2Gy fractions, 26Gy in 5 fractions is equivalent to 46.8Gy in 2Gy fractions and 27Gy in 5 fractions equivalent to 49.95Gy in 2 Gy fractions. All three doses are well under the tolerance dose (TD5/5) of 60Gy to the whole brachial plexus. Regardless of fractionation, it is assumed that treatment will be delivered with an appropriate matching technique and image guidance protocol.

Patients requiring internal mammary chain (IMC) irradiation were not included in FAST-Forward and yet, as COVID-19 incidence continues to rise globally, pressure on radiotherapy resources and risks to patients attending hospital for multiple visits are also increasing. In the light of this, pragmatic extension of 5-fraction regimens to the IMC may be necessary in order to maximise the local and survival benefits of breast cancer radiotherapy whilst minimising the risk of exposure to the SARS-COV-2 virus. Assuming a lung alpha-beta ratio of 4Gy for the clinical endpoint of pneumonitis, a dose of 40Gy in 15 fractions is equivalent to 44.5Gy in 2Gy fractions, a dose of 26Gy in 5 fractions to 39.9Gy in 2Gy fractions and 27Gy in 5 fractions to 42.3Gy in 5 fractions.

Where IMC RT is delivered using a 5-daily fraction schedule, it is recommended that the following constraints are adhered to:

Ipsilateral lung $V_{11Gy} < 35\%$

Mean lung dose $< 10Gy^*$

Heart $V_{11Gy} < 10\%$

Mean heart dose $< 3.5Gy^\dagger$

*Based on alpha-beta ratio of 4Gy for the clinical endpoint of pneumonitis

† Based on alpha-beta ratio of 3Gy for heart tissue

Treatment should be delivered using daily on-line imaging, preferably cone beam CT where a single isocentre is used. Consideration should be given to treating all IMC RT patients (regardless of laterality) in breath-hold where resources allow. All left-sided patients should be treated in breath-hold.

It is also recommended that patients are reviewed (by phone as necessary) 3-4 weeks following completion of radiotherapy in order to record oesophageal and lung toxicity, with further review at

3 months. Central means of collecting data on patients treated in this way are currently being explored at RM/ICR.

References

1. International Guidelines on Radiation Therapy for Breast Cancer during the COVID-19 Pandemic. Coles, Aristei, Bliss et al. *Clinical Oncology* 2020 (32):279-81

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