Robotic left lower sleeve lobectomy with bronchoplasty for the removal of a carcinoid tumour

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Abstract: Lung carcinoid tumours constitute approximately 1–2% of all pulmonary tumours. They are derived from enterochromaffin cells, which are also known as 'Kulchitsky cells' and generally have indolent growth and development patterns. Carcinoid tumours are categorized as typical or atypical, depending on the number of mitoses per high power field and the presence of necrosis. In terms of management, surgical resection has been recognized to be the standard treatment for pulmonary carcinoid tumours. To our knowledge, the da Vinci system and robotic surgery have not been applied in sleeve lobectomies and bronchoplasty for the removal of carcinoid tumours in the United Kingdom. Therefore, we present a case of a sleeve lobectomy with bronchoplasty procedure for the removal of a carcinoid tumour located in the left lower lobe of the patient. The bronchus was repaired using a V-lock suture & Prolene sutures with the surgery performed using the da Vinci robotic surgical system.

Keywords: Carcinoid tumour; bronchoplasty; minimally invasive surgery; robotic surgery

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Introduction

Lung carcinoid tumours are known to derive from stem cells of the bronchial epithelium known as Kulchitsky cells, which exhibit neuroendocrine activity (1). Neuroendocrine tumours are typically categorized into four types namely, typical carcinoid, atypical carcinoid (ATC), large cell neuroendocrine carcinoma and small cell lung cancer (2). Carcinoid bronchopulmonary tumors are evidently rare and represent approximately 25% of all carcinoid tumours and 1-2% of all lung neoplasms. It is suggested that 70%of these tumors are located centrally in the large bronchial tubes, while 10-20%, known as peripheral carcinoids, develop in the pulmonary periphery (3). In terms of management, surgical resection is conventionally performed and remains the cornerstone in the treatment for these tumours in customized centers. Surgical intervention is targeted towards radical resection and ensuring the least resection possible of the normal functioning lung tissue (4).

To our knowledge, the da Vinci system robotic

surgery has not been applied in sleeve lobectomies with bronchoplasty for the removal of pulmonary carcinoid tumours in other cardiothoracic units in the United Kingdom.

Case presentation

We report the case of a 35-year-old lady who underwent the procedure of a robotic sleeve lobectomy with bronchoplasty due to resection of a central bronchial carcinoid tumour located in the left lower lobe of her lung.

The patient had initially presented at the thoracic outpatient clinic with symptoms of shortness of breath and mild wheezing. Computed tomography scan of the thorax was performed and had revealed an occlusion of the left lower lobe bronchus immediately distal to the origin of the superior apical segmental bronchus (*Figure 1*). The occlusion appeared to be secondary to a rounded soft tissue lesion measuring approximately 20 mm in diameter. Upon Page 2 of 3



Figure 1 Computed tomography scan of the thorax revealing an occlusion of the left lower lobe bronchus.



Figure 2 Robotic removal carcinoid tumour (5). Available online: http://www.asvide.com/article/view/24424

further imaging, positron emission tomography (PET) scan had noted that the nodular fullness amongst the proximal left lower lobe vessels was no larger than 2.3 cm, however, segmental airways at this region were occluded. More avid uptake was observed between the oesophagus and descending thoracic aorta, suggesting the potential presence of malignancy. Due to the increased uptake, the patient was subjected to bronchoscopy and mediastinoscopy, which had demonstrated no evidence of regional lymph node metastasis.

Robotic surgery was offered due to its availability and prospects in aiding a smoother procedure in removing the mass and treating her symptoms. This surgical approach was also justified on the basis that the mass was very proximal and would warrant the need for a sleeve resection, where robotic operation would greatly assist through minimally invasive methods.

During the surgery, there were areas of consolidation that were discovered and later resected for histology (*Figure 2*). From the histology report, it was interesting to note that the consolidation was due to distal collapse of the lung rather than the carcinoid tumour. The histology confirmed that the tumour was benign in nature, thus confirming the presence of a proximal tumour. Microscopy had revealed the lung tumour to be low-grade neuroendocrine carcinoid tumour with no evidence of lympho-vascular invasion. The bronchus was repaired with a 4.0 V-lock suture and a few Prolene sutures with clear visible access by robotic surgery. The patient had made an excellent recovery without any surgical complications and was discharged 2 days post-operatively.

Discussion/conclusions

In this case, the da Vinci robotic surgical system has the benefit of displaying 3-dimensional images, which facilitated and improved depth perception by the surgeon and provided higher quality images, when compared with the conventional 2-dimensional video-assisted thoracoscopic cameras. It is also noted that all the robotic instruments are able to articulate in many directions of flexible movement and rotation, which then offers an increased range of maneuvers during surgery. Interestingly, the robotic surgery approach also reduces the risk of human error, by preventing tremors thus improving precision. These cumulative benefits may ultimately lead to improved dissection, accurate stitching and safer approaches in thoracic surgery.

In conclusion, sleeve lobectomies with bronchoplasty for pulmonary carcinoid tumours can be performed by robotic surgical approaches, which lead to excellent postoperative outcomes. Although the conventional methods are often open surgery, thoracic surgeons are encouraged to develop interest in new innovations and advances in surgical techniques, in order to devise the best management plan for each individual patient.

It is believed that the robotic surgical technique significantly simplifies and eases the thoracoscopic approach for pulmonary carcinoid tumours and many other types of thoracic surgical conditions (6). With growing participation, it may potentially enhance evidenced-based practice, training, cost effectiveness and ultimately better patient outcomes and recovery.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed consent: Written informed consent was obtained from the patient for publication of this Case Report and any accompanying images.

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