

Outcomes of Volumetric Modulated Arc Therapy in the Treatment of Patients with Inoperable Lung Cancer

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BACKGROUND

- Lung cancer remains the leading cause of cancer-related mortality worldwide. NSCLC accounts for at least 80% of cases, and about 30% present with unresectable locally advanced disease (stage IIIA–IIIB).
- Around 50–60% of patients receive radiotherapy. IMRT, including VMAT, is a standard approach thanks to superior dose conformality and sparing of organs at risk.
- Published VMAT series report median OS of ~18–19 months with mostly moderate acute toxicity, uncommon grade ≥3 events and rare late pulmonary toxicity.
- We retrospectively evaluated outcomes of lung cancer patients treated with VMAT at our centre.**

OBJECTIVE

To evaluate outcomes of Volumetric Modulated Arc Therapy in the treatment of patients with inoperable lung carcinomas.

OPERATIONAL DEFINITION

VMAT: an advanced form of linear accelerator treatment that delivers radiation while rotating continuously around the patient, giving a highly conformal radiotherapy dose.

METHODS

DESIGN

Retrospective, single-arm, observational study

SETTING

Dept. of Clinical and Radiation Oncology, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore

PERIOD

Patients treated Jan 2018–Jan2023

SAMPLING

Non-probability consecutive sampling

INCLUSION

- Age ≥18 years, male and female
- Biopsy-proven non-small cell lung carcinoma

EXCLUSION

- Metastatic disease
- Small cell carcinoma on biopsy

ENDPOINTS & ANALYSIS

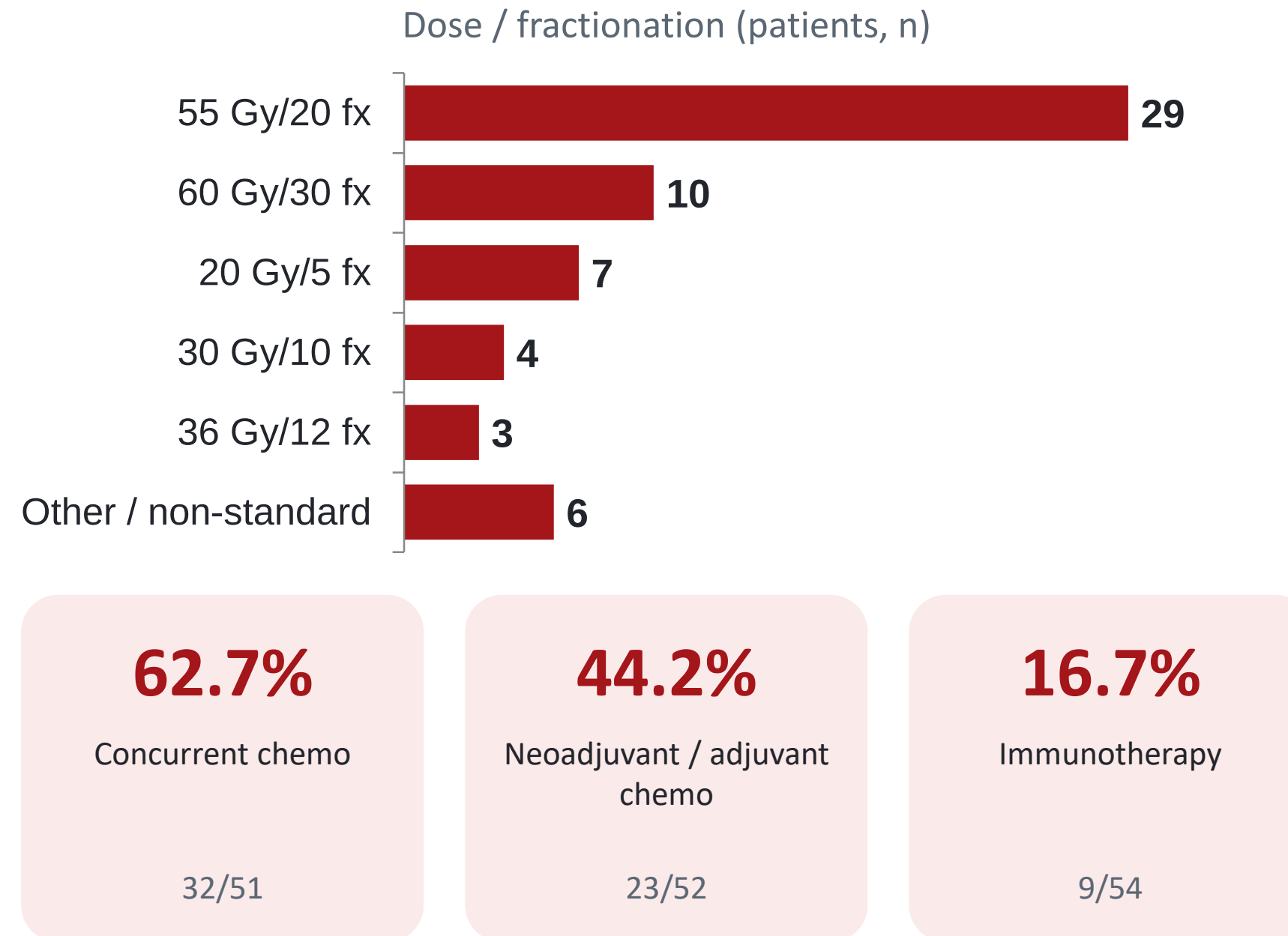
OS and PFS from date of RT registration; Kaplan–Meier estimates with 95% CI and log-rank test.

BASELINE CHARACTERISTICS

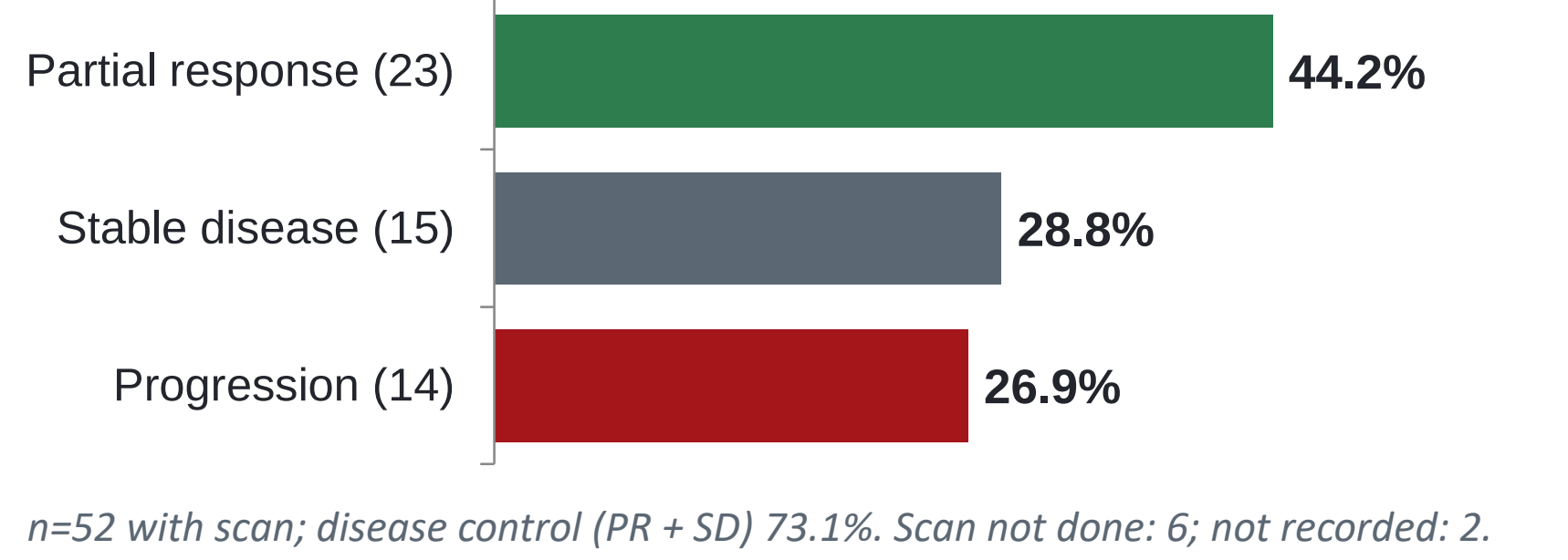
Age, median (IQR)	66 (57.8–72) yrs; range 18–82
Male sex	43 (74.1%) [n=58]
ECOG 0 / 1 / 2	36 (60.0%) / 22 (36.7%) / 2 (3.3%)
Smoking history	33 (55.0%)
Squamous cell	31 (51.7%)
Adenocarcinoma	27 (45.0%)
Adenoid cystic	2 (3.3%)
T4 / T3 / T2 / T1	40 / 10 / 8 / 2 (66.7% T4)
N3 / N2 / N1 / N0	25 / 25 / 6 / 4 (83.3% N2–N3)
Right lung	37 (62.7%) [n=59]
Intent: radical / palliative	45 (75.0%) / 14 (23.3%) + 1 emergency
Comorbidity: none	30 (50.0%)
DM / HTN / IHD	17 / 17 / 4
Inoperable: tumour factors	58 of 59 recorded (98.3%)

n = 60. Percentages use available data; missing values excluded from denominators.

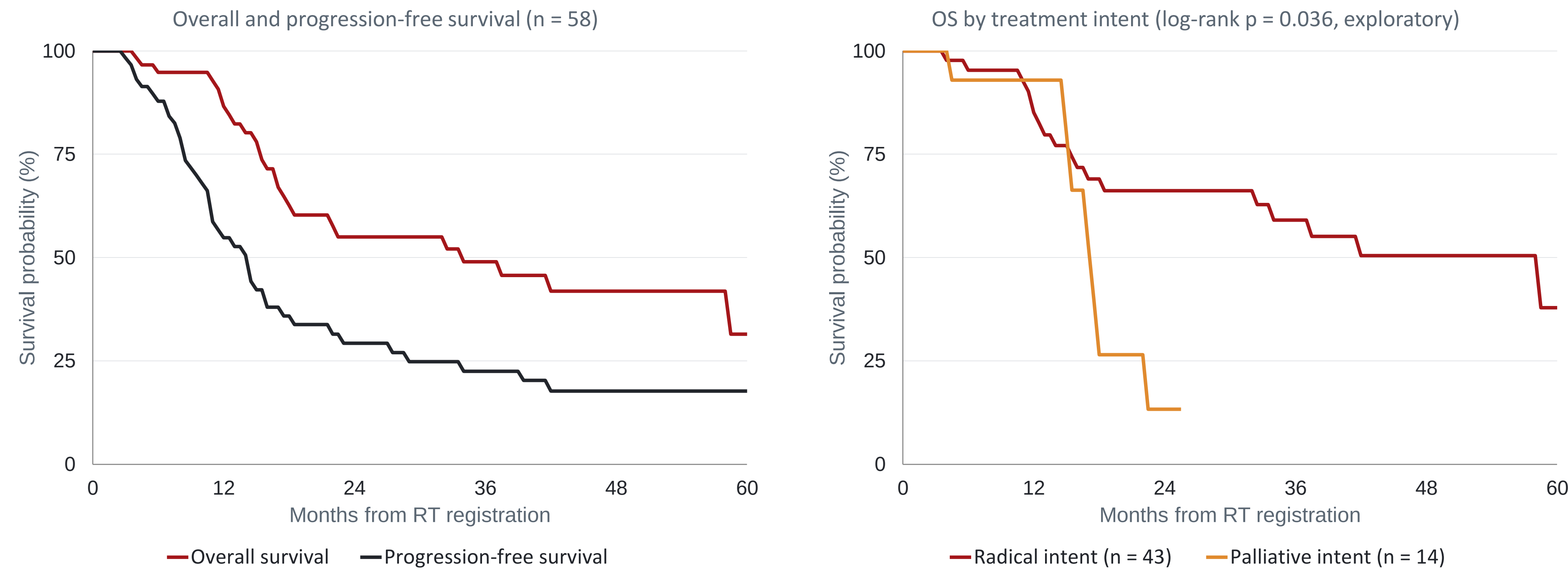
TREATMENT



RESPONSE (RECIST)



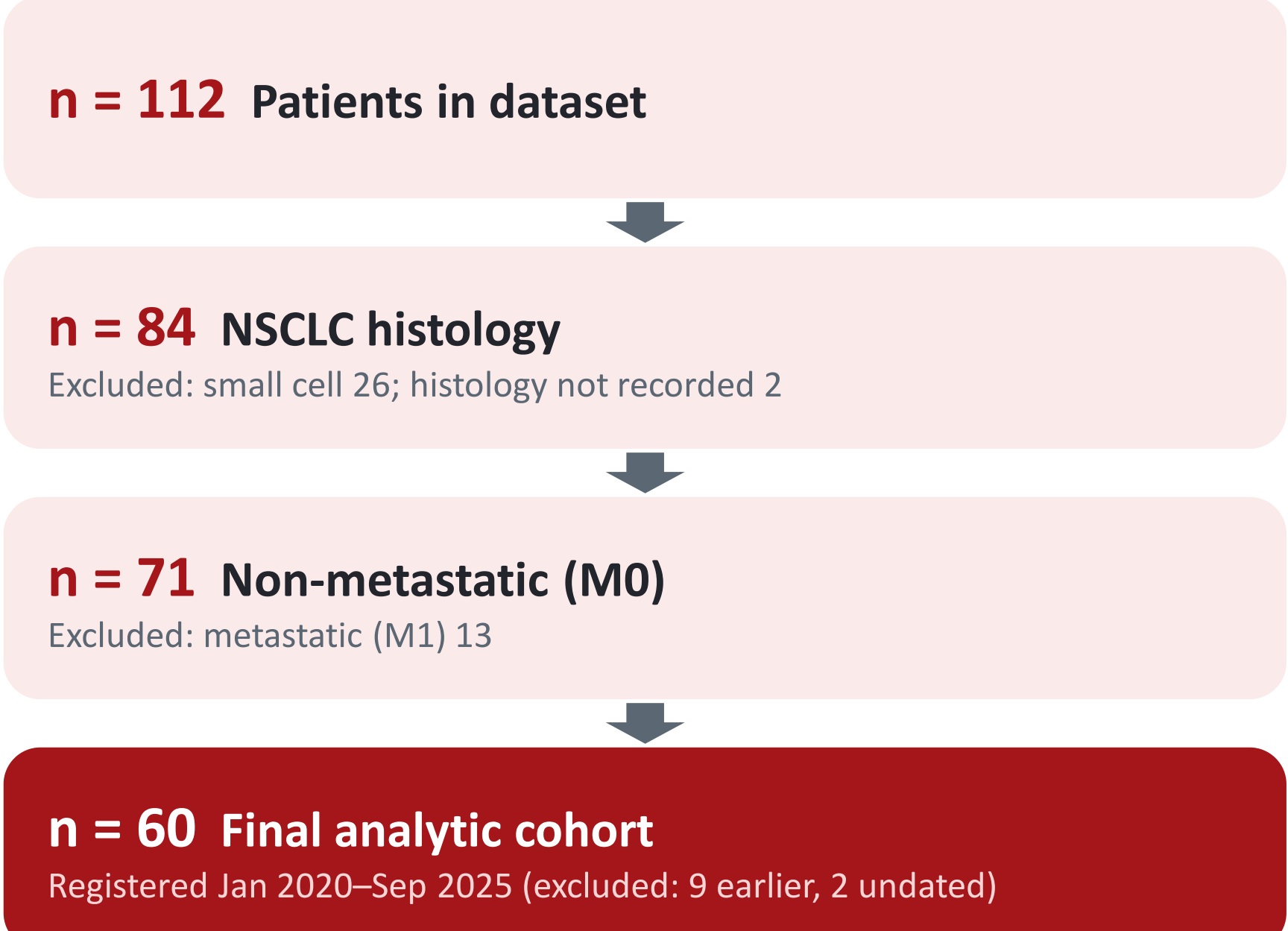
SURVIVAL OUTCOMES



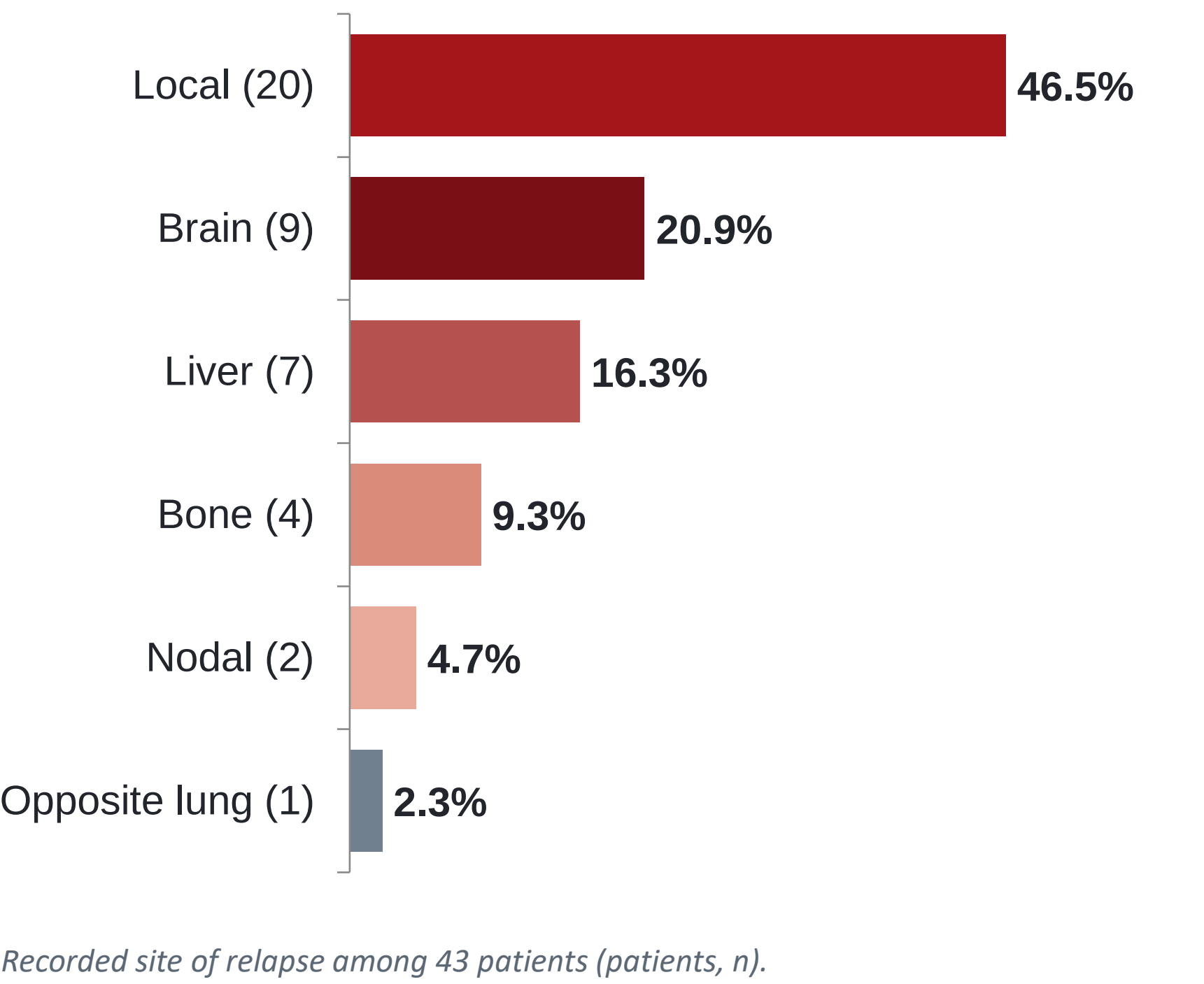
34.0 months Median OS 95% CI 17.2–NR	86.6% 1-year OS 95% CI 74–93%	55.0% 2-year OS 95% CI 39–68%	14.1 months Median PFS 95% CI 10.6–17.1	40.0 months Median follow-up reverse Kaplan–Meier
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OS: 26 deaths; PFS: 42 events (progression or death). 2 patients without a last-contact date excluded from time-to-event analysis. Five patients recorded as alive but with a death date were counted as deaths. Curves shown to 60 months; the intent comparison excludes one emergency-intent patient; NR = not reached.

PATIENT FLOW



PATTERN OF RELAPSE



CONCLUSION

- In 60 patients with inoperable, non-metastatic NSCLC treated with VMAT, median OS was 34.0 months (95% CI 17.2–NR), with 1- and 2-year OS of 86.6% and 55.0%.
- Median PFS was 14.1 months; 73.1% of evaluable patients achieved partial response or stable disease.
- Local relapse was the commonest recorded failure site (46.5%). Radical-intent patients fared better than palliative-intent patients (exploratory).

Limitations: retrospective single-arm design; 11 patients lost to follow-up; toxicity not captured; OAR dosimetry available for only 3 patients. Prospective evaluation with toxicity reporting is warranted.