MIDAS: Minimally Invasive Diagnosis and Surgery for Management of Lung Nodules

Objective:
Earlier diagnosis of lung cancer may result in a stage shift and generate enhanced survival. Achieving diagnosis of small peripheral nodules and GGO's is challenging and may not routinely be accomplished endoscopically or with a minimally invasive surgical approach. An algorithm utilizing robotic navigational bronchoscopy for diagnosis and/or localization combined with robotic pulmonary resection may reduce number of interventions, truncate time to definitive therapy, decrease anesthesia risks, increase likelihood of achieving minimally invasive resection, and enhance patient satisfaction while reducing patient anxiety. We are evaluating the impact of single episode of anesthesia for diagnosis and surgical resection.

Methods:
All patients undergoing Ion navigational bronchoscopy were entered into an IRB approved registry. Patients were stratified by clinical elements and radiographic characteristics for likelihood of malignancy; patients who were felt to have significant likelihood of malignancy were offered simultaneous diagnosis and resection. Localization with ICG (0.4 cc) was performed for lesions less likely to be visually identified including small, deep, semisolid nodules and GGO. All resections were performed utilizing a da Vinci Xi robot and intraoperative localization was performed with Firefly. Patient demographics, medical comorbidities, nodule characteristics, operative details, surgical pathology, and patient outcomes were evaluated.

Results:
One hundred twenty patients had Ion navigational bronchoscopy. We successfully navigated to all nodules. Thirty patients were offered MIDAS; 26 patients (18 F/ 8 M) were resected. Mean age was 71 (range 34 - 83). Two were not resected; 1 patient had benign disease proven on Ion biopsy and 1 patient was deferred after bronchoscopy for cardiac management. Median FEV1 1.95 (range 0.93 - 3.7) The median nodule size was 13 mm (range 9 - 30 mm) and the median SUV was 5.3 The resections included the following: 13 sub lobar, 4 segmentectomy, and 9 lobectomy. Lymphadenectomy was performed in all cases. Final pathology documented malignancy in 23 patients; 18 patients had lung primary (NSCLC) and 5 were metastatic (1 anal, 3 colorectal, 1 esophageal). All margins were negative on final pathology. Stages of NSCLC included: Stage I -15, stage II - 2, stage IIIa - 1. There were no procedure related complications.

Conclusions:
Single episode of anesthesia for robotic bronchoscopy and resection is a safe and effective procedure. ICG Localization facilitated maintaining a minimally invasive approach; there were no conversions. Ninety three percent of patients offered MIDAS elected to proceed with the combined approach. Patients uniformly expressed satisfaction with shortened timeline to definitive therapy eliminating the waiting interval between nodule diagnosis and resection. Impact on operating room efficiency can be managed with patient selection and team preparation. Single episode of anesthesia may reduce risk, increase patient satisfaction, and enhance short and long term outcomes.

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