CHAPTER 60

ROBOTIC PULMONARY RESECTIONS

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INTRODUCTION

The use of robotics in thoracic surgery has evolved dramatically over the last decade. Since its inception, the use of robotic technology in thoracic surgery has become increasingly common, particularly for pulmonary lobectomy. Employing minimally invasive access similar to video-assisted thoracoscopic surgery (VATS), robotic surgery utilizes machine technology to control surgical instrumentation via a remote surgeon console. Robotic thoracic surgery provides precision control of the operation: flexible instrument manipulation, a three-dimensional and magnified operative view, advanced adjunctive camera technology, and the use of surgeon controlled stapling devices. Robotic surgery, however, is limited by its significant financial costs, absence of tactile feedback (versus VATS and open surgery), and a notable learning curve for the surgeon and operating room team.

With an increasing volume of published data, robotic pulmonary resections have been shown to be safe and effective, revealing superior perioperative outcomes versus open thoracotomy with similar long-term oncologic outcomes [1-3]. Studies comparing approaches to pulmonary resection are ongoing. In this chapter, we will describe our techniques and optimal conduct for robotic pulmonary lobectomy and segmentectomy. These technical descriptions will be followed by a brief review of the recent literature regarding perioperative and long-term outcomes for patients undergoing robotic pulmonary resection for lung cancer.

INITIAL EVALUATION

The evaluation of candidates for robotic lobectomy includes the standard preoperative studies for patients undergoing pulmonary resection via VATS or open thoracotomy. For patients with suspected or biopsy-proven lung cancer, computed tomography scanning (CT) with subsequent whole-body PET-CT scan is currently the standard of care for complete staging. A magnetic resonance imaging (MRI) of the head is indicated in patients with neurologic signs or symptoms. Mediastinal staging is pursued for mediastinal lymphadenopathy and may involve the use of either endobronchial ultrasound guided fine-needle aspiration biopsy (EBUS-FNA) or mediastinoscopy, depending on anatomy and local expertise.

To risk stratify patients for surgery, pulmonary function testing (PFTs) including measurement of force expiratory volume in one second (FEV1) and diffusion capacity for carbon monoxide (DLCO). Patients with limited pulmonary function may have the most benefit from a robotic approach [4]. For patients with cardiac comorbidities we recommend preoperative evaluation by a cardiologist, with potential stress-testing or

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CONCLUSION

Robotic lobectomy is an increasingly common surgical approach to anatomic lung resection, particularly for the treatment of lung cancer. Over the last decade, robotic lobectomy has shown to be safe, with oncologic efficacy similar to lobectomy via thoracotomy or VATS. Comparative analysis between these modalities is an active area of investigation. Systematic training and teaching are necessary for surgeon expertise and for developing a robotic operative team. While initially more expensive, the costs of a robotic platform decrease as the number of operations performed increases, length of stay is shortened, and postoperative morbidity is reduced.

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