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INTRODUCTION

- Recent large randomized trials have suggested similar postoperative outcomes for lobectomy and sublobar resection in patients with small-sized NSCLC. Consequently, the number of patients with NSCLC undergoing segmentectomy is increasing.⁽¹⁾
- However, local relapse was about twice as frequent after segmentectomy as after lobectomy — 10.5% versus 5.4% at a median follow-up of 7.3 years in JCOG0802.⁽¹⁾
- Treating newly developed lung malignancies in the residual lobe after segmentectomy for NSCLC poses a challenge. Diagnosis and selection of the optimal treatment are difficult, and surgical resection is technically challenging.

Objective

To clarify how newly developed lung malignancies in the residual lobe after segmentectomy for NSCLC are actually treated, and the outcome of each local therapy.

NSCLC, non-small cell lung cancer

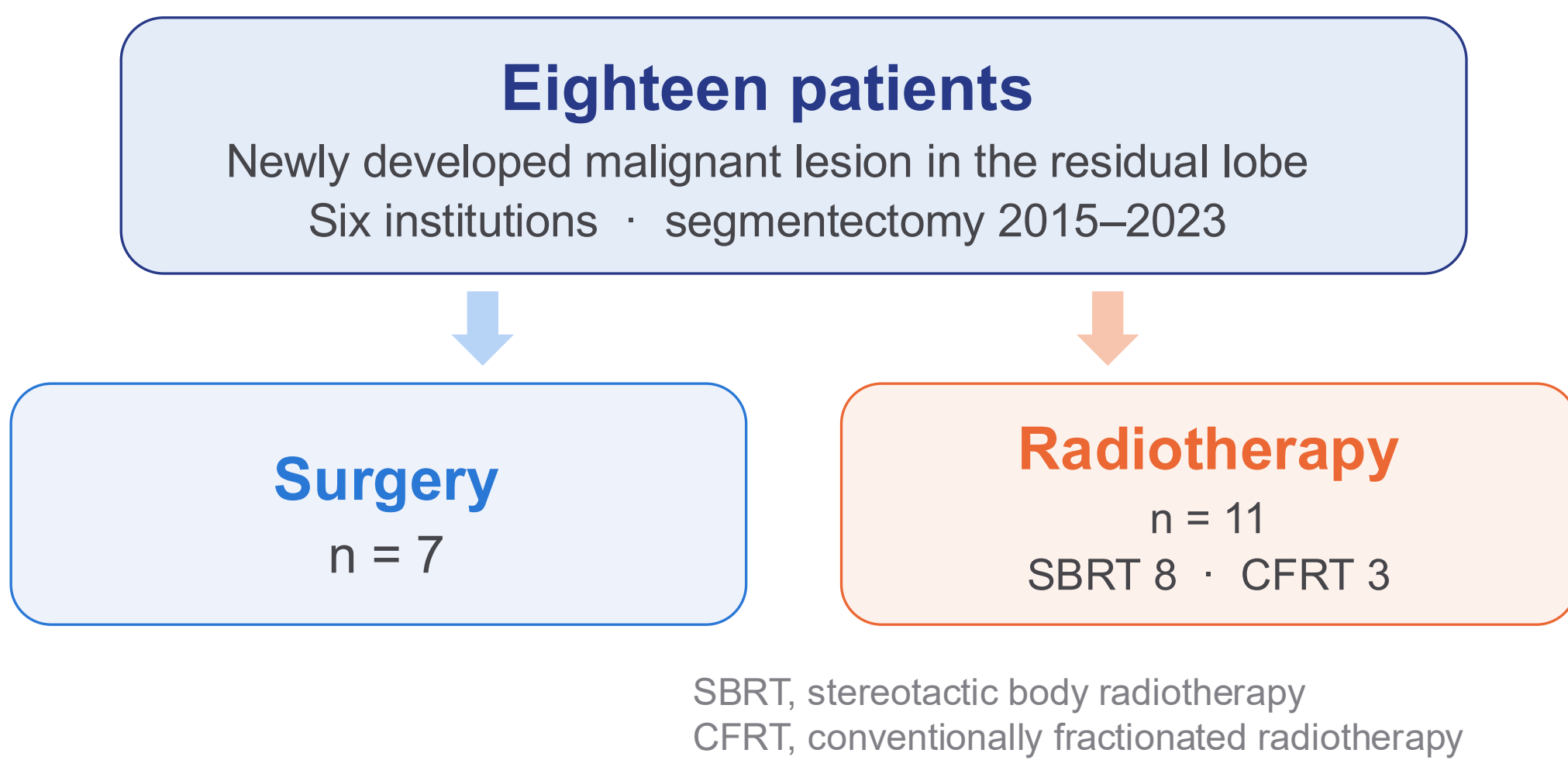
METHODS

Design

- We conducted a retrospective review of patients with newly developed lung malignancies in the residual lobe after segmentectomy for NSCLC from 2015 to 2023, who underwent local therapies (surgery or radiotherapy) at the six institutions comprising the Niigata Chest Surgery Research Group.
- A newly developed lung malignancy in the residual lobe was defined as a lesion arising in the lobe left after segmentectomy: a margin or bronchial stump recurrence, a metachronous second primary lung cancer, or an intrapulmonary metastasis.
- We analyzed and compared demographic and clinical factors between patients who underwent each local therapy. Overall survival after each local therapy was calculated using the Kaplan–Meier method (95% CI by Greenwood’s formula; log-rank test).

CI, confidence interval

STUDY COHORT



DISCUSSION AND CONCLUSION

Key findings

- Of the 18 lesions, 14 were margin or bronchial stump recurrences, 3 metachronous second primary lung cancers, and 1 an intrapulmonary metastasis.
- Only 3 patients had a pre-treatment pathological diagnosis; most were treated on radiological grounds (growth on serial CT 9, FDG uptake 5). Biopsy of a small lesion beside the staple line is rarely feasible, so imaging has to carry the diagnosis.
- Resection of the residual lobe carried substantial risk: 1 intraoperative death and complications in 3 of the remaining 6 patients. Adhesions and altered hilar anatomy make completion lobectomy far more hazardous than a first resection.
- Three-year overall survival was 64.3% after surgery (75.0% excluding the intraoperative death) and 90.0% after radiotherapy (p = 0.32). Radiotherapy was given to the frailer patients yet performed at least as well, suggesting that perioperative risk, not tumor control, drives the difference.

Conclusion

The postoperative and post-radiotherapy outcomes for patients with newly developed lung malignancies in the residual lobe following segmentectomy for NSCLC appear relatively favorable.

Since surgical resection of the residual lobe after segmentectomy is technically challenging and carries a high risk of perioperative complications, radiotherapy may be a valuable option for patients who are ineligible for surgery.

Limitations

Retrospective series of only 18 patients, most without pathological confirmation. Treatment was chosen by the attending team, so the groups are not comparable and the confidence intervals are wide.

FDG, fluorodeoxyglucose

REFERENCES & ACKNOWLEDGEMENTS

- Saji H, et al. Segmentectomy versus lobectomy in small-sized peripheral non-small-cell lung cancer (JCOG0802/WJOG4607L): a multicentre, open-label, phase 3, randomised, controlled, non-inferiority trial. Lancet 2022;399:1607–17.

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RESULTS

Table 1. Patients and the initial segmentectomy

	All (n = 18)	Surgery (n = 7)	RT (n = 11)
Age at segmentectomy, yr	72 (64–79)	72 (65–79)	72 (64–79)
Sex, male / female	11 / 7	5 / 2	6 / 5
Brinkman index	500 (0–2000)	900 (0–2000)	440 (0–1440)
VC, % predicted	96.6 (74–128)	97.0 (74–128)	88.1 (80–127)
FEV1/FVC, %	74.7 (46–85)	72.7 (65–81)	76.2 (46–85)
Tumor size on CT, mm	16.5 (6–53)	15 (6–33)	18 (11–53)
RUL / LUL / S6 / basal	1 / 6 / 4 / 7	1 / 4 / 1 / 1	0 / 2 / 3 / 6
MIS / open	14 / 4	5 / 2	9 / 2
Intentional / compromised	12 / 6	7 / 0	5 / 6
ND2a / ND1b / ND0	13 / 3 / 2	4 / 1 / 2	9 / 2 / 0
Adenocarcinoma / squamous cell	14 / 4	4 / 3	10 / 1
pT, Tis–1mi / T1 / T2a / T3–4	2 / 11 / 3 / 2	1 / 5 / 1 / 0	1 / 6 / 2 / 2
Negative surgical margin	14	5	9

Median (range) or n. Abbreviations: Brinkman index, cigarettes/day × years; VC, vital capacity; MIS, minimally invasive surgery; Intentional / compromised, by choice / because of limited reserve; ND, nodal dissection (Japan Lung Cancer Society); pT, pathological T category (UICC 9th ed.).

Table 2. The new lesion in the residual lobe

	All (n = 18)	Surgery (n = 7)	RT (n = 11)
Age at local therapy, yr	75.5 (67–84)	76 (68–82)	74 (67–84)
ECOG PS 0 / 1	13 / 5	6 / 1	7 / 4
Seg. → detection, mo	32.9 (12–70)	33.5 (21–60)	24.0 (12–70)
Seg. → local therapy, mo	34.3 (14–72)	34.5 (24–71)	24.5 (14–72)
Detection → therapy, mo	2.3 (0.6–21)	3.1 (0.6–15)	2.0 (0.6–21)
Margin / bronchial stump rec.	14	5	9
Metachronous second primary	3	2	1
Intrapulmonary metastasis	1	0	1
FDG-PET performed	15	6	9
SUVmax	10.1 (0.9–21)	14.7 (1.1–21)	6.6 (0.9–18)
Basis: growth / PET / path.	10 / 5 / 3	4 / 1 / 2	6 / 4 / 1
Pre-treatment pathology	3	2	1

Median (range) or n. FDG-PET and the basis of the diagnosis were not recorded in 2 patients; SUVmax was measured in 14. Abbreviations: Seg., segmentectomy; rec., recurrence; path., pathological diagnosis; ECOG PS, Eastern Cooperative Oncology Group performance status; PET, positron emission tomography; SUVmax, maximum standardized uptake value.

Outcome after local therapy

- Recurrence after local therapy in 4 of 18 patients — 2 of 7 after surgery and 2 of 11 after radiotherapy
- Five deaths: 1 from lung cancer, 1 intraoperative, and 3 from other causes

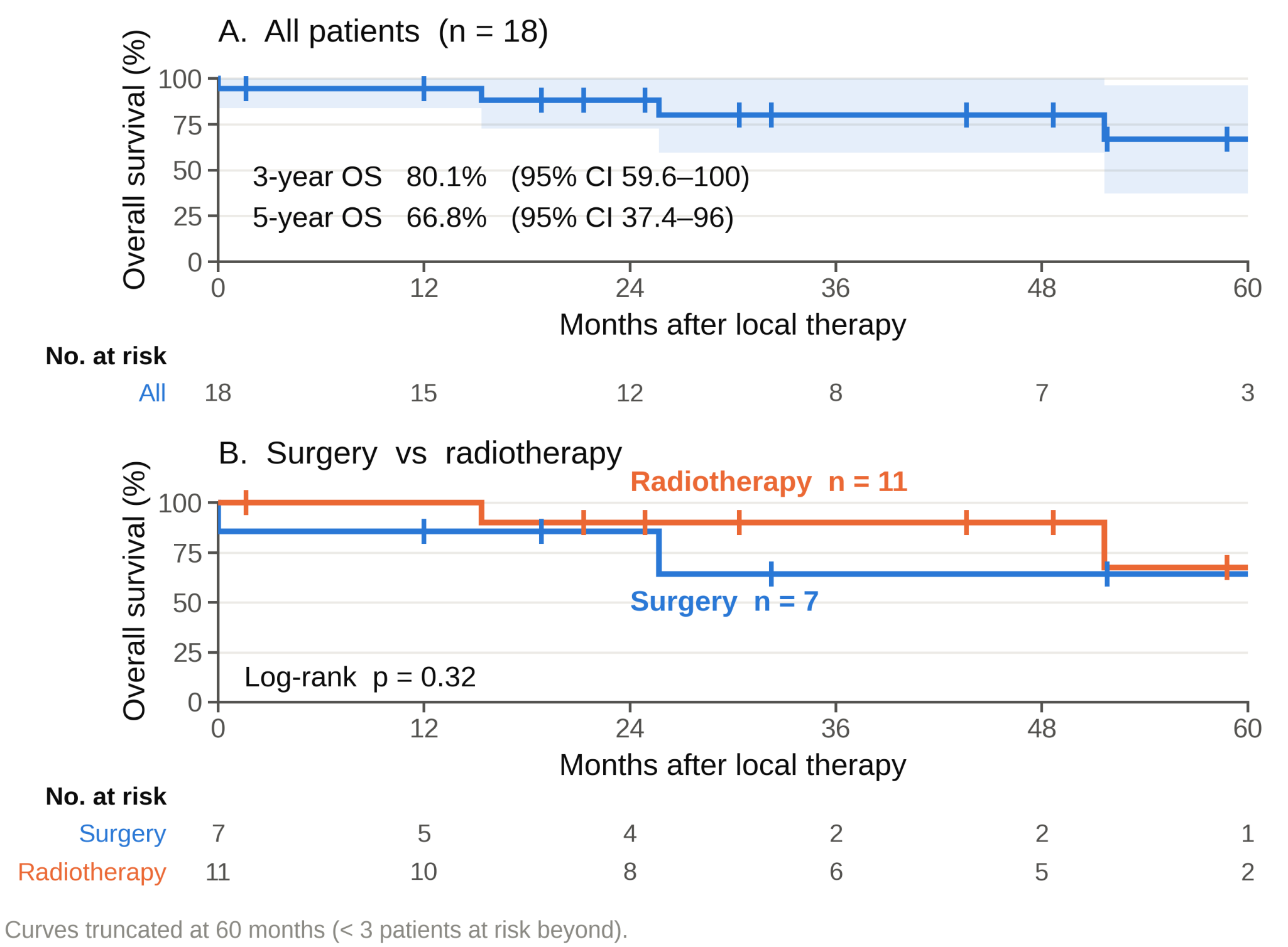
Table 3. Local therapy delivered

Surgery n = 7

- Completion lobectomy 6, wedge resection 1
- Median operative time 238 min (197–390); median blood loss 325 mL (32–6389)
- One patient died intraoperatively due to uncontrolled massive bleeding from the injured pulmonary artery
- Complications in 3: recurrent laryngeal nerve palsy (Clavien–Dindo grade I), empyema, and pneumonia (grade II)
- Pathology showed recurrence in 5 and second primary lung cancer in 2

Radiotherapy n = 11

- SBRT 8 (42–64 Gy / 4 fr), CFRT 3 (60–66 Gy)
- Ten treated for recurrence, one for a second primary lung cancer
- Reasons for not operating: impaired pulmonary function or previous resection 4; comorbidity or poor PS 2; resection too extensive 3; advanced age 1; patient preference 1
- No radiotherapy-related adverse event was recorded



Curves truncated at 60 months (< 3 patients at risk beyond).

Figure 2. Overall survival from the date of local therapy. All patients: 3-year 80.1% (95% CI 59.6–100), 5-year 66.8% (37.4–96.2). Surgery: 3-year 64.3%, and 75.0% when the intraoperative death is excluded. Radiotherapy: 3-year 90.0% (71.4–100). Log-rank p = 0.32. Median follow-up after local therapy (reverse Kaplan–Meier) 43 months overall, 32 after surgery, and 48 after radiotherapy.

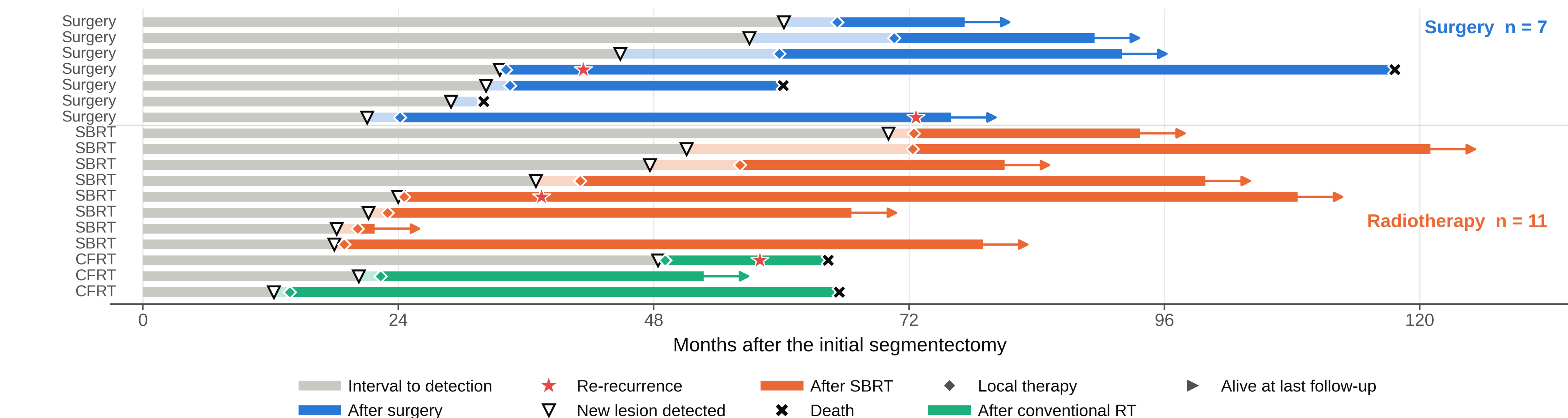


Figure 1. Clinical course of each patient. The new lesion was detected a median of 32.9 months after segmentectomy and was treated a median of 2.3 months later.