RUSH

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The Arthur E. Diggs, MD, and L. Penfield Faber, MD, Chair of Surgical Sciences

Advancement of Medicine

In 2023, we made significant investigative progress! The foundation of this progress has been our Rush Lung Center Clinical Research Scholar, Arsalan Khan, MD, whose salary is paid for by the Arthur E. Diggs, MD, and L. Penfield Faber, MD Chair of Surgical Science endowment. He has partnered with Savan Shah, MD, a Rush general surgery resident to carry out multiple projects. Together they have submitted two written abstracts and one video abstract to the General Thoracic Surgery Club, or GTSC, as well as two projects to the International Association for the Study of Lung Cancer, or IASLC, meeting. Also, we were able to purchase a Participant User File from the Society of Thoracic Surgeons, and bioinformatic analyses are pending on approximately 1,400 lung cancer samples. We are making more rapid progress in thoracic research than ever before at Rush, in large part due to your generosity.

Research

Studies Submitted to the General Thoracic Surgery Club Annual Meeting

1. Minimally invasive pneumonectomy for NSCLC is associated with improved survival compared to open pneumonectomy

The objective of this study was to determine if minimally invasive pneumonectomy for non-small cell lung cancer, or NSCLC, provides a survival advantage over open pneumonectomy. We examined 3,784 patients who underwent pneumonectomy for NSCLC between 2015 and 2020 from the National Cancer Database. Our results demonstrated that minimally invasive (robot-assisted or video-assisted) pneumonectomy is associated with improved 90-day survival compared to open pneumonectomy in patients with NSCLC.

2. Social Vulnerability Index is associated with major morbidity after VATS lung resection

The objective of this study was to determine if social vulnerability index, or SVI, is associated with major morbidity after video-assisted thoracoscopic, or VATS, lung resection for early-stage NSCLC. We examined 667 patients from Rush who underwent VATS lung resection for stage IA-IIB NSCLC between 2007-2020. SVI was determined by geocoding the permanent addresses of Illinois residents, mapping them to U.S. census tracts, and using the Centers for Disease Control and Prevention calculator for census-tract level SVI. Our results demonstrated that a high social vulnerability index is associated with major morbidity after VATS lung resection for early-stage NSCLC.

3. Video abstract: Robot-assisted repair of a giant para-conduit hernia

This video demonstrates the key technical steps to repairing a giant paraconduit hernia after an esophagectomy. This is an unusual complication that was handled at Rush with a minimally-invasive robotic approach, resulting in an excellent outcome.

Studies Submitted to the International Association for the Study of Lung Cancer

1. Association between body composition, nodal upstaging and recurrence

With about $15,000 from the Diggs-Faber endowment, I purchased a license for Data Analysis Facilitation Suite, or DAFS. This innovative software package allows for 2D and 3D body composition analysis of CT scans and PET scans. We are currently analyzing scans from approximately 550 patients to identify associations between body composition characteristics and nodal upstaging at the time of surgery or disease-free survival (recurrence).

2. Association between systemic inflammatory indices, nodal upstaging and recurrence

Drs. Khan and Shah have collected concentrations of multiple systemic inflammatory markers on over 1,000 lung cancer patients. With these data, we plan to investigate if there is an association between these systemic inflammatory indices and nodal upstaging at the time of surgery or disease-free survival (recurrence).

Bioinformatics Analyses of the Molecular Make-Up of Approximately 1,400 Lung Cancers

The Diggs-Faber endowment funded bioinformatic analyses of the genetic make-up of approximately 1,400 tumors from lung cancer patients. There are a variety of questions we will ask using this data, including trying to understand if specific genomic signatures can help predict which patients are most likely to experience a recurrence of their cancer. We also plan to examine differences between tumor genetic make-up in the following groups: node negative vs. node positive patients, never smokers vs. ever smokers, obese vs. non-obese, male vs. female, older vs. younger, and diabetic vs. non-diabetic patients. We will eventually plan to investigate if tumor proteins in blood samples can help predict which patients will recur within each of these groups.

Clinical Trials

The Diggs-Faber fund partially underwrites the salary of the Rush Lung Center clinical research coordinator. This position is vital to coordinating the nine clinical trials open within the Rush Lung Center. I have arranged to make withdrawals every six months to fund approximately 5% of the coordinator's salary. I would be happy to share details of the ongoing clinical trials open at the Rush Lung Center with you, if you are interested.

Professional Development

As mentioned previously, I have also budgeted $10,000 annually from the Diggs-Faber fund for a traveling scholarship for our two senior cardiothoracic fellows, Michael O'Connor, MD, and Michael Bishop, DO, to spend a week observing an expert cardiothoracic surgeon anywhere in the continental United States to learn innovative techniques that they can take with them into practice.

Publication Highlights and Presentations — Abbreviated

- The Society of Thoracic Surgeons General Thoracic Surgery Database: 2022 Update on Outcomes and Research. The Annals of Thoracic Surgery. 2023.

- Latrogenic Air Embolism: Pathoanatomy, Thromboinflammation, Endotheliopathy, and Therapies. Frontiers in Immunology. 2023.
- Low-Dose CT Scan Features are Associated with Annual Risk of Hospitalization. Annals of Thoracic Surgery Short Reports 2023.

- Conditional Survival Analysis of Patients with Resected Non–Small Cell Lung Cancer. The Journal of Thoracic and Cardiovascular Surgery. 2023.
- I presented my research 16 times in 2023 at conferences ranging from the Annual Society of Thoracic Surgeons Meeting to the American Cancer Society National Lung Cancer Roundtable.

The Year Ahead: 2024 and Beyond

I was able to purchase a Participant User File from the Society of Thoracic Surgeons that contains data from about 100,000 patients that underwent lung resection for cancer between 2015 and 2022. We hypothesize that elective lung resections for lung cancer that begin later in the day will be associated with a higher rate of 30-day major morbidity, mortality, conversion to open, hospital length of stay and readmission than those that start earlier in the day. The results of this project will be submitted to the 2025 STS Annual Meeting. Finally, I am hopeful that the second clinical research scholar I hired, thanks to your generosity, will amplify our success!

With Gratitude

I want to thank you for your generosity in establishing the Arthur E. Diggs, MD, and L. Penfield Faber, MD Chair of Surgical Science. Without your funding, we would not be able to do the innovative work we are doing.