Five-year Feasibility Study of a 3-Day Rapid Access Palliative VMAT Program in a Two LINAC Centre

Quinn Matthews[1], Kim Lawyer[1], Evan Maynard[1], Robert Olson[1], Allison Ye[1], Vivian Yau[1], Stacy Miller[1], Boris Valev[2], Nick Chng[1]

[1]BC Cancer – Prince George, BC. [2]BC Cancer – Victoria, BC.

Purpose

To report the five-year experience of implementing and evolving Rapid Access Palliative VMAT (RAP-VMAT) in a two LINAC cancer centre with no dedicated resources.

Materials and Methods

A 3-day turnaround RAP-VMAT program in our two LINAC centre was launched in 2018.

Initial eligibility criteria:

- Expected clinical benefit vs. CT sim-and-treat (i.e. POP or single direct)
- Sufficient pain control for VMAT
- Excluded sites: soft-tissue neck, head, skin, extremities, whole pelvis
- Rx: up to 8Gy/1#, 20Gy/5# (25Gy for pelvis), or 30Gy/10#
- CT and dosim-specific criteria to minimize complexity
- Maximum 2 OARs for optimization and dose reporting

Specialized communication workflows and pre-defined breakpoints in planning timelines were implemented (e.g. Figure 1).

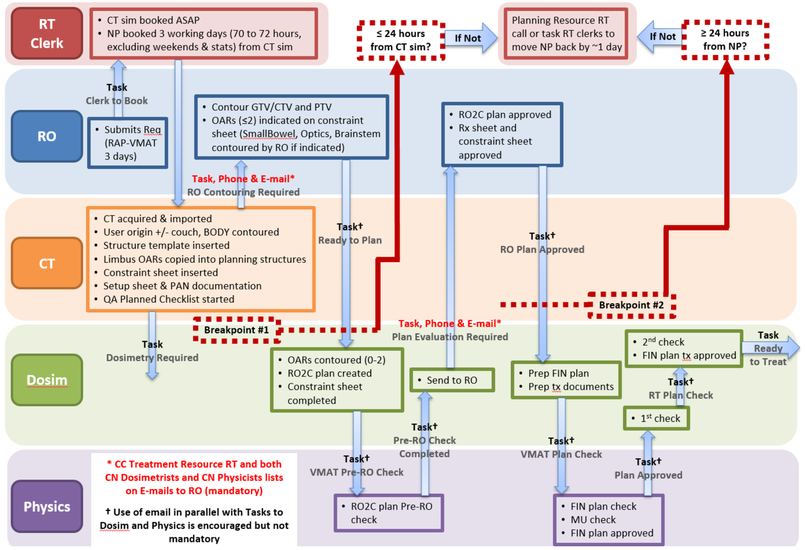

Figure 1: Three-day Rapid Access Palliative VMAT workflow

From 2019-2022, eligibility was expanded to include:

- 40Gy/15# for lung and pelvis sites
- Brain and skull sites with up to 25Gy/5#, 34Gy/10#, or 40Gy/15#
- 5-day workflow to accommodate image fusion for planning

For timing analysis, the durations of planning tasks were tracked using ARIA task creation times.

Results

Since launch, 285 plans have been requisitioned for RAP-VMAT

- 166 (58.2%) eligible for 3-day protocol throughout planning
- 13 (4.6%) eligible for 5-day protocol (with image fusion)
- 106 (37.2%) recorded as "off-protocol", with reasons:
  - Plan complexity / measurement QA required
  - Clinical trial
  - Planned delay to start time (e.g., RO or patient preference)
  - Linac unavailability (i.e., no time slot available)
  - Change in Rx or intent during planning
- 5 patients did not make planning timelines (delayed 1 day) due to delays in RO contouring. No patients delayed for any other reason.
- Number of plans by site and protocol shown in Table 1

Table 1: Number of plans by site and protocol (3 or 5-day turnaround)

Site:	Lung/ Med	Spine	Bone	Pelvis	Eso / GEJ	Abdo	Brain	H&N	Total
3-day protocol:	62	38	15	21	12	15	1	2	166
5-day protocol:	1	0	1	0	3	1	7	0	13
Off-protocol:	29	24	27	14	4	4	1	3	106

For "on-time" 3-day protocol plans, median times (in working hours) between ARIA tasks (including dead time) for each role were:

- Dosimetry – Planning and checks (8.7 hours)
- RO – Contouring and plan evaluation (3.8 hours)
- Physics – Plan checks (2.6 hours)
- CT staff duties (0.2 hours)

For the 166 plans on the 3-day protocol, box plots for timings are shown in Figure 2, grouped by (a) task, (b) staff group and (c) overall.

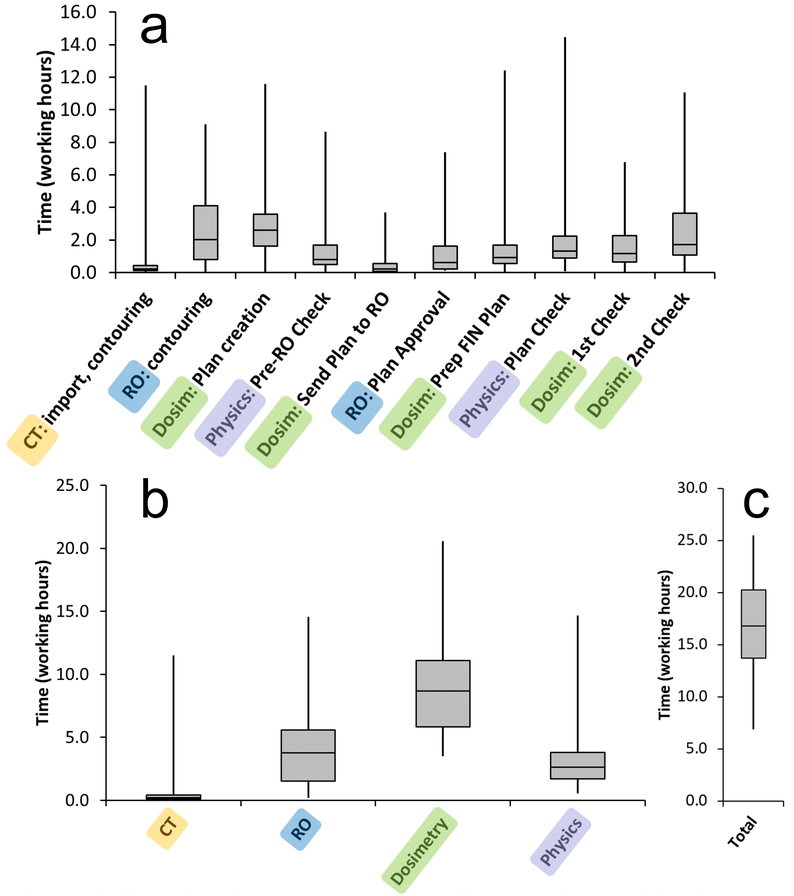

Figure 2: Box plots for times between ARIA tasks for the 166 plans on the 3-day RAP-VMAT workflow, grouped by (a) task, (b) staff group and (c) overall.

Conclusions

Rapid Access Palliative VMAT allows an accelerated path to VMAT for many patients that otherwise would be treated with either a CT sim-and-treat (i.e. POP or single direct field) or standard 2-week planning workflow.