Robotic resection of inflammatory tumour

Ali Zamir Khan[1], Kamran Ali[2]

[1]Department of Minimally Invasive Thoracic Surgery, Medanta, The Medicity 122001, India; [2]Department of Thoracic Surgery, Fortis Group of Hospitals, Delhi, India

Correspondence to: Ali Zamir Khan. Department of Minimally Invasive Thoracic Surgery, Medanta, The Medicity 122001, India.
Email: azamirk@gmail.com.

Abstract: We present a video showing techniques of robotic sleeve lobectomy in a case of inflammatory tumour of left main bronchus. Inflammatory tumour is a rare condition that is encountered in South east Asia. Usually there is a background of tuberculosis. This causes intense adhesions and inflammatory reaction making surgical resection difficult. Our patient presented with evidence of left main bronchus Endobronchial tumour with distal collapse. Bronchoscopic biopsy confirmed this to be an inflammatory tumour. We performed a Robotic resection of the tumour. During surgery we did a left upper lobectomy. We performed a bronchotomy and opened the left upper lobe bronchus. We then delivered the tumour into the left upper lobe and completed the upper lobectomy. This enabled us to save the lower lobe. The stump of the left upper lobe bronchus was sutured using robotic techniques. Post operative radiology confirmed good expansion of lower lobe. Follow up at one year confirmed bronchoscopic and radiological freedom from recurrence with continued good expansion of left lower lobe and good pulmonary function tests. Robotic is an additional tool in the armamentarium of the thoracic surgeon. It gives good vision in inflammatory conditions. It facilitates dissection of dense adhesions with minimal blood loss. Sleeve resection and sleeve lobectomy is possible due to ease of suturing with the robotic platform. This is our operation of choice in the complex thoracic surgery cases.

Keywords: Robotic; inflammatory tumour

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Introduction

Inflammatory diseases are prevalent in Asian Subcontinent, particularly in South East Asia. They cause severe inflammatory responses and dense adhesionsin the chest. This is one of the reasons why video assisted and robotic thoracic surgery took time to gain a foothold in countries like India, Pakistan, Nepal and Bangladesh. It is very difficult to promote VATS/Robotic surgery as It is technically very challenging to enter a densely adherent chest.

We present our experience with starting and setting up a minimally invasive robotic thoracic surgery program in India in the background of endemic tuberculosis and inflammatory diseases.

Case presentation

A 26-year-old patient presented to us from Bangladesh with a history of recurrent chest infections. He was treated with repeated courses of antibiotics. Chest X-ray showed collapse and consolidation of left upper lobe with progressive collapse of lower lobe. He was also started on an empirical course of Anti tuberculosis therapy. This is unfortunately a common practise in South East Asia tuberculosis is endemic. Since he was showing no improvement, he as referred to us for a tertiary opinion.

PET CT scan showed the presence of an endobronchial tumour in the left main bronchus (*Figure 1*). There was some aeration of left lower lobe with a collapse consolidated upper lobe. Endobronchial Biopsy was haemorrhagic.

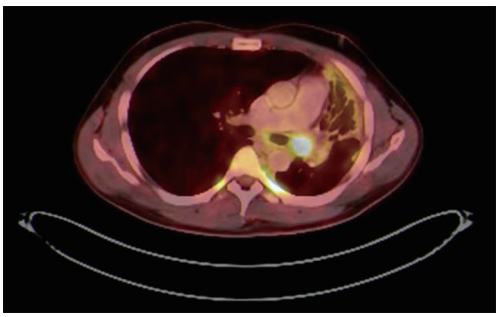

Figure 1 PET scan of inflammatory tumour in left main bronchus.

Figure 2 Robotic sleeve lobectomy for inflammatory tumour of left lung (1).
Available online: http://www.asvide.com/article/view/30914

Histopathology suggested the presence of chronic inflammatory cells with no evidence of malignancy. Acid fast bacilli were negative on microscopy and culture. A preliminary diagnosis of endobronchial inflammatory tumour was made and he was scheduled for Robotic resection of Lung.

Intraoperative strategy

A preoperative rigid bronchoscopy was performed. It was mandatory for us to try and avoid a pneumonectomy as this was only an inflammatory process with no evidence of malignancy. The growth seemed to arise from the left upper lobe and encroach onto the left main bronchus. It seemed that the lower lobe bronchus was blocked due to prolapsing tumour rather than infiltration.

We used a Da Vince Si Robotic platform to perform the surgery. The ports are placed in a linear fashion along the 6th Intercostal space with a distance of 9 cm between the ports. With the newer Xi system, you could reduce the space between the ports. A additional port was paced in the 10th intercostal space for assistance and to deliver the stapler. With SI system, you do not have the ability to perform Robotic stapling. With Xi system, this is an added benefit, hence you may not need an assistant port.

The surgery was started with VATS to enable us to do some dissection of adhesions and create the space to dock the robot.

Once the robot is docked after the three ports are created, we dissected the adhesions under vision (*Figure 2*). This prevents bleeding. The pulmonary vein to upper love was dissected and stapled using a standard white stapler. The arterial branches to upper lobe were identified, dissected and stapled. The bronchus to upper lobe was isolated. A bronchotomy was made in the bronchus using a robotic scissor. The tumour was delivered out from the bronchotomy. An intraoperative bronchoscopy was performed to ensure complete removal of all tumour from lower lobe. Complete Endobronchial suctioning and toil was performed. Since we were dealing with an inflammatory tumour, we did not need to send the margins for frozen section. The upper lobe was resected and delivered out in a bag. The Margins of the upper lobe bronchus was sutured with 3-0 PDS suture. Use of robotics platform makes the suturing very easy and intuitive. Suturing by VATS is technically more challenging as we are dealing with a mirror image. Intraoperative lung expansion and under water test was performed to ensure no air leak. A single drain was placed and connected to a suction bottle at –2 Kpas. An extrapleural catheter was sited for pain control.

Postoperative recovery

The drain was removed on day 2 post op. Aggressive chest physiotherapy and Yoga therapy was initiated. Chest X-ray confirmed good lung expansion. The patient was discharged on 3rd postoperative day.

Follow up

This patient was followed up for 2 years now and has confirmed good lung expansion. Clinically he is doing well with no symptoms. He is not short of breath and has no recurrence of chest infection. A follow up bronchoscopy was not required as the patient was clinically well.

Discussion

Robotics thoracic surgery in inflammatory diseases (2)

offered us the following benefits:

(I) High definition optics and 3D visualisation of intrathoracic anatomy and structures;
(II) 360-degree movement and 7 degree of freedom for Endowrist;
(III) Ability to dissect adhesions under vision thereby reducing the blood loss;
(IV) Ability to dissect carefully under direct vision around major vascular structures;
(V) Ability to do a bronchotomy and deliver the tumour out so that the lower lobe +/– upper lobe could be spared;
(VI) The ability to suture the bronchus intuitively or perform a sleeve anastomosis.

The other benefits were similar to VATS and included the following:

(VII) Smaller incisions;
(VIII) No muscle cutting;
(IX) No spreading of ribs;
(X) Less inflammatory response (3);
(XI) Less immunological response (3);
(XII) Shorter hospital-stay (4,5);
(XIII) Quicker return to work (3-5);
(XIV) Less damage to the chest wall muscles thereby better post operative respiratory reserve and function leading to less atelectasis and chest infection (4-6);
(XV) Less pain hence better compliance with post operative chest physiotherapy (6);
(XVI) Earlier mobilisation hence less psychological effects;
(XVII) Better cosmetic results (4).

Conclusions

We conclude that using robotics in challenging inflammatory diseases is technically possible. The ease of suturing on the robotic platform makes sleeve resection technically possible by minimally invasive surgery. We can achieve good clinical outcomes and early discharge from hospital.

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Footnote

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