

Intrathoracic Carcinoids: A 7-Year Tertiary Care Level Experience

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ABSTRACT

Intrathoracic carcinoids are relatively uncommon chest cavity tumors. Timely diagnosis and the management of intrathoracic carcinoids have remained suboptimal in our deprived setup. Here we present our 7-year tertiary level experience dealing with this pathology.

Materials & Methods: A total of 14 patients with intrathoracic carcinoids were diagnosed, adequately treated and prospectively followed up. The data were collected related to patient's clinical presentation and management.

Results: The mean age of the patients was 36.3 (28-53) years. Presenting features included cough (7/14), hemoptysis (8/14), pneumonia (4/14), pleuritic chest pain (3/14) and superior vena caval obstruction (1/14). CT scan, bronchoscopy and biopsy were employed for the diagnosis. 7 tumors were located in the right lung, 6 lesions were on the left side, while one lesion was located in mediastinum. None of the patients exhibited features of serotonin excess. All of the patients were mistreated as a case of tuberculosis at some time point during their illness. All of the patients were successfully managed by surgical intervention. One patient had serotonin excess crisis perioperatively, which was successfully managed with octreotide infusion and volume expansion. Two mortalities in this series were related to distant metastasis and concomitant hepatitis C related cirrhosis.

Conclusions: Intrathoracic carcinoids still remain an under diagnosed and mistreated pathology in our setup. The detailed knowledge about this pathology and way to deal with it, is pre-requisite for its timely diagnosis and adequate management.

Keywords: carcinoids, bronchopulmonary carcinoids, carcinoid syndrome

INTRODUCTION

Bronchopulmonary carcinoid tumors represent about 10% of all carcinoid tumors and 1- 6% of all lung tumors are carcinoid tumors¹⁻³. Carcinoids are endodermal in origin arising from stem cells of the bronchial epithelium known as Kulchitsky cells⁴. Typical carcinoids usually involve the main airway and respond well to surgical intervention. On the contrary, atypical carcinoids are located in peripheral lung parenchyma and are associated with poor prognosis owing to early metastasis^{5,6}.

Excess serotonin production from the tumor cells results in carcinoid syndrome characterized by a constellation of symptoms, including tachycardia, flushing, bronchoconstriction, hemodynamic instability, diarrhea, and acidosis⁷. This syndrome commonly occurs in gastrointestinal carcinoids and only in 2-12% of patients with bronchial carcinoid tumors⁷. The vast majority of symptoms from bronchial carcinoids

occur due to the direct involvement of the bronchopulmonary tree. Mostly endobronchial in occurrence these result in sequelae resulting from bronchial obstruction, including persistent atelectasis, recurrent pneumonia, pulmonary abscess, and bronchiectasis¹⁻⁵. Being a vascular tumor it can bleed secondary to bronchial irritation and recurrent hemoptysis is therefore a common presenting feature⁸.

We have been prospectively following up all of our patients diagnosed with intrathoracic carcinoid tumors including bronchial and mediastinal, for the last seven years. This paper describes these fourteen patients with carcinoid tumor who underwent successful surgical resection in our department.

MATERIALS AND METHODS

Prospective follow up of a cohort diagnosed with intra thoracic carcinoid tumor was done since 2002.

All data was kept regarding patient's clinical presentation, diagnostic procedures and surgical intervention. Follow up of the patients were maintained in the thoracic surgery clinic for any recurrence. Yearly CT scan of the chest was planned for three consecutive years and then every two years. Brochoscopy was performed on yearly basis in those patients who had brochoplastic procedures. Single lung anesthesia was used in all patients to isolate the lung. Standard posterolateral thoracotomy was done to perform lobectomy in 6, sleeve right upper lobectomy in 3, bilobectomy in 1, pneumonectomy in 3 and median sternotomy in one patient was performed to excise mediastinal carcinoid. Postoperative recovery was uneventful in all except in one, who developed carcinoid crisis during operation. This patient responded well to volume expansion and octreotide infusion. Descriptive analysis is presented as mean and standard deviation.

RESULTS

Total of 14 patients had a diagnosis of intrathoracic carcinoid after surgical resection of the tumor. Mean age of the patients was 36.3 (28-53) years and majority were males [n=10]. None of the patients had preoperative carcinoid related symptoms and mostly presented with bronchial obstruction symptoms shown in table 1. All patients had received anti tuberculous treatment for 6 months at least and in one patient twice. All except two patients had mass on radiological evaluation. The other two had destroyed lung and recurrent hemoptysis due to bronchiectasis and were referred for pneumonectomy. The tumor was equally distributed on both sides (seven on the right side and six on the left side) Table 2.

Eight patients underwent bronchoscopy, the other patients did not have bronchoscopy as 3 patients had massive hemoptysis and the other two were already planned for left sided pneumonectomy for destroyed lung. Six patients had endobronchial findings consistent with carcinoid tumor. In two patients where the gross appearance was not typical of carcinoid tumor biopsy was obtained without any significant bleeding post biopsy. The last patient had mediastinal mass aspiration that revealed carcinoid tumor.

Total of 5 patients (36%) had diagnosis made upon thoracotomy revealing typical carcinoid tumor and confirmed on histopathology. Two patients had

diagnosis from the pneumonectomy specimen and the other 3 had lobectomy for massive hemoptysis. Eleven lesions were endobronchial in location and histopathology confirmed typical carcinoid tumor. 3 lesions which were peripherally located within lung parenchyma had atypical features on histopathology.

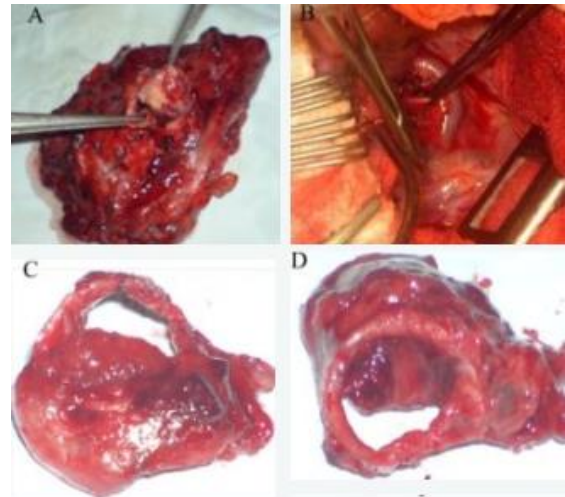


Figure 1: (A) resected pneumonectomy specimen showing total obstruction of main stem bronchus by carcinoid tumor (B) anterior bronchial wall repair after sleeve lobectomy (C, D) typical iceberg appearance of bronchial carcinoid tumor.

Table 1: Patients' presenting symptoms at the time of diagnosis of carcinoid tumor

Clinical Features	N
Cough	7
Hemoptysis	8
Pneumonia/atelectasis	4
SVC obstruction	1
Pleuritic chest pain	3

Table 2: Anatomical location of carcinoid tumor within the thoracic cavity

Anatomical location	N
Right:	7
Main bronchus	1
Right Upper Lobe	3
Bronchus intermedius	1
Right Lower lobe	2
Left:	
Main bronchus	2
Lower lobe	4
Mediastinum	1

Perioperative analysis revealed operative time was 2.5 (2-4) hours, blood loss in first 24 hours was 300 (200-700) ml, ICU stay was only one day in all patients and atelectasis developed in one patient that responded to physiotherapy. No immediate perioperative mortality was documented. Mean duration of follow up was 48 (18 – 72) months and one patient was lost to follow up. There was no stricture formation in patients who had bronchoplastic procedures. Two patients died; one at three years of follow up due to distant metastasis and atypical carcinoid on repeat histopathology. The other died at two years due to hepatic failure from Hepatitis C related cirrhosis. Overall survival was 86% and disease free survival at last follow up was 93%.

DISCUSSION

Reviewing the available published sources, we did not find any series of bronchial carcinoids reported before from Pakistan. This is due to the fact that bronchial carcinoid tumors are a rare group of pulmonary neoplasms. They are characterized by neuroendocrine differentiation and relatively indolent clinical behavior and therefore missed unless incidentally found on investigations for other reasons or when it is symptomatic⁵. All of our patients had some sort of chronic pulmonary symptoms commonly chronic cough and hemoptysis that led to further investigation. Frequently these patients may have unresolving pneumonia with multiple courses of antibiotics before proper diagnosis^{9,10}. All of our patients had received presumptive anti tuberculous therapy -in one case twice- prior to the final diagnosis. This probably is due to the lack of widely available proper culture facilities for mycobacterium tuberculosis and a common trend among the general physicians to treat with a presumptive diagnosis of TB in non resolving pneumonia. In fact, it is well known that the correct diagnosis is often delayed, and patients may receive several courses of antibiotics to treat recurrent pneumonia before the carcinoid tumor is diagnosed.

The bronchoscopic appearance is sufficiently characteristic to make a presumptive diagnosis as it was in six of our patients who did not require biopsy. In two of the patients bronchoscopic appearance was more of an endobronchial mass and only after biopsy the diagnosis was made. Earlier literature suggested complication of carcinoid biopsy by significant bleeding, however recent literature suggests a lesser incidence of

bleeding due to epinephrine use for washing similar to our patients who had biopsy performed^{10,11}. Two patients had fibrotic scar that was causing recurrent hemoptysis. Resection of the lobe revealed surprisingly carcinoid hidden in the scarred lung. Careful histopathological examination is therefore necessary for any lung resection for scarred tissue to exclude the possibility of underlying carcinoid as a cause of recurrent hemoptysis. All of the carcinoid tumors were endobronchial except one mediastinal and typical on histopathology and two with atypical features were located in peripheral lung parenchyma, while none depicting any clinical features of serotonin excess.

Surgery offers the only chance for cure and is the treatment of choice¹². In case of endobronchial localization of a typical carcinoid, bronchoplastic parenchyma-sparing surgery is the standard surgical procedure¹³. Lobectomy (with or without bronchoplastic procedures) is the most frequent resection (51%–58%). Other surgical resections include bilobectomy (9%–15%), segmentectomy or wedge resection (2%–15%), bronchoplastic procedures (5%–18%), and pneumonectomy (6%–16%)^{13,14}. Similarly, in our series, we performed in most cases lobectomy (42%) and other patients underwent sleeve right upper lobectomy (21%), bilobectomy (7%), pneumonectomy (21%) and median sternotomy (7%) to excised mediastinal carcinoid¹⁵.

Marty-Ané et al in their study highlighted the features of atypical carcinoids presenting mainly as peripheral nodules (63%) and a central mass or atelectasis (37%)¹⁶. Parenchyma sparing surgery is not considered as sufficient in atypical carcinoid when it is suspected due to its presentation or intraoperative diagnosis or if there is doubt during surgery about the diagnosis¹⁷.

Because of the low-grade malignancy of typical carcinoids the most conservative types of surgical resection can be adequate. In our series sleeve-techniques was possible in three patients. This is reinforced by the high long term survival rate, no anastomotic stricture and the excellent event-free survival and therefore temptation of a “speedy” lobectomy or pneumonectomy in favor of a tissue-saving procedure in these young patients should be resisted¹⁷.

Our surgical resection of the tumor was successful since no local recurrence was documented in any of our patients followed for up to 72 months. Recurrence locally or distant may be

observed in 1-2 % of patients and one of our patient [7%] did have distant recurrence 3 years later. This patient had features of typical carcinoid on histopathology that on re-biopsy at the time of recurrence now showed atypical features. In general these patients possess an overall 5-year survival rate of 78-95% and a 10-year survival rate of 77-90%⁴⁻⁶. Our patients' survival rate over 7 years was 86%; one patient died of recurrence of carcinoid and other died of HCV related cirrhosis. In fact survival from carcinoid was 93% excluding the later case. High survival rate in majority of our patients with disease free survival at their last follow up signifies the importance of a careful surgical resection to avoid local recurrence and in general a successful out come in most of these patients.

In conclusion, bronchial carcinoid is not an uncommon disease. Clinical presentation may mimic tuberculosis and a careful evaluation in any patient with hemoptysis may reveal the underlying carcinoid tumor.

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