

Natural History of Pulmonary Subsolid Nodules: A Prospective Multicenter Study



Ryutaro Kakinuma, MD, PhD,^{a,b,c,*} Masayuki Noguchi, MD, PhD,^d
Kazuto Ashizawa, MD, PhD,^e Keiko Kuriyama, MD, PhD,^f
Akiko Miyagi Maeshima, MD, PhD,^g Naoya Koizumi, MD, PhD,^h
Tetsuro Kondo, MD, PhD,ⁱ Haruhisa Matsuguma, MD, PhD,^j Norihisa Nitta, MD, PhD,^k
Hironobu Ohmatsu, MD, PhD,^l Jiro Okami, MD, PhD,^m Hiroshi Suehisa, MD, PhD,^{n,o}
Taiki Yamaji, MD, PhD,^{p,q} Ken Kodama, MD, PhD,^{m,r} Kiyoshi Mori, MD, PhD,^{s,t}
Kouzo Yamada, MD, PhD,ⁱ Yoshihiro Matsuno, MD, PhD,^u
Sadayuki Murayama, MD, PhD,^v Kiyoshi Murata, MD, PhD^k

^aCancer Screening Division, Research Center for Cancer Prevention and Screening, National Cancer Center, Tokyo, Japan

^bCancer Screening Center, National Cancer Center Hospital, Tokyo, Japan

^cDepartment of Pulmonology, Tokyo General Hospital, Tokyo, Japan

^dDepartment of Pathology, University of Tsukuba, Faculty of Medicine, Tsukuba, Japan

^eDepartment of Clinical Oncology, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

^fDepartment of Radiology, Osaka National Hospital, Osaka, Japan

^gDepartment of Pathology, National Cancer Center Hospital, Tokyo, Japan

^hDepartment of Radiology, Niigata Cancer Center, Niigata, Japan

ⁱDepartment of Thoracic Oncology, Kanagawa Cancer Center, Yokohama, Japan

^jDepartment of Thoracic Surgery, Tochigi Cancer Center, Utsunomiya, Japan

^kDepartment of Radiology, Shiga University of Medical Science, Otsu, Japan

^lDepartment of Thoracic Oncology, National Cancer Center Hospital East, Kashiwa, Japan

^mDepartment of General Thoracic Surgery, Osaka Medical Center for Cancer and Cardiovascular Diseases, Osaka, Japan

ⁿDepartment of Thoracic Surgery, Shikoku Cancer Center, Matsuyama, Japan

^oDepartment of Thoracic Surgery, Iwakuni Clinical Center, Iwakuni, Japan

^pEpidemiology and Prevention Division, Research Center for Cancer Prevention and Screening, National Cancer Center, Tokyo, Japan

^qDivision of Epidemiology, Center for Public Health Sciences, National Cancer Center, Tokyo, Japan

^rDepartment of Thoracic Surgery, Yao Municipal Hospital, Yao, Japan

^sDepartment of Thoracic Oncology, Tochigi Cancer Center, Utsunomiya, Japan

^tDepartment of Pulmonology, Tsuboi Cancer Center Hospital, Koriyama, Japan

^uDepartment of Surgical Pathology, Hokkaido University Hospital, Sapporo, Japan

^vDepartment of Radiology, University of the Ryukyus, Faculty of Medicine, Okinawa, Japan

Received 14 February 2016; revised 27 March 2016; accepted 6 April 2016

Available online - 15 April 2016

ABSTRACT

Introduction: The purpose of this study was to evaluate the natural course of the progression of pulmonary subsolid nodules (SSNs).

Materials and Methods: Eight facilities participated in this study. A total of 795 patients with 1229 SSNs were assessed for the frequency of invasive adenocarcinomas. SSNs were classified into three categories: pure ground-glass nodules (PGGNs), heterogeneous GGNs (HGGNs) (solid component detected only in lung windows), and part-solid nodules.

Results: The mean prospective follow-up period was 4.3 ± 2.5 years. SSNs were classified at baseline as follows: 1046 PGGNs, 81 HGGNs, and 102 part-solid nodules. Among the

1046 PGGNs, 13 (1.2%) developed into HGGNs and 56 (5.4%) developed into part-solid nodules. Among the 81 HGGNs, 16 (19.8%) developed into part-solid nodules. Thus, the SSNs at the final follow-up were classified as follows:

*Corresponding author.

Disclosure: The authors declare no conflict of interest.

Address for correspondence: Ryutaro Kakinuma, MD, PhD, Cancer Screening Center, National Cancer Center Hospital, 5-1-1, Tsukiji, Chuo-ku, Tokyo, 104-0051, Japan. E-mail: rkaki@ncc.go.jp

© 2016 International Association for the Study of Lung Cancer. Published by Elsevier Inc. All rights reserved.

ISSN: 1556-0864

<http://dx.doi.org/10.1016/j.jtho.2016.04.006>

977 PGGNs, 78 HGGNs, and 174 part-solid nodules. Of the 977 PGGNs, 35 were resected (nine minimally invasive adenocarcinomas [MIAs], 21 adenocarcinomas in situ [AIS], and five atypical adenomatous hyperplasias). Of the 78 HGGNs, seven were resected (five MIAs and two AIS). Of the 174 part-solid nodules, 49 were resected (12 invasive adenocarcinomas, 26 MIAs, 10 AIS, and one adenomatous hyperplasia). For the PGGNs, the mean period until their development into part-solid nodules was 3.8 ± 2.0 years, whereas the mean period for the HGGNs was 2.1 ± 2.3 years ($p = 0.0004$).

Conclusion: This study revealed the frequencies and periods of development from PGGNs and HGGNs into part-solid nodules. Invasive adenocarcinomas were diagnosed only among the part-solid nodules, corresponding to 1% of all 1229 SSNs.

© 2016 International Association for the Study of Lung Cancer. Published by Elsevier Inc. All rights reserved.

Keywords: Subsolid nodule; Ground-glass nodule; Natural history; Computed tomography; Lung adenocarcinoma

Introduction

With the introduction of computed tomography (CT) screening for lung cancer,¹⁻⁴ pulmonary subsolid nodules (SSNs) have emerged as a possible indicator of lung cancer.⁵⁻⁹ SSNs are classified into pure ground-glass nodules (PGGNs) and part-solid GGNs. PGGNs are focal nodular areas of increased lung attenuation, including both well and poorly defined lesions through which normal parenchymal structures, including airways and vessels, can be visualized; part-solid GGNs include a combination of ground-glass and solid components, the latter obscuring the underlying lung architecture.¹⁰ Although some SSNs are transient,^{11,12} persistent SSNs have a high likelihood of being malignant.^{7,13} However, the natural history of SSNs has not yet been clarified thoroughly.^{10,14} Regarding the causes of SSNs, transient SSNs have been mainly caused by inflammation,^{11,15,16} whereas most of the persistent SSNs have been pre-invasive or invasive adenocarcinomas.¹⁷ Although various algorithms have been developed to address these lesions,^{10,18-22} to our knowledge, these algorithms have not been based on prospective follow-up results for SSNs.

Thus, the purpose of this prospective multicenter study was to evaluate the natural course of the progression of pulmonary SSNs.

Materials and Methods

Ethics Statement

This study was conducted with the approval of the institutional review boards of each of the eight

participating institutions. Informed consent was obtained from the patients.

Participating Institutions

The eight institutions that participated in this study were as follows: Kanagawa Cancer Center, National Cancer Center Hospital East, National Cancer Center Research Center for Cancer Prevention and Screening, Niigata Cancer Center, Osaka Medical Center for Cancer and Cardiovascular Diseases, Shiga University of Medical Science, Shikoku Cancer Center, and Tochigi Cancer Center.

Nodule-Related Entry Criteria

The inclusion criteria for SSNs were as follows. First, the persistence of the SSNs for 3 months was confirmed after the initial CT examination. Second, the included GGNs had a long axial diameter of 3 cm or less.²³ Third, the included part-solid nodules had a long axial diameter of 3 cm or less and a solid component with a long axial diameter of 5 mm or less when viewed using a mediastinal window. Finally, each SSN had been evaluated using thin-section CT images with a section thickness of 1.25 mm or less.

Numbers of Patients and SSNs

A total of 845 patients with 1325 SSNs agreed to participate in this study between April 2009 and December 28, 2011. However, 57 SSNs in 50 patients were excluded because of the following reasons: availability of thick-section CT images only (31 nodules in 26 patients [21 with one nodule and five with two nodules]), resection within 2 months after the first CT scan (seven nodules in five patients [three with one nodule and two with two nodules]), a decrease in maximal diameter of 2 mm or more (six nodules in six patients), a maximal diameter of the solid component larger than 5 mm (five nodules in five patients), fluctuation in maximal diameter (three nodules in three patients, with *fluctuating* defined as an increase in diameter after a decrease in diameter or vice versa, as a result of which an increase in maximal diameter of 2 mm or more from the baseline CT could not be determined), a diameter of an SSN larger than 3 cm (two nodules in two patients), disappearance after persistence for at least 3 months (two nodules in two patients), and hospital transfer (one nodule in one patient). In addition, 30 other SSNs in patients with multiple SSNs were excluded because of the following reasons: availability of thick-section CT images only (20 nodules in 20 patients), diameter of solid component larger than 5 mm (five nodules in four patients [three with one nodule and one with two nodules]), and diagnosis of inflammation on the basis of the conclusions of a radiology panel (five nodules in one

Download English Version:

<https://daneshyari.com/en/article/6192455>

Download Persian Version:

<https://daneshyari.com/article/6192455>

[Daneshyari.com](https://daneshyari.com)