# Enhanced Recovery Pathway (ERP) for Thoracic Surgical Patients Decreases PACU Recovery Time and Opioid Use

Timothy Rohman MD, Benjamin Judd MD, Kristina Mayo MD, Lyla Hance MPH, Christopher Burns BS, Benjamin Haithcock MD, Jason Long MD, Robert Isaak DO, Emily Teeter MD, Lavinia Kolarczyk MD

## INTRODUCTION

Published mean hospital length of stay (LOS) for thoracic surgical patients undergoing video assisted thoracoscopic (VATS) procedures includes 4.78 days for VATS lobectomy[1] and 4.44 days for VATS wedge[2]. At our institution, the mean LOS for VATS lobectomy and VATS wedge was 5.86 days and 4.45 days, respectively. PACU recovery time and PACU opioid consumption was widely variable. We designed and implemented a multidisciplinary ERP for thoracic surgical patients at a major academic center. The target population was patients undergoing VATS wedge and lobectomies. The primary outcome was hospital LOS and secondary outcomes included PACU recovery time and opioid use.

## METHODS

All patients having elective VATS wedge resection and VATS lobectomy from September 2015 to January 2016 were managed using an ERP. The ERP included evidence-based best practice recommendations for preoperative, intraoperative, and postoperative management.

Patients who had elective VATS wedge resection and VATS lobectomy from September 2014 to September 2015 were used as historical controls. Exclusion criteria included procedures other than VATS wedge resection and lobectomy.

## RESULTS

**LENGTH OF STAY**

| **Lobectomy** | Controls | ERP | | **VATS Wedge** | Controls | ERP |
|---|---|---|---|---|---|---|
| n= | 36 | 11 | | n= | 60 | 22 |
| LOS (days) | 5.86 | 5.91 | | LOS (days) | 4.45 | 3.95 |
| p-value | 0.659 | | | p-value | 0.273 | |

**PACU OPIOID USE**

| **Lobectomy** | Controls | ERP | | **VATS Wedge** | Controls | ERP |
|---|---|---|---|---|---|---|
| n= | 36 | 11 | | n= | 60 | 22 |
| Morphine (mg) | 8.77 | 2.12 | | Morphine (mg) | 7.73 | 2.93 |
| p-value | 0.011 | | | p-value | 0.030 | |

**PACU PHASE I RECOVERY TIME**

| **Lobectomy** | Controls | ERP | | **VATS Wedge** | Controls | ERP |
|---|---|---|---|---|---|---|
| n= | 36 | 11 | | n= | 60 | 22 |
| Time (min) | 114.9 | 84.9 | | Time (min) | 99.9 | 107.7 |
| p-value | 0.045 | | | p-value | 0.987 | |

## ERP COMPONENTS

Preoperative components included patient education, incentive spirometry education, and tobacco cessation. Intraoperative components included a standardized anesthetic approach which focused on minimization of systemic opioids, lung protective ventilation, fluid management, and multimodal analgesia with selected use of thoracic epidural analgesia. Postoperative components included multimodal analgesia, early mobilization, incentive spirometry program, and early removal of urinary catheters.

## CONCLUSION

Implementation of an ERP pathway for thoracic surgery decreases PACU opioid use for both patient groups and PACU recovery time for VATS lobectomies. This is likely attributable to the use of multimodal analgesia and standardized anesthetic maintenance. The decrease in PACU recovery time impacts the hospital system on a larger scale, as it improves resource (nursing staff) utilization and improves perioperative workflow. While there was no difference in hospital length of stay between ERP and historical controls, we observed a trend toward decreased hospital length of stay in VATS wedge patients.

## REFERENCES

1. Ann Thor Surg 2006; 81(2): 421-5
2. Chest 2012; 141: 429-435