

INTRODUCTION

Small Cell Lung Cancer (SCLC) represents 15% of lung cancer and is characterized by rapid growth with metastasis resulting in poor survival rates.¹ SCLC with a limited stage defined as disease limited to the hemithorax with no evidence of current metastasis.² The current gold standard includes chemoradiation and prophylactic cranial irradiation (PCI)^{3,4} which can result in acute adverse effects that do not improve over time.² These include long-term toxicity with neurocognitive impairment, decrease short term memory and change in personality. An alternative treatment is the implementation of a watchful waiting strategy utilizing Gamma Knife Radiosurgery on a single or a few metastatic lesions as they appear. With Gamma Knife Radiosurgery, treating small lesions to a high dose with little irradiation to the rest of the brain does not result in cognitive side effects. Patients are subjected to close image surveillance of serial MRIs monthly to determine if Gamma Knife is necessary.

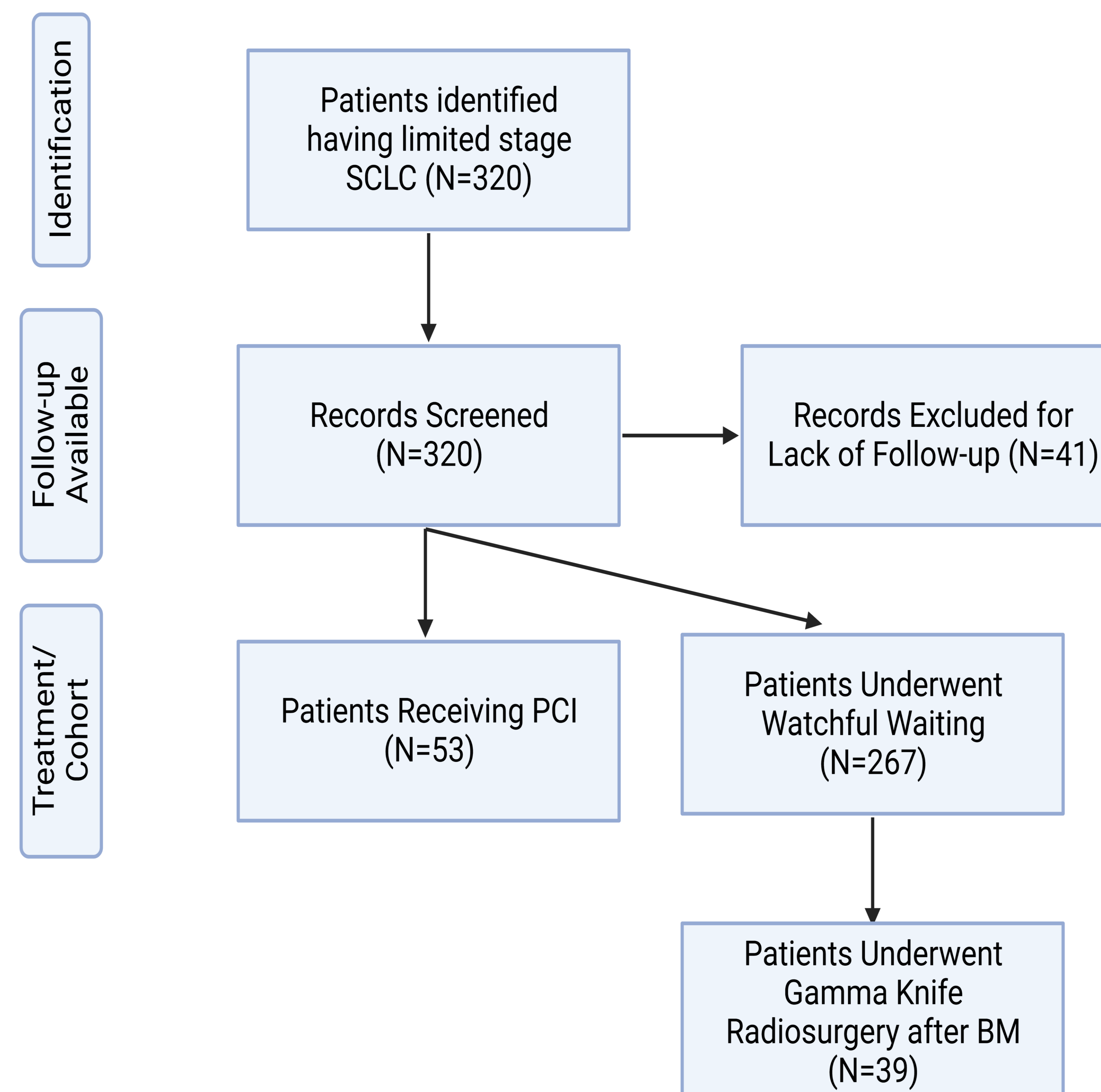
MATERIALS & METHODS

Patients were identified from chart review with previous diagnosis of small cell lung cancer. Through chart abstraction, patients with limited stage SCLC were abstracted. Treatment received was recorded to determine if the patient received PCI or watchful waiting with serial MRI surveillance with or without gamma knife. Recurrence of brain metastasis and overall survival were key factors analyzed to determine difference in the two treatment strategies. As well as treatments, the chart was abstracted for mentions and diagnoses of cognitive impairment that developed after treatment to determine differences in treatment adverse events.

RESULTS

Patients with limited stage small cell lung cancer at ECU Health were identified (N=320) and were chart abstracted by the authors. Diagnosis of limited stage small cell lung cancer was confirmed in the chart and treatments and outcomes were recorded. During this review, patients were excluded due to lack of adequate follow-up (N=41), including treatment reviewed outside ECU or those lost to follow-up after diagnosis. Of the remaining patients included in the study (N=279), patients were identified as having received PCI (N=53), were put on watchful waiting with no recurrence (N=187), and those who were on watchful waiting who received Gamma Knife Radiosurgery after discovery of brain metastasis (N=39).

Further abstraction will be carried out in the Department of Radiation Oncology to determine additional patients who underwent Gamma Knife Radiosurgery in the department whose records were not in ECU Health's EHR. As this abstraction is still ongoing, additional findings are yet to be found. We hope to continue expanding the cohort and add to the number of PCI and Gamma Knife patients.



DISCUSSION

The use of serial MRIs is vital to catching brain metastasis in patients with limited stage SCLC allows the provider to delay treatment that has known serious side effects. The MRIs are capable of detecting metastasis while still small enough to be treated with Gamma Knife. This tactic can spare patients from high cumulative radiation doses to the whole brain and prevent neurocognitive decline.

REFERENCES

- 1) Rudin CM, Brambilla E, Faivre-Finn C, Sage J. Small-cell lung cancer. *Nat Rev Dis Primers*. 2021 Jan 14;7(1):3. doi: 10.1038/s41572-020-00235-0. PMID: 33446664; PMCID: PMC8177722.
- 2) Wang Z, Chen L, Sun L, Cai F, Yang Q, Hu X, Fu Q, Chen W, Li P, Li W. Prophylactic cranial irradiation for extensive stage small cell lung cancer: a meta-analysis of randomized controlled trials. *Front Oncol*. 2023 May 17;13:1086290. doi: 10.3389/fonc.2023.1086290. PMID: 37265787; PMCID: PMC10229841.
- 3) Aupérin A, Arriagada R, Pignon JP, Le Péchoux C, Gregor A, Stephens RJ, Kristjansen PE, Johnson BE, Ueoka H, Wagner H, Aisner J. Prophylactic cranial irradiation for patients with small-cell lung cancer in complete remission. *Prophylactic Cranial Irradiation Overview Collaborative Group*. *N Engl J Med*. 1999 Aug 12;341(7):476-84. doi: 10.1056/NEJM199908123410703. PMID: 10441603.
- 4) Yang GY, Matthews RH. Prophylactic cranial irradiation in small-cell lung cancer. *Oncologist*. 2000;5(4):293-8. doi: 10.1634/theoncologist.5-4-293. PMID: 10964996.

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