université PARIS DIDEROT


SIT
Société d'Imagerie Thoracique

# J'ai lu pour vous: Radiologie interventionnelle

A. Khalil

# Introduction

- Ablations tumorales
- Ponctions Trans-thoraciques

# Ablations tumorales

# Ablation tumorale du cancer bronchique

2 Etudes analysant un cohorte comparant la RF à la Radiothérapie stéréotaxique dans le cancer bronchique stade I: T1a, T1b, T1c, T2A N0 M0

# Survival Rates after Thermal Ablation versus Stereotactic Radiation Therapy for Stage 1 Non–Small Cell Lung Cancer: A National Cancer Database Study

Radiology 2018; 00:1–9 • https://doi.org/10.1148/radiol.2018180979

*Johannes*
*Justin D.*

Patients with stage 1 NSCLC were defined by American Joint Committee of Cancer (seventh edition) criteria as either T1a, T1b, T1c, or T2a NSCLC without nodal involvement (N0) or metastases (M0). The burden of the patients' comorbid diseases was measured by using the Charlson comorbidity index,

Sociodemographic variables were evaluated as potential predictors for NSCLC treatment by TA. The primary outcome evaluated was overall survival, which was defined as time from NSCLC diagnosis to death from any cause or censoring. Because of the risk profile associated with TA, a secondary outcome of unplanned hospital readmission within 30 days after treatment was also evaluated as a surrogate parameter for complications.

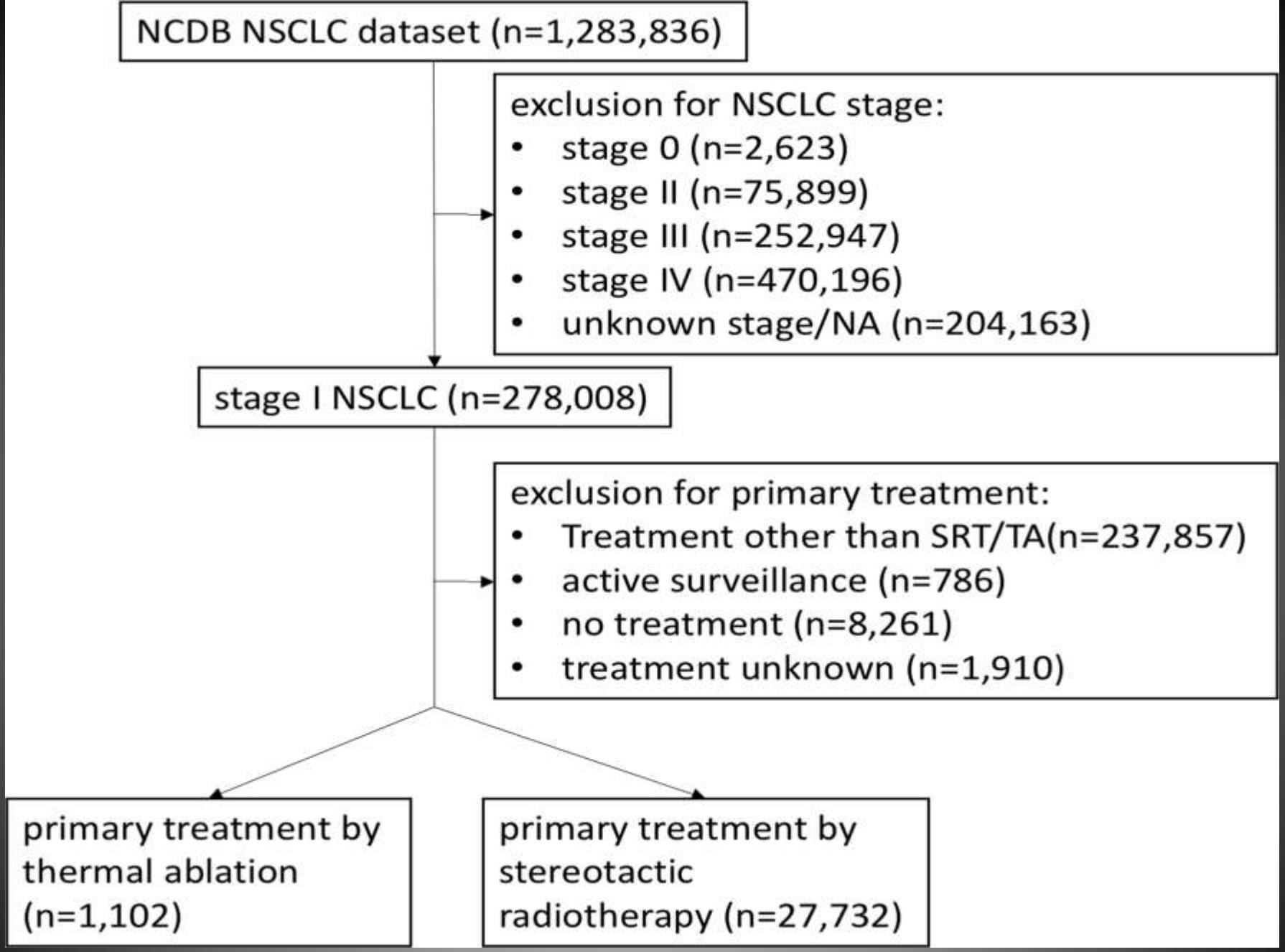


Figure 1: Flowchart of study participant exclusion and inclusion. NA = not applicable, NCDB = National Cancer Database, NSCLC = non–small cell lung cancer, SRT = stereotactic radiation therapy,

**Table 1: Baseline Characteristics of Included Patients**

| Parameter | Total ($n$ = 28834) | Treatment with Stereotactic Radiation Therapy ($n$ = 27732) |
|---|---|---|
| Median age (y)* | 60.0 (53.0–65.0) | 60.0 (53.0–65.0) |
| Sex | | |
| Women | 15493 (53.7) | 14895 (53.7) |
| Men | 13341 (46.3) | 12837 (46.3) |
| Ethnicity | | |
| African American | 2337 (8.1) | 2281 (8.2) |
| White | 25839 (89.6) | 24815 (89.5) |
| Other | 658 (2.3) | 636 (2.3) |
| Insurance status | | |
| Private insurance | 3728 (12.9) | 3573 (12.9) |
| Medicare | 22991 (79.7) | 22109 (79.7) |
| Medicaid | 797 (2.8) | 766 (2.8) |
| Government insurance | 750 (2.6) | 739 (2.7) |
| Not insured or unknown insurance | 568 (2.0) | 545 (2.0) |
| Median household income for residence area | | |
| <$38000 | 5416 (18.8) | 5253 (18.9) |
| $38000-$47999 | 7537 (26.1) | 7243 (26.1) |
| $48000-$62999 | 7784 (27.0) | 7536 (27.2) |
| ≥$63000 | 7723 (26.8) | 7345 (26.5) |
| Missing data | 374 (1.3) | 355 (1.3) |
| Education: proportion of residents without high school diploma | | |
| ≥21% | 4323 (15.0) | 4183 (15.1) |
| 13%–20.9% | 7779 (27.0) | 7508 (27.1) |
| 7%–12.9% | 10017 (34.7) | 9604 (34.6) |
| <7% | 6351 (22.0) | 6092 (22.0) |
| Missing data | 364 (1.3) | 345 (1.2) |
| Residency area | | |
| Metropolitan area | 22943 (79.6) | 22112 (79.7) |
| Urban area | 3557 (12.3) | 3430 (12.4) |
| Rural area or residency area not reported | 2334 (8.1) | 2190 (7.9) |
| Distance to hospital (km) | | |
| Median* | 10.1 (4.4–25.1) | 10.1 (4.4–25.2) |
| Missing data | 350 (1.2) | 331 (1.2) |
| Charlson comorbidity index score | | |
| 0 | 16556 (57.4) | 16033 (57.8) |
| 1 | 7810 (27.1) | 7448 (26.9) |
| ≥2 | 4468 (15.5) | 4251 (15.3) |
| Tumor location | | |
| Lower lobe | 9158 (31.8) | 8769 (31.6) |
| Middle lobe | 1355 (4.7) | 1306 (4.7) |
| Upper lobe | 17376 (60.3) | 16742 (60.4) |
| Other location | 945 (3.3) | 915 (3.3) |
| Tumor grade | | |
| I | 2153 (7.5) | 2055 (7.4) |
| II | 4685 (16.2) | 4512 (16.3) |
| IV | 129 (0.4) | 123 (0.4) |
| Unknown | 21867 (75.8) | 21042 (75.9) |
| Median tumor size (mm)* | 22.0 (16.0–29.0) | 22.0 (16.0–29.0) |

**Table 2: Characteristics of One-to-One Propensity Score–matched Patients**

| Parameter | Treatment with Stereotactic Radiation Therapy ($n$ = 1070) | Treatment with Thermal Ablation ($n$ = 1070) | $P$ Value |
|---|---|---|---|
| Median age (y)* | 59.0 (53.0–65.0) | 59.0 (53.0–65.0) | .87 |
| Sex | | | .43 |
| Women | 601 (56.2) | 582 (54.4) | |
| Men | 469 (43.8) | 488 (45.6) | |
| Ethnicity | | | .47 |
| African American | 55 (5.1) | 55 (5.1) | |
| White | 984 (92.0) | 993 (92.8) | |
| Other | 31 (2.9) | 22 (2.1) | |
| Insurance status | | | .94 |
| Private insurance | 158 (14.8) | 152 (14.2) | |
| Medicare | 844 (78.9) | 856 (80.0) | |
| Medicaid | 35 (3.3) | 30 (2.8) | |
| Government insurance | 13 (1.2) | 11 (1.0) | |
| Not insured or unknown insurance | 20 (1.9) | 21 (2.0) | |
| Median household income for residence area | | | .99 |
| <$38000 | 167 (15.6) | 163 (15.2) | |
| $38000–$47999 | 286 (26.7) | 291 (27.2) | |
| $48000–$62999 | 244 (22.8) | 247 (23.1) | |
| ≥$63000 | 373 (34.9) | 369 (34.5) | |
| Residency area | | | >.99 |
| Metropolitan area | 829 (77.5) | 829 (77.5) | |
| Urban area | 127 (11.9) | 127 (11.9) | |
| Rural area or residency area not reported | 114 (10.7) | 114 (10.7) | |
| Charlson comorbidity index score | | | .56 |
| 0 | 510 (47.7) | 511 (47.8) | |
| 1 | 335 (31.3) | 352 (32.9) | |
| ≥2 | 225 (21.0) | 207 (19.3) | |
| Tumor grade | | | .24 |
| Grade I, II | 242 (22.6) | 266 (24.9) | |
| Grade III, IV, or unknown | 828 (77.4) | 804 (75.1) | |
| Median tumor size (mm)* | 19.0 (14.0–25.0) | 19.0 (15.0–25.0) | .64 |
| Treatment facility type | | | .67 |
| Academic and/or research program | 516 (48.2) | 527 (49.3) | |
| Other treatment facility type | 554 (51.8) | 543 (50.7) | |
| Treatment facility location | | | .85 |
| East North Central | 202 (18.9) | 205 (19.2) | |
| East South Central | 80 (7.5) | 74 (6.9) | |
| Middle Atlantic | 232 (21.7) | 221 (20.7) | |
| Mountain | 37 (3.5) | 32 (3.0) | |
| New England | 162 (15.1) | 177 (16.5) | |
| Pacific | 98 (9.2) | 81 (7.6) | |
| South Atlantic | 157 (14.7) | 171 (16.0) | |
| West North Central | 46 (4.3) | 47 (4.4) | |
| West South Central | 56 (5.2) | 62 (5.8) | |
| 30-day unplanned hospital readmission | | | <.001 |
| No unplanned readmission | 1068 (99.8) | 1030 (96.3) | |
| Unplanned readmission | 2 (0.2) | 40 (3.7) | |

Note.—Unless otherwise indicated, data are numbers of patients and data in parentheses are percentages.

* Data are continuous variables; data in parentheses are interquartile ranges.

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| Unplanned readmission | 2 (0.2) | 40 (3.7) | |
| 0 | 510 (47.7) | 511 (47.8) | |
| 1 | 335 (31.3) | 352 (32.9) | |
| ≥2 | 225 (21.0) | 207 (19.3) | |
| Tumor grade | | | .24 |
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| Mountain | 37 (3.5) | 32 (3.0) | |
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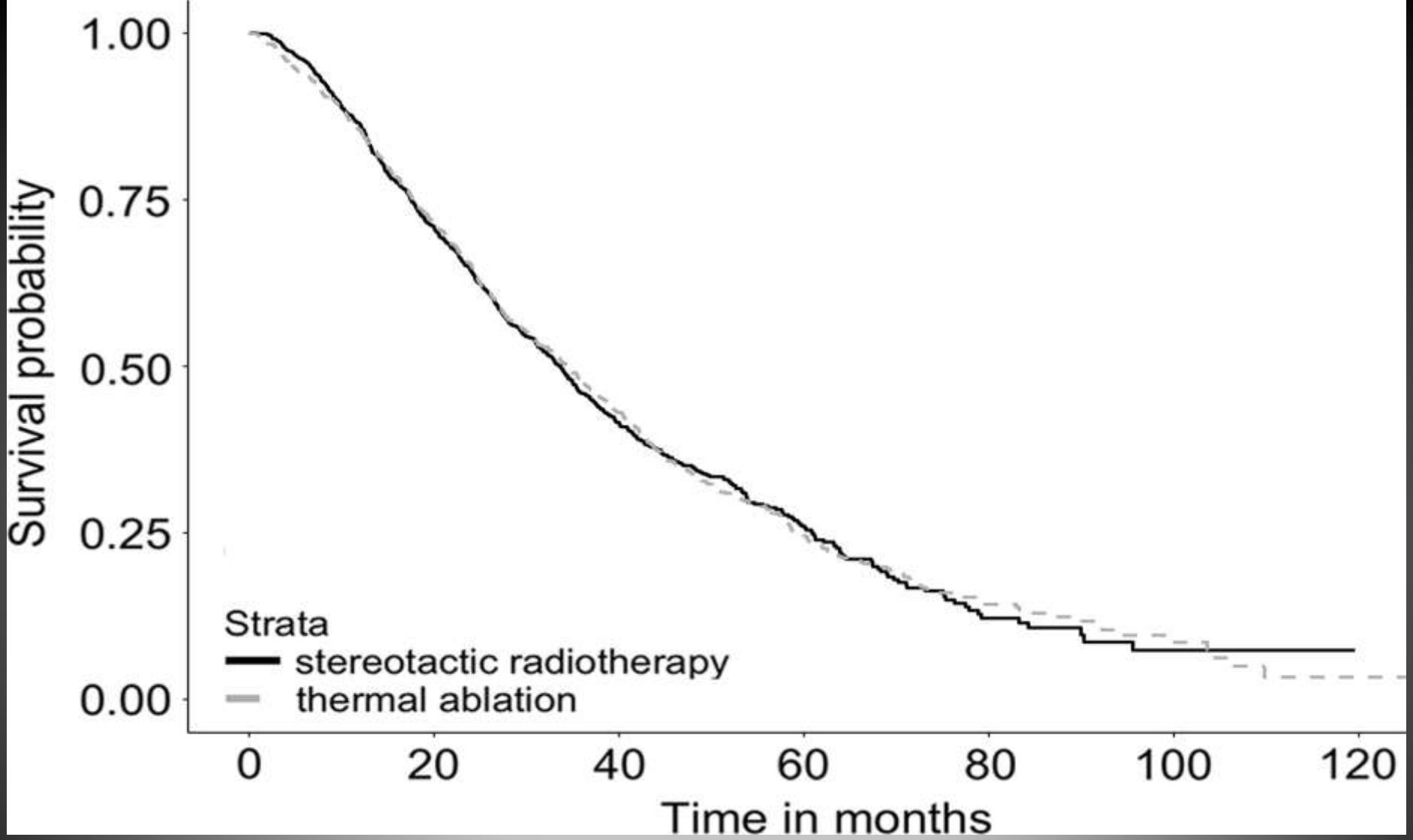



Figure 4: Kaplan-Meier plot shows the nonsignificant overall survival differences for patients who underwent thermal ablation compared with stereotactic radiation therapy as primary treatment for stage 1 non–small cell lung cancer (*P* = .694).

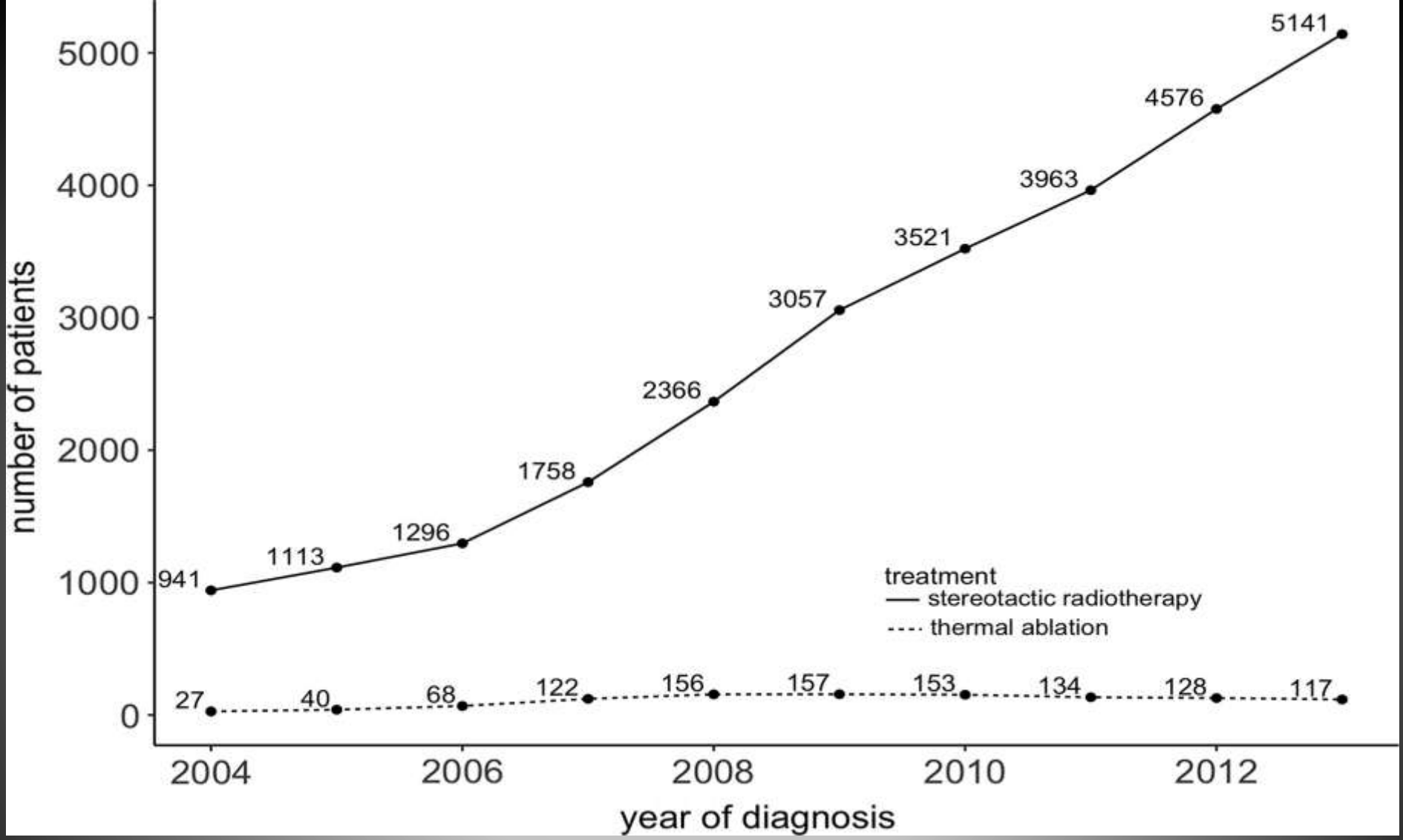



Figure 2: Graph of absolute number of patients with stage 1 non–small cell lung cancer treated by thermal ablation and stereotactic radiation therapy between 2004 and 2013 in the National Cancer Database.

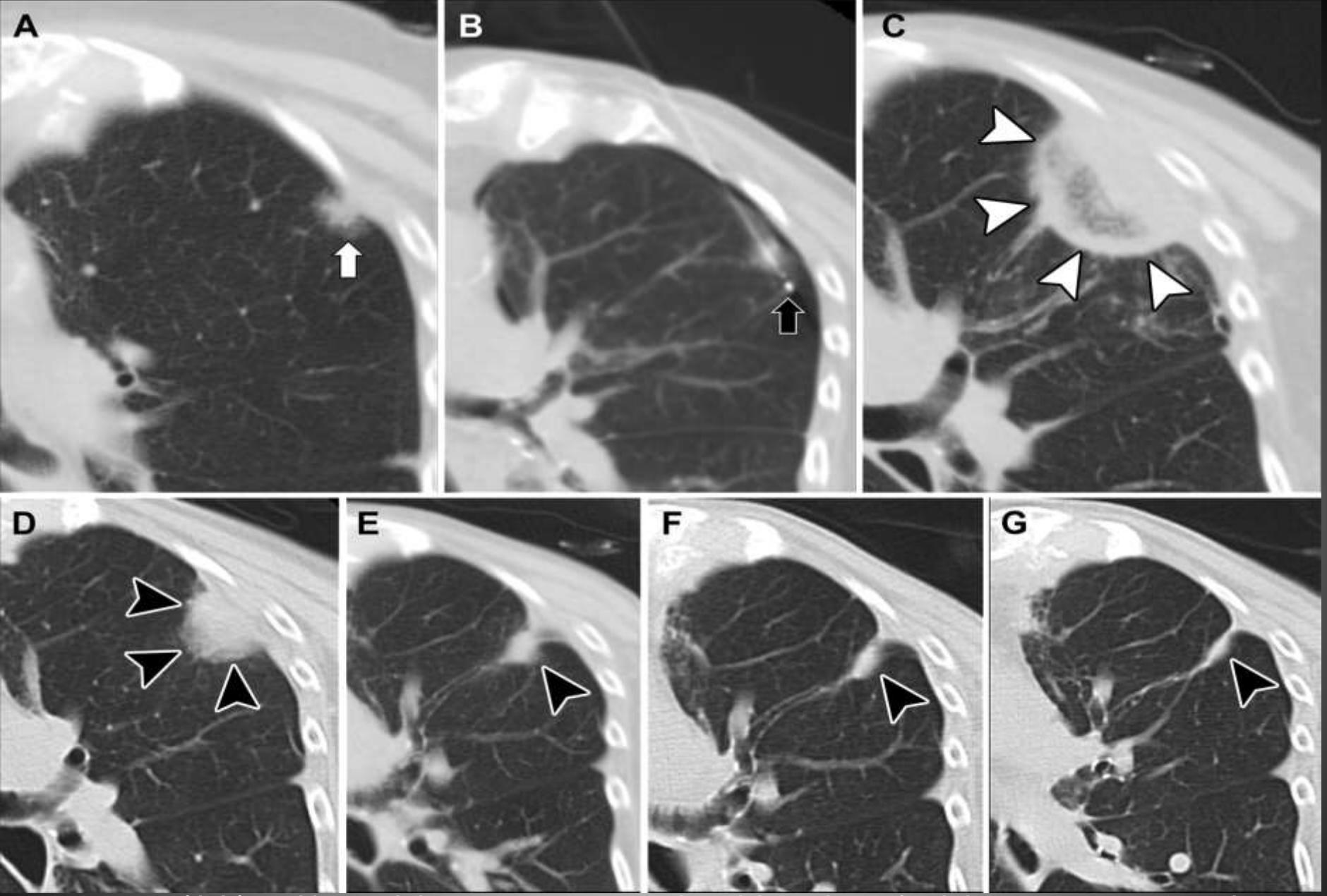



Figure 5: CT images of the left upper lobe mass, which was, *A*, a stage 1 (T1a, N0, M0) histopathologic analysis–confirmed adenocarcinoma (arrow in *A*). *B*, With CT guidance, an ablation probe was positioned for thermal ablation of the lung mass (arrow in *B*). *C*, CT imaging at 6 weeks showed consolidations of the postablation zone (arrowheads in *C*). *D*, Follow-up CT at 6 months showed gradual involution of the ablation zone (arrowheads in *D*). On CT images obtained 3 years *(E)*, 4 years *(F)*, and 5 years *(G)* after thermal ablation, a residual scar is visible (arrowheads on *E*–*G*). At 5 years *(G)*, there is no evidence of local recurrence or metastatic disease. (Images courtesy of Stephen B. Solomon, MD, Memorial Sloan-Kettering Cancer Center, New York, NY.)

# Survival Rates after Thermal Ablation versus Stereotactic Radiation Therapy for Stage 1 Non–Small Cell Lung Cancer: A National Cancer Database Study

Radiology 2018; 00:1–9 • https://doi.org/10.1148/radiol.2018180979

## Summary

Patients who underwent thermal ablation had equivalent survival rates compared with those who underwent stereotactic radiation therapy for stage 1 non–small cell lung cancer in this National Cancer Database study.

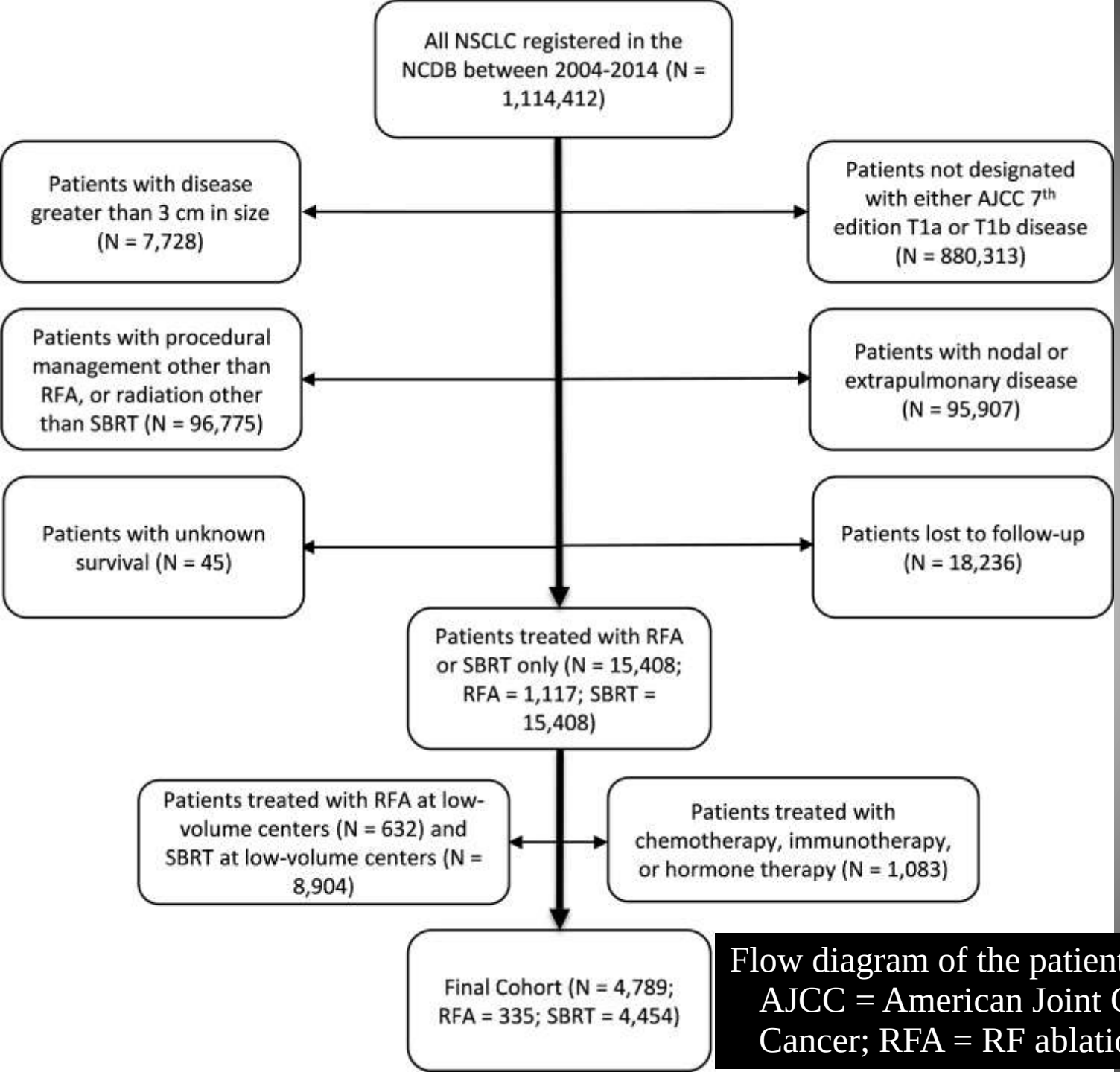
## Implication for Patient Care

Thermal ablation appears to offer comparable 5-year survival rates to stereotactic radiation therapy in patients with stage 1 non–small cell lung cancer. This information can be considered along with known or expected differences in number of required treatments, costs, and complication profiles.

# A National Cancer Database Analysis of Radiofrequency Ablation versus Stereotactic Body Radiotherapy in Early-Stage Non–Small Cell Lung Cancer

Alexander Lam, MD, Emi J. Yoshida, MD, Kevin Bui, MD, Dayantha Fernando, MD, Kari Nelson, MD, and Nadine Abi-Jaoudeh, MD

*J Vasc Interv Radiol 2018; 29:1211–1217*

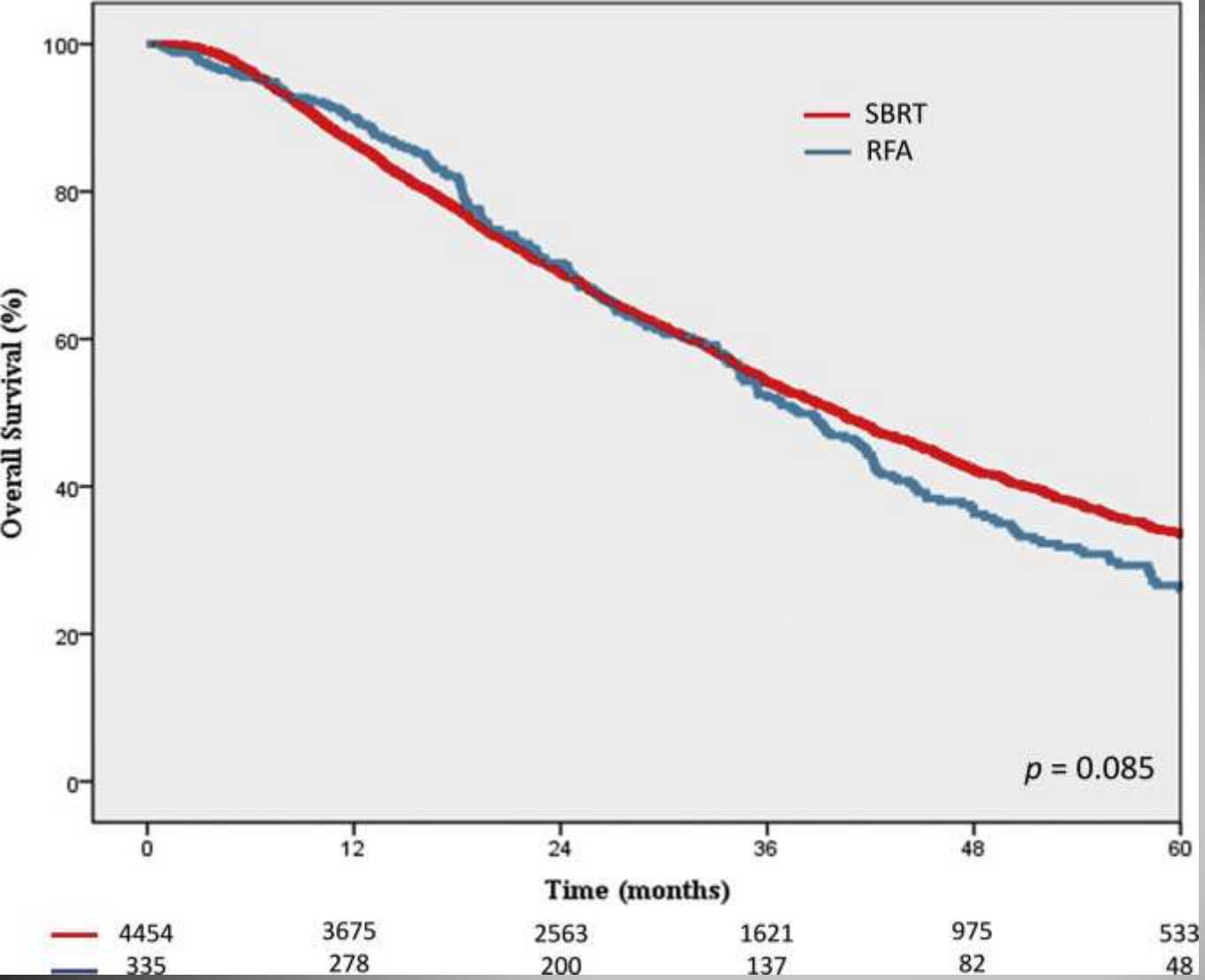



Flow diagram of the patient selection process. AJCC = American Joint Committee on Cancer; RFA = RF ablation.

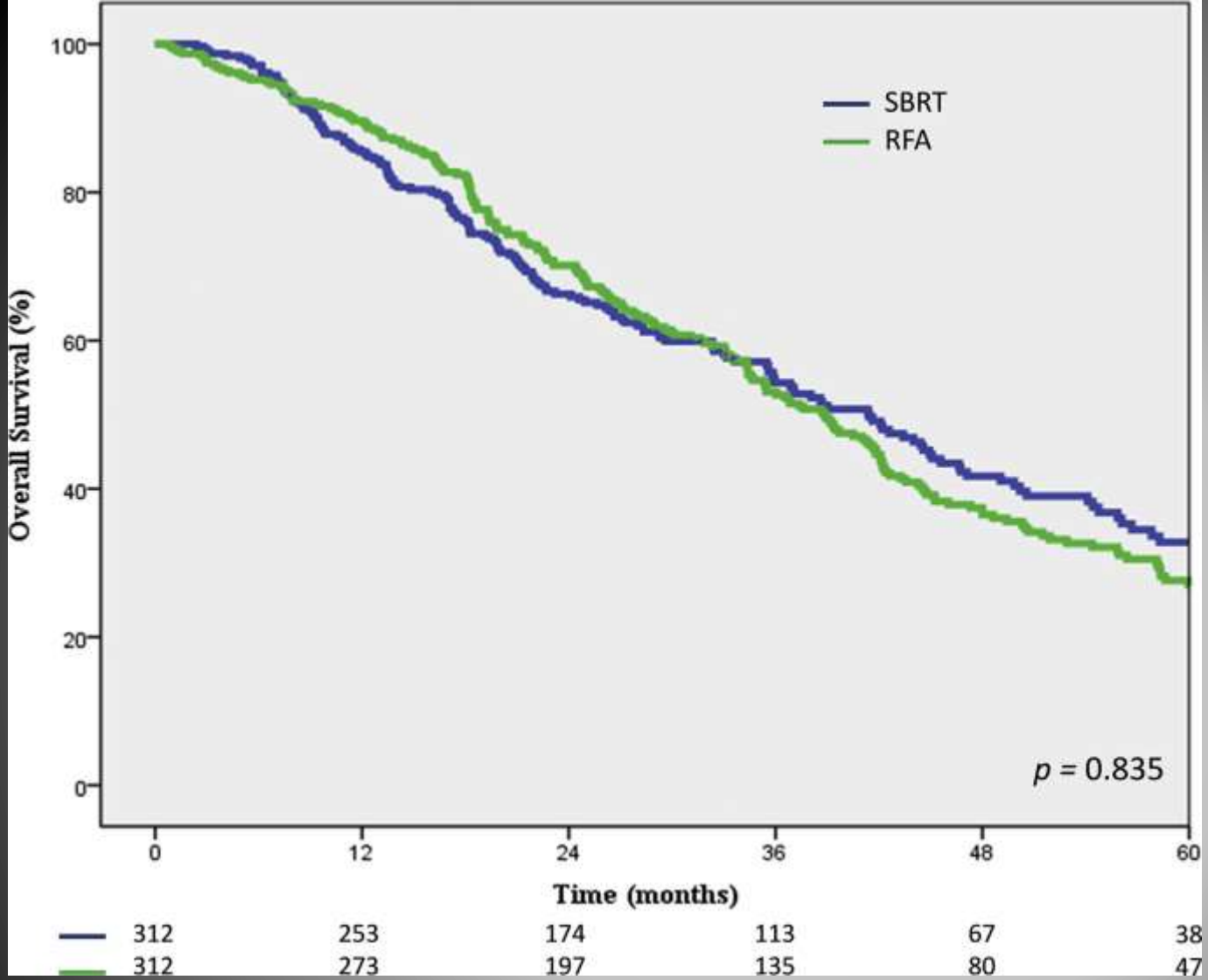
The eligibility criteria were met by 4,789 patients. Of these cases, 335 patients (7.0%) were treated with RF ablation, and 4,454 (93%) were treated with SBRT. Among the 305 facilities that performed RF ablation initially included in the query, 15 were designated as HVCs, treating > 12 patients from 2004 to 2014. For SBRT, 42 centers were designated as HVCs from the initial 837 facilities, treating > 76 patients from 2004 to 2014. The mean age of

RF: 305 centres / 17 centres ont été sélectionnés comme grande structure, >12 patients (2004-2014)

SBRT: 837 centres / 42 centres ont été sélectionnés comme grande structure, >76 patients (2004-2014)




Log-rank analysis of unadjusted Kaplan-Meier survival curves comparing treatment type. The number of patients at risk is listed below each time interval. *P* value for the log-rank test is included. RFA = RF ablation.




Log-rank analysis of the propensity score adjusted Kaplan-Meier survival curves comparing treatment types and stratified by propensity score. The number of patients at risk is listed below each time interval. *P* value for the log-rank test is included. RFA = RF ablation.

# A National Cancer Database Analysis of Radiofrequency Ablation versus Stereotactic Body Radiotherapy in Early-Stage Non–Small Cell Lung Cancer

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**Results:** The final cohort comprised 4,454 cases of SBRT and 335 cases of RF ablation. Estimated median survival and follow-up were 38.8 months and 42.0 months, respectively. Patients treated with RF ablation had significantly more comorbidities ($P < .001$) and higher risk for an unplanned readmission within 30 days (hazard ratio = 11.536; $P < .001$). No difference in OS for the unmatched groups was found on multivariate Cox regression analysis ($P = .285$). No difference was found in the matched groups with 1-, 3-, and 5-year OS of 85.5%, 54.3%, and 31.9% in the SBRT group vs 89.3%, 52.7%, and 27.1% in the RF ablation group ($P = .835$).

**Conclusions:** No significant difference in OS was seen between patients with early-stage NSCLC treated with RF ablation and SBRT.

Survie médiane: SBRT (38,8 M) RF (42M)

Comorbidité: RF>SBRT (p<0,001); Hospitalisation non prévue en 30J: RF>SBRT (hazard ratio . 11,536; P <.001).

Pas de différence de survie entre les deux groupes

# Ponctions trans-thoraciques

Clinical Radiology xxx (2018) 1–7

Contents lists available at ScienceDirect

Clinical Radiology

journal homepage: www.clinicalradiologyonline.net

# Non-malignant pathological results on transthoracic CT guided core-needle biopsy: when is benign really benign?

Y. Rui [a], M. Han [a], W. Zhou [a], Q. He [a], H. Li [b], P. Li [a], F. Zhang [a], Y. Shi [a], X. Su [a,b,*]

**Table 1**
Characteristics of the first transthoracic CT-guided core-needle biopsy (TTNB) of 950 patients with non-malignant initial findings.

| | | *n* | % |
|---|---|---|---|
| Gender | Male | 667 | 70.2% |
| | Female | 283 | 29.8% |
| Age | Mean± SD | 54.3±14.6 | |
| Smokers | Yes | 471 | 49.6% |
| | No | 479 | 50.4% |
| Prior malignancy | Yes | 39 | 4.1% |
| | No | 911 | 95.9% |
| Target location | lower | 448 | 47.2% |
| | Upper + middle | 489 | 51.5% |
| | Mediastinum | 3 | 0.3% |
| | Missing | 10 | 1.1% |
| Target size (mm) | Mean ± SD | 44.2± 22.3 | |
| Number of biopsy samples per TTNB | 1 | 228 | 24% |
| | 2 | 329 | 34.6% |
| | 3+ | 297 | 31.3% |
| | Fragmented tissues | 72 | 7.6% |
| | missing | 24 | 2.5% |
| Target morphology | Nodule | 222 | 23.4% |
| | Cavity | 38 | 4% |
| | consolidation | 351 | 36.9% |
| | Mass | 339 | 35.7% |
| Length of needle path (mm) | Mean ± SD | 56.1± 19.2 | |
| Haemorrhage | Yes | 142 | 15% |
| | No | 808 | 85.1% |
| Pneumothorax | Yes | 87 | 9.2% |
| | No | 863 | 90.8% |

SD, standard deviation.

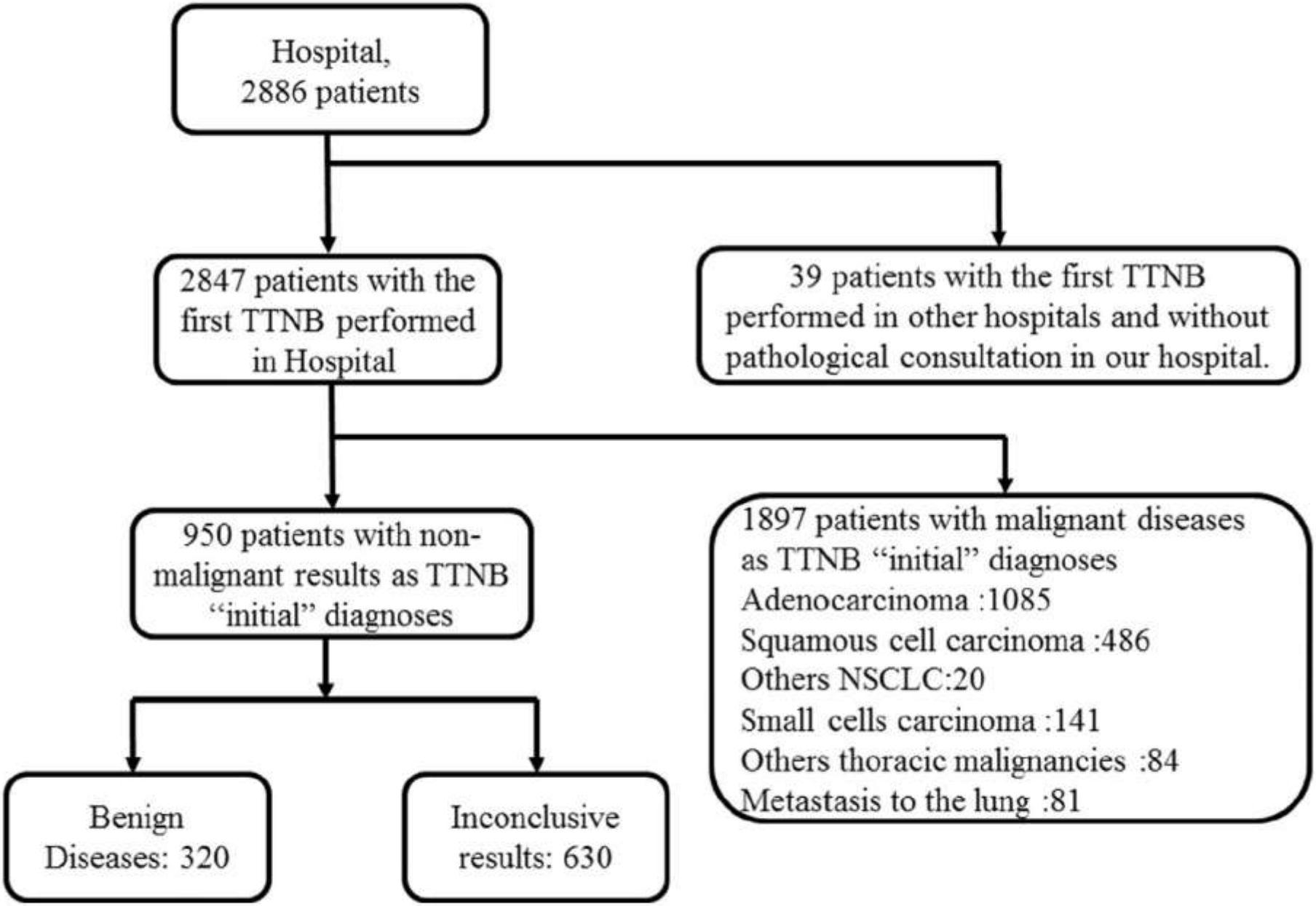


**Figure 1** Inclusion/exclusion flow chart for the study.

**Table 2**
Initial and final diagnoses for 950 non-malignant transthoracic CT-guided core-needle biopsy (TTNB).

| Final diagnosis<br>Initial results: | Total | Missing | Total (F) | Tuberculosis | Fungal infection | Infection NOS | Inflammatory disease | Benign tumour | Other benign disease[a] | Malignant disease |
|---|---|---|---|---|---|---|---|---|---|---|
| Benign diseases | 320 | 3 | 317 | 185 | 35 | 38 | 47 | 9 | | 3 |
| Tuberculosis | 185 | 2 | 183 | 183[b] | | | | | | |
| Fungal infection | 33 | | 33 | | 33[c] | | | | | |
| Infection NOS | 38 | | 38 | 1 | 1 | 35 | | | | 1 |
| Benign tumour | 9 | | 9 | | | | | 9 | | |
| Inflammatory disease | 55 | 1 | 54 | 1 | 1 | 3 | 47 | | | 2 |
| Inconclusive results | 630 | 86 | 544 | 78 | 20 | 203 | 77 | 6 | 22 | 138 |
| Necrosis | 60 | 3 | 57 | 26 | 1 | 3 | 3 | | 2 | 22 |
| Poor sample | 44 | 11 | 33 | 5 | 3 | 7 | 2 | | | 16 |
| Heterocyst | 14 | 1 | 13 | | | 2 | | 1 | 1 | 9 |
| Inflammation NOS | 253 | 31 | 222 | 21 | 12 | 113 | 23 | | 8 | 45 |
| Fibrosis process | 185 | 24 | 161 | 12 | 1 | 68 | 45 | 2 | 7 | 26 |
| Granuloma | 33 | 3 | 30 | 14 | 2 | 9 | 3 | | 1 | 1 |
| Other | 41 | 13 | 28 | 0 | 1 | 1 | 1 | 3 | 3 | 19 |
| Total | 950 | 89 | 861 | 263 | 55 | 241 | 124 | 15 | 22 | 141 |

NOS, not otherwise specified.
[a] Other benign disease=uncharacterised disease and pulmonary sequestration.
[b] One patient with initial tuberculosis was definitively diagnosed with tuberculosis and ANCA-associated vasculitis.
[c] One patient who was proved to have fungal infection also had tuberculosis.

**Table 3**
Predictive factors for false negative results in univariate and multivariate analysis in patients with a non-malignant CT-guided lung biopsy ($n$=861).

| | | OR | [CI 95%] | $p$-Value | AOR[a] | [CI 95%] | $p$-Value |
|---|---|---|---|---|---|---|---|
| Clinical characterisation | | | | | | | |
| Gender | Female | Ref | | | Ref | | |
| | Male | 1.43 | [0.95, 2.15] | 0.087 | 0.96 | [0.56, 1.66] | 0.89 |
| Age | Cont.(Y) | 1.03 | [1.01, 1.04] | <0.001 | 1.02 | [1.01, 1.04] | 0.002 |
| Smoking | Never smoked | Ref | | | Ref | | |
| | Smoker[b] | 1.715 | [1.19, 2.46] | 0.004 | 1.46 | [0.89, 2.37] | 0.13 |
| Personal history cancer | No | Ref | | | Ref | | |
| | Yes | 5.318 | [2.65, 10.69] | <0.001 | 5.29 | [2.55, 10.96] | <0.001 |
| TTNB method | | | | | | | |
| Number of biopsy samples per TTNB | Fragmented tissues | Ref | | | | | |
| | 1 | 0.77 | [0.39, 1.52] | 0.46 | | | |
| | 2 | 0.78 | [0.41, 1.48] | 0.44 | | | |
| | 3+ | 0.59 | [0.31, 1.15] | 0.12 | | | |
| Target location | Mediastinum | Ref | | | | | |
| | Lower lobe | 1.29 | [0.15, 10.69] | 0.81 | | | |
| | Upper + median | 1.61 | [0.19, 13.23] | 0.66 | | | |
| Target size (mm) | Cont. (mm) | 1.01 | [1.00, 1.02] | 0.003 | 1.01 | [1.01, 1.02] | 0.02 |
| Solitary nodule | No | Ref | | | | | |
| | Yes | 1.04 | [0.60, 1.78] | 0.90 | | | |
| Length of needle path (mm) | Cont. (mm) | 1.01 | [1.00, 1.02] | 0.03 | 1.01 | [0.999, 1.02] | 0.07 |
| Pneumothorax | No | Ref | | | | | |
| | Yes | 2.01 | [1.19, 3.41] | 0.01 | 2.332 | [1.332, 4.08] | 0.003 |

TTNB, transthoracic CT-guided core-needle biopsy.
[a] AOR=computed in the model adjusted for gender, age, smoking, target size (mm), target morphology, length of needle path (mm) and pneumothorax.
[b] Current smoker and former smoker are combined.

**Table 4**

Additional invasive exams performed to obtain the final diagnosis in the 861 transthoracic CT-guided core-needle biopsy (TTNB) with non-malignant results.

| | | *N*=861 |
|---|---|---|
| Additional invasive examinations performed to reach final diagnosis | At least one | 410[a] |
| | Surgery | 88 |
| | TTNB (same or other target) | 88 |
| | Biopsy of another organ | 25 |
| | Bronchial endoscopy | 303 |
| | Lung FNA | 3 |
| | B ultrasound-guided percutaneous needle biopsy | 6 |
| | No invasive examination | 451 |
| Additional invasive examinations performed to successfully reach final diagnosis | | 216 |

[a] Sixty-five patients underwent two additional invasive examinations and 19 patients underwent three additional invasive examinations to reach final diagnosis.

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# Non-malignant pathological results on transthoracic CT guided core-needle biopsy: when is benign really benign?

Y. Rui [a], M. Han [a], W. Zhou [a], Q. He [a], H. Li [b], P. Li [a], F. Zhang [a], Y. Shi [a], X. Su [a,b,*]

Résultats initiaux, pas de malignité, 83.6% étaient bénins.

Résultats:

Infection spécifique ou tumeur bénigne: vraies lésions bénignes, pas de poursuite des investigations

Granulome inflammatoire: souvent négatives mais 1 à 2 % étaient malins.

Facteurs poussant à interpréter avec précaution l'absence de malignité: sujet âgé, grosse lésion, la survenue d'un pneumothorax ou antécédent de cancer

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CHEST

# Non-specific benign pathological results on transthoracic core-needle biopsy: how to differentiate false-negatives?

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**Table 1** Univariate analysis to determine distinguishing features of false-negative malignancies from true-negative lesions among non-specific benign biopsy results

| Characteristics | False-negatives (n = 24) | True-negatives (n = 202) | P-value |
|---|---|---|---|
| Patients | | | |
| Age (y)† | 64.5 ± 9.8 | 58.9 ± 12.3 | 0.034 [a] |
| < 50 y : ≥ 50 y | 1 : 23 | 46 : 156 | 0.033 [c] |
| < 55 y : ≥ 55 y | 4 : 20 | 70 : 132 | 0.106 [c] |
| Sex (male : female) | 12 : 12 | 107 : 95 | 0.783 [b] |
| Target lesions | | | |
| Size (cm)† | 2.5 ± 2.1 | 2.4 ± 1.4 | 0.894 [a] |
| Size (≤1 cm) | 5 (20.8%) | 16 (7.9%) | 0.055 [c] |
| Lesion location (upper and middle : lower) | 14 : 10 | 107 : 95 | 0.618 [b] |
| Nodule type (part-solid : solid) | 6 : 18 | 11 : 191 | 0.001 [b] |
| SUVmax†‡ | 5.9 ± 3.9 (n = 16) | 6.7 ± 4.9 (n = 56) | 0.585 [a] |
| Biopsy variables | | | |
| Biopsy position (supine : prone) | 13 : 11 | 81 : 121 | 0.186 [b] |
| Pleura-to-target distance (cm)† | 2.5 ± 2.4 | 2.2 ± 2.1 | 0.492 [a] |
| Needle tip within target | 15 (62.5%) | 171 (84.7%) | 0.007 [b] |
| No. of tissue sampling† | 3.3 ± 0.8 | 3.1 ± 0.9 | 0.389 [a] |
| Pneumothorax | 3 (12.5%) | 23 (11.4%) | 0.745 [c] |
| Haemoptysis | 4 (16.7%) | 14 (6.9%) | 0.108 [c] |
| Granulomatous inflammation | 0 (0%) | 81 (40.1%) | 0.000 [c] |
| Clinical features | | | |
| Smoker : Non-smoker | 11 : 13 | 71 : 131 | 0.303 [b] |
| Previous tuberculosis | 5 (20.8%) | 38 (18.8%) | 0.786 [c] |
| Previous malignancy | 4 (16.7%) | 42 (20.8%) | 0.792 [c] |
| Immunocompromised status | 5 (20.8%) | 61 (30.2%) | 0.477 [c] |

*Note:* Unless otherwise indicated, data are the numbers of patients

† Data are mean ± standard deviation

‡ The mean time interval from FDG-PET scan to biopsy was 1.7 ± 8.9 days

[a] Independent sample t-test

[b] Pearson's chi-squared test

[c] Fisher's exact test

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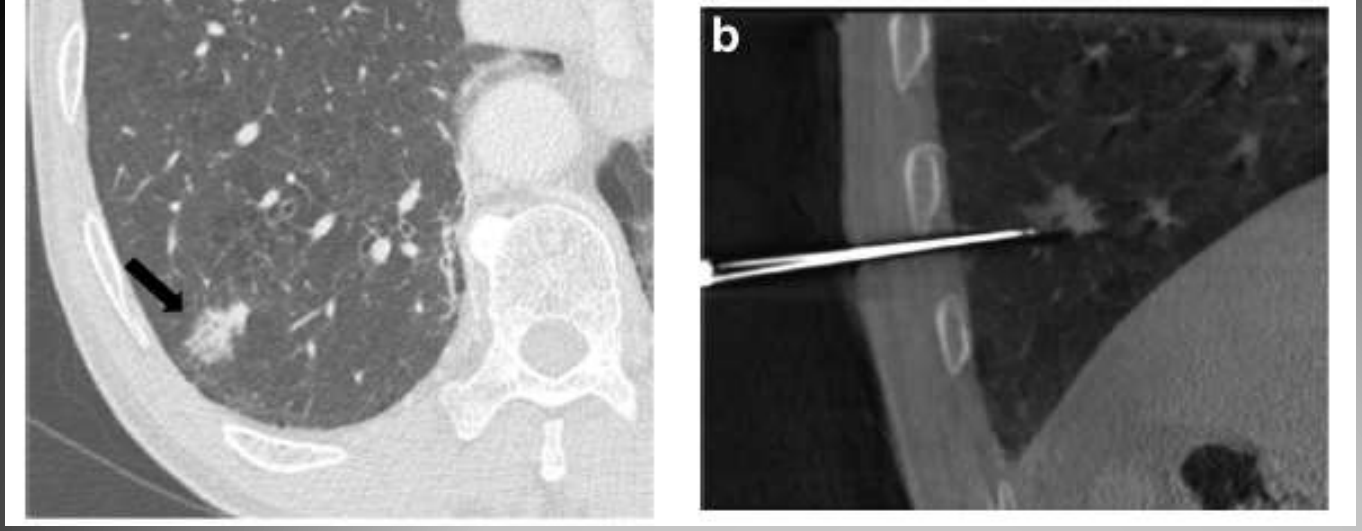


**Fig. 1** A false-negative part-solid nodule for which the biopsy result was benign non-specific pathology. (**a**) A diagnostic chest CT image in a 66-year-old man shows a 2.4-cm part-solid nodule (arrow) in the right lower lobe and lung cancer was highly suspected. (**b**) On the transverse procedural CBCT image, the coaxial needle tip abutted the mass. After the biopsy, the lesion was diagnosed as intra-alveolar macrophages and fibrins. Taking into consideration the discrepancy between the biopsy results and the CT findings, he performed a wedge resection through video-assisted thoracic surgery (VATS). Finally, the lesion was confirmed as adenocarcinoma

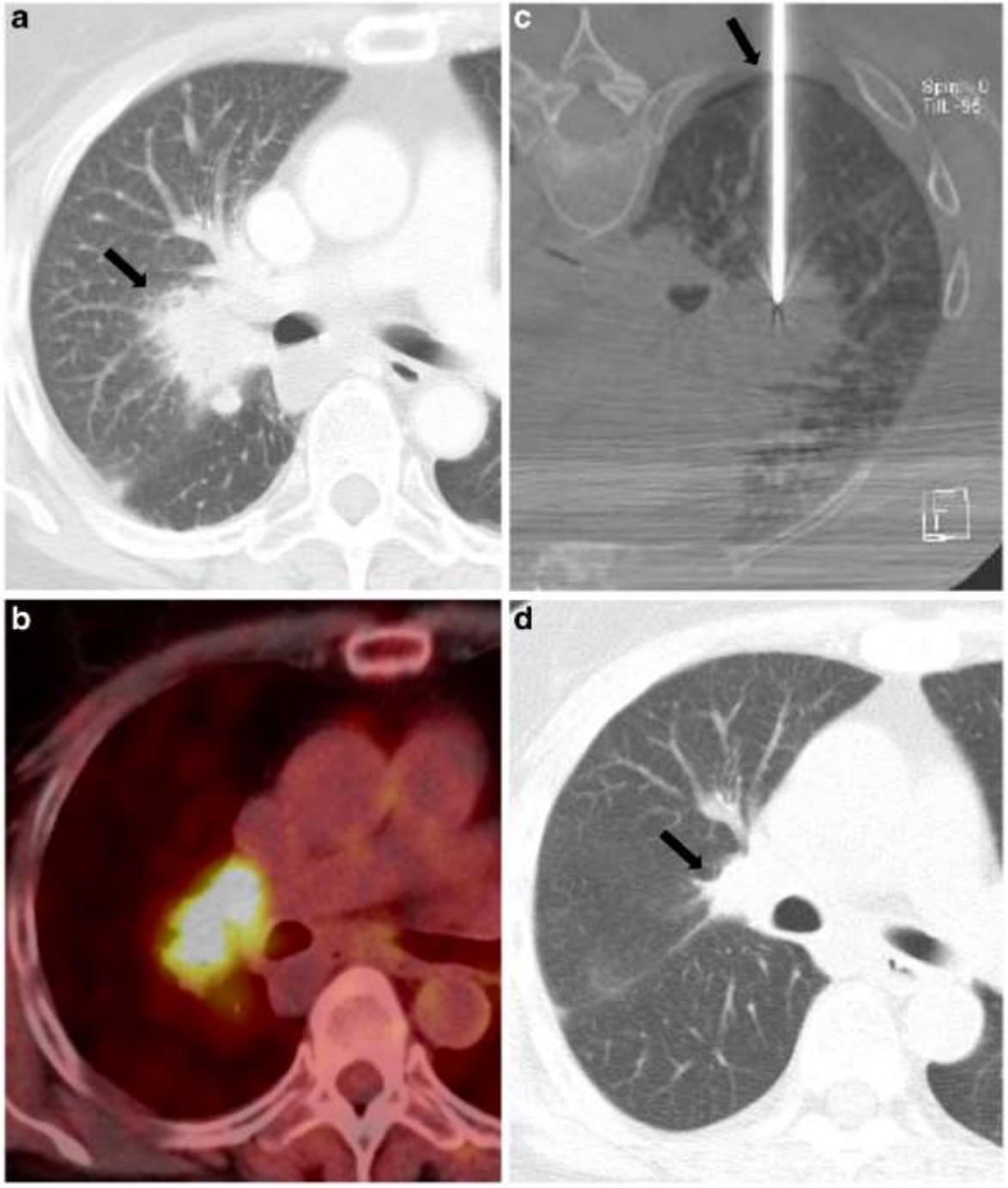


**Fig. 2** A mass for which the biopsy result was a chronic granulomatous inflammation. (**a**) A diagnostic chest CT image in a 71-year-old woman showed a 4.7-cm irregular mass (arrow) in the right upper lobe. (**b**) The maximum standardized uptake value (SUV) of the mass was 8.1 on FDG-PET/CT scan. (**c**) On the transverse procedural CBCT image, the exact location of the needle tip in the mass was noted. There was a minimal amount of pneumothorax. A chronic granulomatous inflammation with negative polymerase chain reaction for *Mycobacterium tuberculosis* (TB-PCR) was reported on the biopsy specimen. (**D**) After 6 months with conservative management, the lesion was almost completely resolved on follow-up CT scan

**Table 2** Results of multivariate logistic regression analysis to determine distinguishing false-negative malignancies from true-negative lesions among non-specific benign biopsy results

| Variables | Adjusted odds ratio | 95% CI | P-value |
|---|---|---|---|
| Needle tip within target | 0.37 | 0.14–0.98 | 0.045 |
| Granulomatous inflammation | 0.04 | 0.00–0.62 | 0.022 |
| Part-solid nodule | 3.95 | 1.21–12.85 | 0.022 |

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- VPN: diagnostic de bénignité incertain: 89,4%
- Le nodule mixte: Faux negative (OR = 3.95).
- Le granulome inflammatoire: indicateur de bénignité (vraie négative)
- Aiguille dans la cible est en faveur d'un vraie négative

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# J'ai lu pour vous: Radiologie interventionnelle

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