

Re: IHPBA Warren Fellowship 6-month report

Dear IHPBA Community,

I am deeply thankful and very fortunate to be a recipient of the IHPBA Kenneth Warren Fellowship 2024/2025. The trust the IHPBA Research Committee has provided me with the opportunity to nurture my passion for surgical research under the kind mentorship of Prof. Adnan Alseidi and his team at UCSF. This is a truly mind opening and career shaping opportunity!

In September 2024, I joined the AIRS (Artificial Intelligence and innovations Research group in Surgical oncology) lab at the UCSF Department of Surgery to develop, validate, and automate a video-based assessment (VBA) tool for minimally invasive distal pancreatectomy (MIDP). We promptly submitted and got approval from the local Institutional Review Board. In parallel, we have invited several expert centers to join the study and contribute surgical expertise and multicentric data. So far, we have accomplished:

- Hierarchical Task Analysis

This study aims to determine the workflow and key performance indicators for MIDP. Three experts with different approaches to MIDP were peer-nominated and invited for online, 1-hour long, semi-structured interviews. Experts were asked to describe step-by-step how they performed MIDP for oncological indications. They were asked to share quality indicators signaling the optimal execution of each step. In addition, they were asked to stress if a step was more critical to a particular outcome (bleeding, pancreatic fistula, margin, lymph node retrieval, etc.) and to share any insights on how to improve the procedural flow and safety. Interviews were recorded, transcribed and thematic analysis was performed. It resulted in a detailed and representative protocol capturing major steps and quality indicators for MIDP.

- Exploratory Video-Based Assessment

This study aims to explore key intraoperative variables for VBA and their correlation with postoperative pancreatic fistulas. We collected a comprehensive dataset of 40 MIDP cases performed at UCSF, including patient demographics and presentation, operative videos, surgeons' profiles, and postoperative outcomes. Each video was carefully edited to isolate the critical pancreatic transection phase for detailed analysis. We began with a thorough review of the first 10 cases by a panel consisting of 2 expert surgeons and 3 clinical fellows, which established the key variables for assessment. These included traction techniques, stapler parameters (type and movement patterns), compression and division timing, staple line bleeding, and pancreatic capsule disruption. Following this standardization phase, a dedicated panel of 3 fellows completed the analysis of all 40 cases. Our subsequent statistical analysis demonstrated significant correlations between specific technical parameters and pancreatic fistula rates.

Currently, we are drafting a manuscript describing the exploratory VBA study. In addition, we are elaborating on the findings of the hierarchical task analysis and the VBA study to draft

statements to run with the IHPBA community in a Delphi study to define a broader consensus on MIDP workflows and quality indicators.

The consensus will help us structure a Competency Assessment Tool (CAT) to video-based assess the critical phases of MIDP according to 5 domains (Exposure, Execution, Judgment, Adverse Events, and End-Product Quality). The resulting CAT will be validated on multicentric videos for its:

- content, by applying the CAT to analyze MIDP videos with a panel of expert surgeons,
- reliability, by having several surgeons independently apply the CAT on MIDP and measuring inter-rater agreements,
- predictivity, by correlating the CAT analysis with patients' outcomes such as blood loss, postoperative pancreatic fistulas, margin status, number lymph nodes retrieved, and length of stay.

Finally, the multicentric dataset and annotations will be used to train an artificial intelligence (AI) model to automatize the validated CAT for MIDP. This computer science work will be conducted in collaboration with the CAMMA Research Group of the IHU-Strasbourg / University of Strasbourg (France).

In San Francisco, I also had the opportunity to engage with the broader research and innovation community through invited presentations to the researchers of the Center for Intelligent Imaging and to the UCSF AI in Medicine (AIM) student group.

This fantastic experience would not be possible without the generous support of the IHPBA Kenneth Warren Fellowship, the expert guidance of Prof. Alseidi, and the precious collaboration of the AIRS lab - Dr. Adam, Dr. Foroutani and Dr. Ashraf Ganjouei.

I look forward to sharing the complete results with the IHPBA community in Singapore!

Respectfully,
Pietro Mascagni, MD, PhD
IHPBA Kenneth Warren Fellow 2024/2025

