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Additional guidance on management of unscheduled radiotherapy treatment interruptions in patients during the COVID-19 pandemic

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The advice given below is formulated to be as practical as possible under the present circumstances and should be read in conjunction with the [Timely delivery of radical radiotherapy: guidelines for the management of unscheduled treatment interruptions, fourth edition](#)

1. Calculations

The existing guidelines¹, based on several longstanding reports, should be used. Some interruptions may be quite complex with two 'gaps', for which special advice may be obtained, as in the case of rare tumours or where combinations of treatments occur.

For normal tissues use α/β of 3 Gy for soft tissue/bone late effects, but α/β of 2 Gy for nervous system. Extra care is necessary to ensure that dose/BED or EQD-2 estimates in normal tissues are not exceeded with increasing use of hypofractionated techniques

Tumour parameters will depend on their proliferation profiles. Physicists should liaise with the responsible clinician about the characteristics of each tumour, in case of special conditions. The clinician will be aware of the influence of cytotoxic chemotherapies, age, other medical conditions and surgery on tissue tolerances by recommending a maximum permissible Dose, EQD-2 or BED.

Suggested Parameter Table for Treatment Interruption Calculations

Tumour and clinical setting	α/β Ratio (Gy)	K-value (Gy day ⁻¹)	T _{lag} (days)
*Squamous cell carcinomas (NSCLC) including adenocarcinomas in lung	10 Gy	0.9	28
Transitional Cell carcinomas	10 Gy	0.36	35
Adenocarcinoma Breast (Postoperative)	4 Gy	0.6	21
Adenocarcinoma Breast (Intact cancer)	4 Gy	0.3 or 0.6 (if time longer than 42 days)	21 42
Adenocarcinoma Prostate (Well differentiated)	2 Gy	0.3	42
Adenocarcinoma Prostate (Moderately and Poorly differentiated)	4 Gy	0.5	42
Other adenocarcinomas (if poorly differentiated use prostate row)	4 Gy	0.3	42
Others in category 1 (rapidly growing tumours or with anaplastic features).	10 Gy	0.9	28

*for short hypofractionated fractionation schedules in this tumour type, some users may prefer to use a compromise such as 0.36 - 0.6 Gy per day after a time of 21 days. For even shorter schedules e.g. skin cancer we suggest 0.15 Gy per day after 14 days.

2. Converting Gy doses expressed for BED in terms of EQD-2

Since EQD-2 is simply

$$\frac{BED}{(1+\frac{2}{\alpha})^{\frac{D}{\beta}}}$$

Then the EQD-2 factor (D_{prolif}) for daily repopulation would be related to the K factor (in BED units) by:

$$K = D_{\text{prolif}} \times (1 + \frac{2}{\alpha})^{\frac{D}{\beta}}$$

So, $D_{\text{prolif}} = \frac{K}{(1+\frac{2}{\alpha})^{\frac{D}{\beta}}}$ for use with EQD-2 equations

3. Extremely protracted treatments

Considerable care is required for very long interruptions of a month or more. In these situations, it is important not to entirely discard the previous exposures (which could amount to only a few fractions). Normal tissue late reacting vascular systems do 'recover' dose after an interval of time amounting to around three months, and provided an initial percentage of the total dose has already been delivered to promote tissue regeneration (probably doses greater than 20 Gy in 2 Gy fractions or equivalent). So, it is important, depending on the normal tissue at risk, not to assume that an entire treatment schedule can be restarted. Drs Hopewell and Jones are researching this issue and can be contacted if necessary.

4. Additional advice and support

For departments who may be unsure how to apply the above guidelines, they may wish to approach more experienced radiobiologists. Bleddyn Jones and Roger Dale are approaching various experts around the UK who can also advise in case of a large workload. It is appreciated that many radiotherapy departments will have designated persons for such treatment interruptions, but who might be ill or are given other tasks. Also, some of the suggestions made in previous reports, such as use of twice daily treatments and weekend fractions may no longer be feasible in many departments at this time.

If you would like further advice on individual cases, please email both Bleddyn Jones (Bleddyn.Jones@oncology.ox.ac.uk) and Roger G Dale (r.dale@imperial.ac.uk).

DISCLAIMER: This document provides a short interim update to the comprehensive guidelines already provided in the latest RCR document¹ relating to the management of unscheduled treatment interruptions and which should also be referred to. The information here is intended to provide some additional guidance for dealing with the disruptions to treatment schedules which can be expected as a consequence of the spreading coronavirus. These are pragmatic suggestions and take account of realistic estimates of relevant radiobiological parameters. They should not be interpreted as being specific instructions to be adopted in all cases; the final responsibility for authorising

alterations to any treatment continues to rest with the prescribing physician. Any guidance offered here, or by those who may be subsequently contacted for additional advice, is designed to help clinical judgment, not to replace it.

¹ *The timely delivery of radical radiotherapy: guidelines for the management of unscheduled treatment interruptions (4th Edition, 2019).*

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