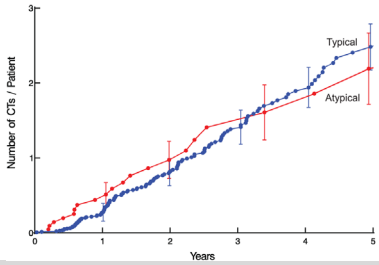
Is Close Surveillance Indicated for Indolent Cancers? The Carcinoid Story

Sudish C. Murthy, MD, PhD,[*] Christopher Bariana, DO,[*] Siva Raja, MD, PhD,[*] Usman Ahmad, MD,[*] Daniel P. Raymond, MD,[*] Thomas W. Rice, MD,[*] Robert Wang, MD,[*] Ponnuthurai Ainkaran, MS,[†] Penny L. Houghtaling, MS,[†] and Eugene H. Blackstone, MD[,†]*

The objective of this article is to determine the relevance of close postresection surveillance for bronchopulmonary carcinoid. From 2006 to 2013, 57 patients underwent lung resection for bronchopulmonary carcinoid. They were assessed for effects of clinical presentation, subtype, stage, and tobacco use on survival and recurrence. Utility of bronchoscopy and radiographic surveillance was reviewed. Mean follow-up was 2.1 ± 1.7 years. Carcinoid patients presented at a young age (51 ± 15 years) with normal spirometry regardless of smoking status (forced 1-second expiratory volume, 88% ± 19% for never smokers vs 87% ± 16% for smokers). Thirty-nine patients underwent a lobectomy (2 sleeve resections) and 11 pneumonectomy or bilobectomy. Most carcinoids were of the typical ($n = 53$, 93%) rather than atypical ($n = 4$, 7.0%) subtype. Staging from pathology was unaffected by smoking status. Eight patients had positive lymph nodes at resection (13% of typical and 25% of atypical subtypes). One recurrence was an atypical pN0 carcinoid. Of 57 patients, 18 were surveilled postoperatively with bronchoscopy, which revealed no recurrences. Furthermore, 146 follow-up computed tomography scans were performed on 53 of 57 patients. No typical carcinoid recurrences were identified by any postresection surveillance technique, regardless of stage. Bronchopulmonary carcinoid is a different entity from non–small cell lung cancer and has low recurrence and mortality risks independent of smoking status. It is hard to justify close surveillance following complete resection of typical carcinoid. Computed tomography scans at 5-year intervals might be reasonable and more cost effective.

Semin Thoracic Surg I:III–III

Keywords: carcinoid, recurrence, surveillance, CT scan



Surveillance after bronchopulmonary resection for typical and atypical carcinoid.

Central Message

Surveillance after complete resection of typical carcinoid has a low yield, suggesting that less-intensive follow-up may be appropriate.

Perspective

Bronchopulmonary carcinoids are a different entity from non–small cell lung cancer, having low recurrence and mortality risks independent of smoking status. It is hard to justify close surveillance after complete resection of typical carcinoids. Computed tomography scans at 5-year intervals might be a reasonable compromise and more cost effective.

INTRODUCTION

Bronchopulmonary carcinoid is a fairly rare neuroendocrine tumor, comprising less than 5% of all primary lung cancers,[1] but its incidence might be slowly rising.[2] Patients with typical carcinoid[3] have superior survival to those with atypical carcinoid, with reported 5-year survival in excess of 90% and cause-specific survival approaching 100% for completely resected, node-negative cases.[4-8] There are well-established predictors of survival, including histology, lymph node involvement, age, and African American ethnicity.[5,6,9,10]

Few published guidelines are available for postresection follow-up or surveillance for bronchopulmonary carcinoid.[11] This becomes particularly germane considering that the majority of patients present with the most favorable risk profile and are expected to have an extended survival.[5,10] To what

[*]Department of Thoracic and Cardiovascular Surgery, Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio
[†]Department of Quantitative Health Sciences, Research Institute, Cleveland Clinic, Cleveland, Ohio

This article was presented at the 95th Annual Meeting of the American Society for Thoracic Surgery, April 25-29, 2015, Seattle, Washington.

The study was funded in part by the Gus P. Karos Registry Fund; the Daniel and Karen Lee Endowed Chair in Thoracic Surgery, held by Dr Murthy; and the Kenneth Gee and Paula Shaw, PhD, Chair in Heart Research, held by Dr Blackstone.

Address reprint requests to Sudish C. Murthy, MD, PhD, Cleveland Clinic, Department of Thoracic and Cardiovascular Surgery, 9500 Euclid Avenue/Desk J4-1, Cleveland, OH 44195. E-mail: murthys1@ccf.org

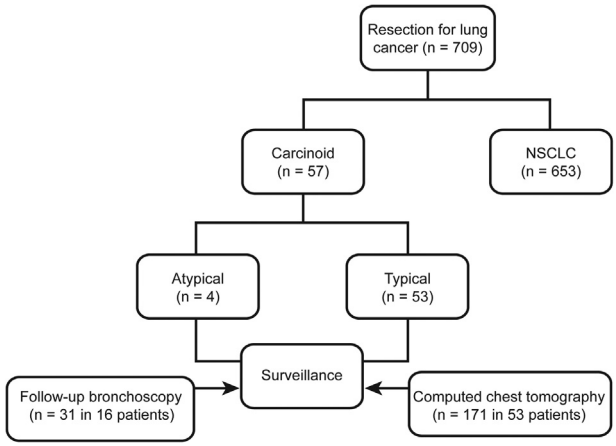


Figure 1. CONSORT-style diagram of resections for lung cancer, with a focus on carcinoid and postresection surveillance. NSCLC, non–small cell lung cancer.

surveillance, then, should they be subjected?[10,12] We have reviewed our contemporary experience of resected bronchopulmonary carcinoid to gain additional insight into this issue. Specifically, we have documented recurrence and survival, but also reviewed the impact and utility of our own surveillance routine, which has included postoperative computed chest tomography (cCT) as well as bronchoscopy.

PATIENTS AND METHODS

Patients

From January 2006 to January 2013, of 709 patients undergoing pulmonary resection for cancer at Cleveland Clinic, 57 had primary bronchopulmonary carcinoid (Fig. 1). Among them, 53 had typical and 4 had atypical carcinoid. TNM classification of carcinoid was pT1 in 72% of cases and pN1 or pN2 in 14% (Table 1). In typical carcinoid, 87% were pTanyN0. Mean age at the time of resection was 51 ± 15 years, and 58% were women (Table 1). This study was approved by the Cleveland Clinic Institutional Review Board, with patient consent waived.

Surgical Management

Of 57 operations, 39 (68%) were lobectomies (Table 2). All typical carcinoid patients had R0 resections; atypical carcinoid patients had an R1

Table 1. Patient Characteristics

Characteristic	Overall No. (% of 57) or Mean ± SD	Typical No. (% of 53) or Mean ± SD	Atypical No. (% of 4) or Mean ± SD
Age	51 ± 15	50 ± 15	57 ± 6.7
Female	33 (58)	32 (60)	1 (25)
History of smoking	26 (46)	24 (45)	2 (50)
Cancer anatomic classifications			
pT			
1	41 (72)	38 (72)	3 (75)
2	16 (28)	15 (28)	1 (25)
pN			
0	49 (86)	46 (87)	3 (75)
1	5 (8.8)	4 (7.5)	1 (25)
2	3 (5.3)	3 (5.7)	0 (0)
pM			
0	57 (100)	53 (100)	4 (100)
1	0 (0)	0 (0)	0 (0)
FEV1 (% of predicted)	88 ± 18	87 ± 18	96 ± 8.5
DLCO (% of predicted)	87 ± 17	87 ± 17	N/A

DLCO, diffusing capacity of lung carbon monoxide; FEV1, forced expiratory volume in 1 second; N/A, not available; SD, standard deviation.