

Evaluating the Market Need for an Enhanced Postoperative Respiratory Depression Treatment

Enalare Therapeutics Inc.

Poster #5686

BACKGROUND

Postoperative respiratory depression (PORD) can arise from a number and combination of variables leading to reduced pulmonary function including prolonged supine positioning², anesthetics and analgesics utilized during surgery, use of narcotics for analgesic management, and can be exacerbated by certain types of surgeries including thoracic or abdominal procedures that further diminish lung capacity³. The majority of PORD events (85%) occur within the initial 24 hours post-surgery.⁴ Atelectasis occurring at the induction of anesthesia, and possibly persisting post-surgery,² can lead to varying degrees of respiratory depression. These effects may have clinically relevant long-term consequences including heightened morbidity and mortality beyond the time of hospital discharge.⁵ The aim of this market research study was to understand the current PORD treatment landscape and areas needing improvement.

CONCLUSION

- HCPs recognize downstream impact of acute presentation of PORD, however, acknowledge unknown incidence and variable definition
- Challenges include management of PORD in the general ward, variability in treatment capabilities, and lack of follow-up after discharge
- Analgesic non-interference, earlier recognition of PORD risk, and prophylactic treatment are acknowledged unmet needs

REFERENCES

- Peppin JF, Pergolizzi JV, Jr., Gan TJ, Raffa RB. J Clin Pharm Ther. 2021;46(5):1220-1225.
- McPherson K, Stephens R. Br J Hosp Med (Lond). 2016;77(4):C60-64.
- Golder FJ, Hewitt MM, McLeod JF. Respir Physiol Neurobiol. 2013;189(2):395-402.
- Weingarten TN, Warner LL, Sprung J. Curr Opin Anaesthesiol. 2017;30(1):156-162.
- Miskovic A, Lumb AB. Br J Anaesth. 2017;118(3):317-334.

Errol Gould, PhD, Joseph V. Pergolizzi Jr., MD, MBA,
Herm Cukier, MBA, Daniel Motto, MBA

Enalare Therapeutics Inc., Princeton, NJ USA

METHODS

Qualitative interviews gathered insights from N = 20 interviews including surgeons, anesthesiologists, nurses, pharmacists, and payers



60-minute TDIs
N = 20

Respondent Type
Sample

Surgeons
5

Anesthesiologists
6

Pharmacists
2

Nurses
2

Hospital Payer
2

GPO
1

IDN Payer
2

Total
20

Surgeon + Anesthesiologist KOL Screening Criteria:

- Participate in >10 (anesthesiologist) and >20 (surgeon) surgeries per month over the past year
- >10 PORD patients in the past year
- Must have >1 peer-reviewed publications and/or book contributions on PORD in last 3 years (anesthesiologist)
- Sample to include academic and community as well as in-patient and outpatient settings of care
- Sample to include multiple surgery types associated with PORD, such as emergency, head and neck, and thoracic surgery

Nurse Screening Criteria:

- Split between inpatient and outpatient surgical settings as well as academic and community settings of care
- Helped manage ≥10 PORD patients in the past year
- Must work in PACU, ICU, or recovery room setting and specialties where PORD may be prevalent (critical care, surgical, etc.)

Pharmacist Screening Criteria:

- Responsible for ordering and stocking in-patient and outpatient drugs for respiratory depression
- Voting member of a P&T committee
- Split between academic and community medical centers

Hospital + IDN Payer Screening Criteria:

- Key decision maker in purchasing/acquisition of physician-administered products
- Knowledge of medical and pharmacy benefit policies for treatments used for respiratory depression
- Voting member of a P&T committee
- Split between academic and community medical centers

GPO Payer Screening Criteria:

- Key decision maker for contracting decisions for pulmonology therapies
- Can speak to discounts that manufacturers provide for pulmonology therapies
- Knowledge of products used to treat post-operative respiratory depression

Abbreviations: KOL = Key Opinion Leader; PORD = Postoperative Respiratory Depression; PACU = Postanesthesia Care Unit; ICU = Intensive Care Unit; P&T Committee = Pharmacy and Therapeutics Committee; GPO = Group Purchasing Organization; IDN = Integrated Delivery Network

Physicians require increased PORD education given they are uncertain of the condition's definition and incidence

PORD Definition	Unmet Needs	Incidence	PORD Outcomes
- Respondents defined PORD as patients with the following characteristics: - Oxygen levels < 92-94% - Decreased respiratory rate - Airway obstruction - Mental status changes - Hypoxia - Hypercapnia - Abnormal breathing - Inability to regain normal oxygen levels after surgery - Low tidal volume “ [PORD is] oxygen level going below 92%; nurses really do a great job at monitoring patients and making us aware that the patient needs to be assessed” - Anesthesiologist “ When a patient is unable to maintain an oxygen of above 94%, I do the first risk assessment and then I consult with an anesthesiologist” - Surgeon	- Prophylactic product - Pain relief without side effects - Earlier PORD recognition - A product with a durable effect (i.e., lasting efficacy from PACU through ward stay given lower nurse-patient ratio in the ward) “ I want a drug that will continue working while the patient is in the ward to get them over the period of time where they are not being watched and the level of monitoring is decreased” - Anesthesiologist	- Secondary literature indicates that PORD ranges from 0.3% to 17% - Respondents defined PORD risk at patient and surgical levels - High-risk patients: patients with epilepsy, neurodegenerative disorders, COPD, old age, sleep apnea, high BMI, etc. - High-risk procedures: long procedures, use of general anesthesia, high doses of pain medications, and cardiovascular system surgeries “ I think that the incidence could be higher than 10%... I would say the most important part of risk is the length of surgery... a long surgery has volume shift which means the patient needs more iv fluid and this causes imbalance of fluid and electrolytes, more anesthesia, and more narcotics” - Anesthesiologist	- Physicians acknowledge PORD's association with: - Prolonged recovery time - Increased length of stay amounting to [~\$8k/day for ICU and \$4k/day for ward] - Increased 90-day mortality rates - Higher readmission rates - While hospitals track quality metrics (i.e., length of stay, readmission, mortality, etc.) they do not measure PORD's association with these outcomes - Physicians acknowledge the need for follow up with PORD patients given PORD cases can occur after discharge “ I would keep it simple; [PORD is associated with] death and increased hospital stay and [higher] 90-day mortality rate” - Anesthesiologist

Abbreviations: PORD = postoperative respiratory depression; COPD = chronic obstructive pulmonary disease; ICU = intensive care unit; PACU = post anesthesia care unit; BMI = Body Mass Index

RESULTS

Perception of PORD

Surgeons	Anesthesiologists	Nurses
- Consider PORD a serious surgical complication due to its association with poor outcomes such as reintubation and increased length of stay; role includes following up with patients following surgery - Neurosurgeons consider patients with epilepsy, neurodegenerative disorders, COPD, and obesity high-risk due to impaired respiratory capacity - General surgeons see obesity, surgery type, length of procedure, and use of pain medication as risk factors due to their impact on respiration and association with increased need for perioperative drugs that cause PORD	- Consider PORD low priority given existing methods used to control PORD including using non-opioid analgesics, localized anesthesia, ventilation, and limiting neuromuscular blocks; role includes initiating preanesthetic evaluation and determining PORD treatment - Note neurodegenerative diseases are associated with a four-fold increase in PORD risk; high BMI and surgery type were frequently mentioned risk factors - Highlight PORD cases in the general ward are undercounted and severe	- Consider PORD a serious condition due to association with cardiac arrest and anoxic injury; role includes monitoring patients following surgery and administering PORD treatments - Define at-risk patient populations as patients with COPD, long COVID, pulmonary embolism, and those receiving neuromuscular blocks - Acknowledge growing awareness of PORD, noting that anesthesiologists use less neuromuscular blocks or anesthesia that repress the respiratory system

Four key unmet needs include prophylactic availability, relief without side effects, earlier recognition, and reduced economic and clinical burden

