

# INNOVATIVE MEDICINE

## Best Practices

### Integrated Artificial Intelligence Screening to Optimize Patient Identification for Bronchoscopic Lung Volume Reduction Therapy: Redefining Patient Selection with SeleCT™ Screening



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Developed under the direction and sponsorship of Olympus America.

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Faculty Disclosures: D. Kyle Hogarth, MD has been paid a consulting fee by Olympus America. Bobby W. Tullos, MD has been paid a consulting fee by Olympus America.

Neither the editors of *CHEST Physician*® nor the Editorial Advisory Board nor the reporting staff contributed to this content.

LCR53719V01 December 2024

#### Executive summary

Chronic obstructive pulmonary disease (COPD) is the third leading cause of mortality globally, with ~70% of cases undiagnosed. Patients with advanced emphysema, a severe form of COPD, have historically been undertreated due to inadequate patient identification and lack of access to specialist treatment. Treatments, such as bronchoscopic lung volume reduction (BLVR) with the Spiration™ Valve System (SVS), have demonstrated significant improvements in patient outcomes.<sup>7</sup> To streamline patient selection, Olympus' artificial intelligence (AI)-powered SeleCT™ Screening tool identifies eligible candidates for BLVR by analyzing chest computed tomography (CT) scans. Pilot programs show increased patient identification rates and faster treatment times, enhancing access to care for underdiagnosed COPD.

#### COPD remains the most significant pulmonary condition globally, and most people with COPD go undiagnosed

COPD is widely considered the most significant pulmonary condition globally, ranking fifth in terms of overall disease burden and third with respect to mortality worldwide.<sup>1</sup> Emphysema, a severe form of COPD, affects 4.7 million individuals in the United States;<sup>2</sup> however, significantly more people are thought to have undiagnosed COPD.<sup>3</sup> Community-based population studies conducted in North and South America, Europe, Australia, and Asia collectively suggest that approximately 70% of patients with COPD globally may be underdiagnosed.<sup>4</sup> Despite existing treatments, patients with emphysema often experience a negative impact on their quality of life.

#### Advancements in treatments are safe and effective for patients with advanced emphysema

In recent years, several advancements in treatments have become available, and these have been shown to improve symptoms in patients with emphysema. One such breakthrough treatment is the use of endobronchial valves (EBV) such as the Spiration™ Valve System (SVS) (Olympus Corp.) in BLVR procedures.<sup>5</sup> BLVR is recommended as a treatment approach in the Global Initiative for Chronic Obstructive Lung Disease guidelines for patients with advanced emphysema.<sup>6</sup> Clinical trials,<sup>2, 7, 8, 9</sup> such as EMPROVE, have demonstrated marked improvement in lung function, health-related quality of life, and dyspnea in patients receiving SVS treatment. Treatment effect is maintained for at least 24 months, with an acceptable safety profile, and with minimal device-related issues during the follow-up period.<sup>7</sup>

#### Historically, identifying appropriate patients for BLVR treatment has been ineffective and time-consuming

Patient selection for BLVR treatment is challenging due to low diagnosis rates,<sup>3, 4</sup> reliance on referrals, and the high number of patients who are ultimately found ineligible<sup>10</sup>. The conventional diagnostic workflow to identify patients for BLVR treatment typically involves pulmonary function tests, clinical tests, and a medical workup, and concludes with radiographic assessment. This resource-intensive process results in many patients undergoing medical workup but ultimately being disqualified due to radiographic findings (e.g., fissure completeness, lack of emphysema severity). For example, of the patients who did not meet eligibility for the EMPROVE clinical trial, 51% were disqualified due to radiographic assessment via CT.<sup>2</sup>

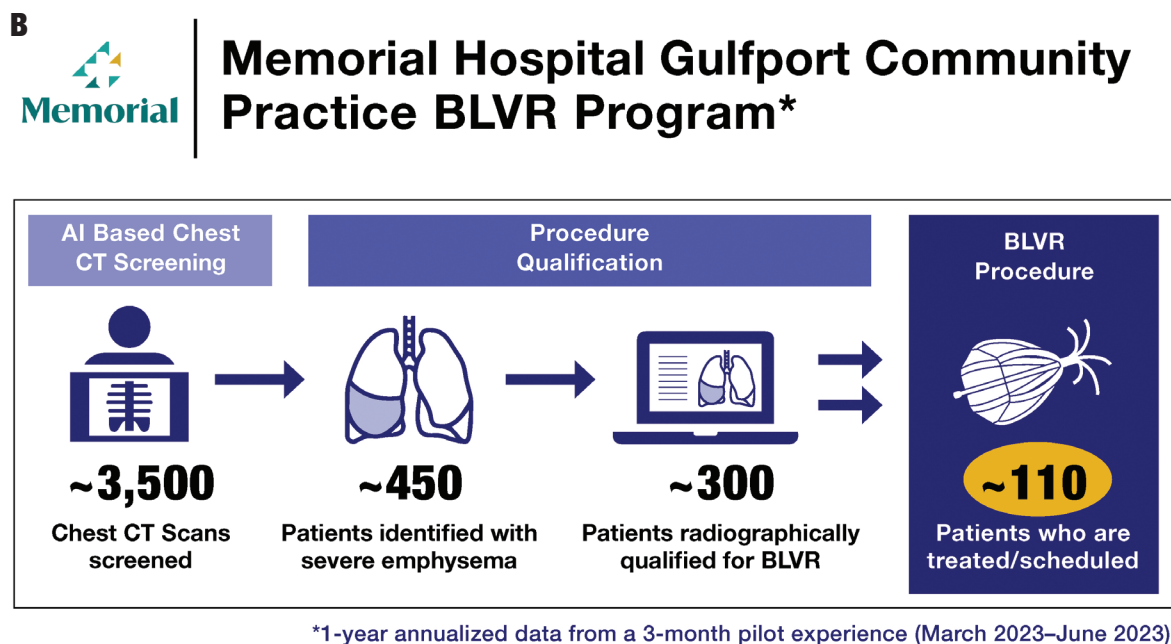
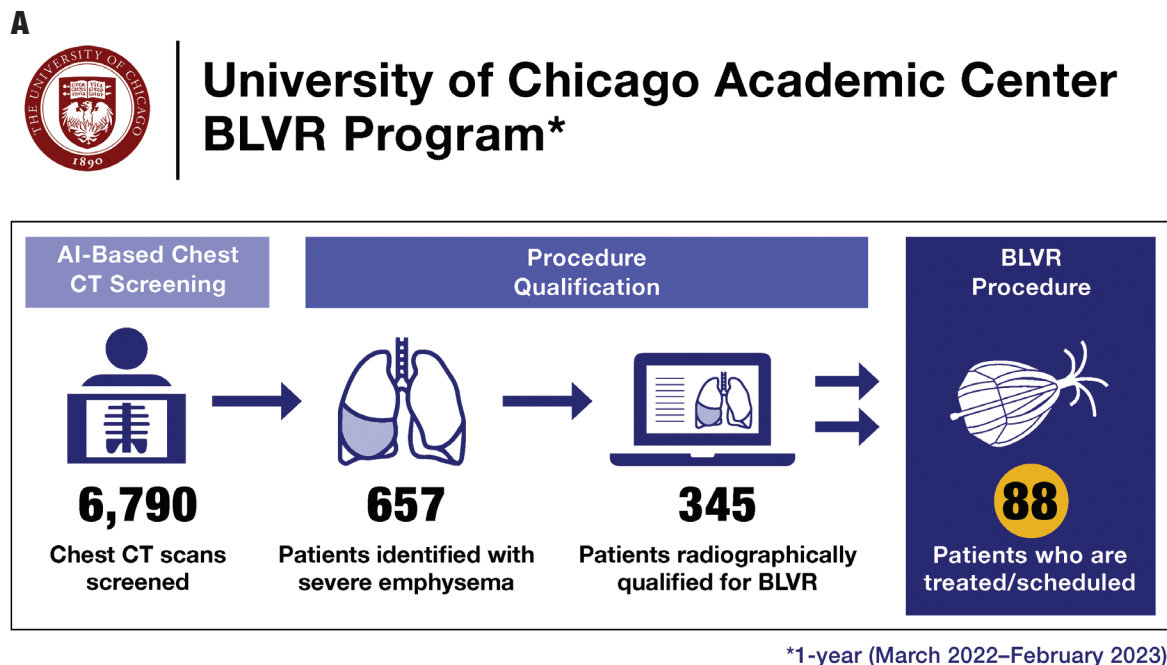
Additionally, the current identification pathways do not capture candidates who may have entered the healthcare system for other reasons or may be suffering from undiagnosed/underdiagnosed COPD. Even after diagnosis, only a fraction of patients with severe emphysema have access to interventional care, with ~82% treated by their primary care physician or non-procedural pulmonologist.<sup>11</sup> Consequently, these limitations often mean a complicated and inefficient selection process, restricting scalability and creating a burden for healthcare providers and patients alike.

#### Harnessing AI to transform patient identification and increase access to BLVR treatment

Leveraging AI to streamline BLVR patient selection and enhance access to treatment is the goal of Olympus' new screening tool, SeleCT™ Screening, powered by Imbio™. Utilizing proprietary AI technology, SeleCT™ Screening redefines the approach to emphysema diagnosis and patient selection for BLVR treatment by automatically accessing any non-contrast chest CT scans within a hospital, irrespective of the specialty. Scans of potential candidates are automatically sent for quantitative CT (QCT) analysis, and the tool identifies patients with emphysema who may be eligible for EBV treatment by evaluating emphysema severity (i.e., target lobe with ≥40% emphysema involvement at -720 Hounsfield unit) and fissure integrity (i.e., ≥90% completeness of the fissure separating the target lobe).

Results from SeleCT™ Screening are provided in an easy-to-read report to help physicians identify target lobes and fissure integrity scores to facilitate clinical decision-making<sup>12</sup>. SeleCT™ Screening addresses unmet needs with respect to patient selection by prioritizing

**Figure 1. Key metrics from pilot studies conducted at (A) the University of Chicago and (B) Memorial Hospital Gulfport**



the most common disqualifier, radiographic assessment as the initial step. This reduces burden on the patient, preventing unnecessary clinical workup, as well as alleviating the physician's workload (both radiology and pulmonary). Furthermore, by proactively scanning each qualifying chest CT in the health system, additional patients are flagged for follow-up and treatment discussion.

#### Implementing AI-based patient screening in two real-world BLVR programs

A BLVR program established at the University of Chicago (an academic center) successfully embedded SeleCT™ Screening within their health system. In a BLVR SeleCT™ Screening pilot study conducted from March 2022 to February 2023, 6,790 chest CT scans were screened, of which 657 met the selection criteria and were selected for further QCT analysis. Of these 657 patients with

severe emphysema, 345 radiologically qualified for BLVR, with a fissure integrity of  $\geq 90\%$  and sufficient emphysema severity. Overall, 88 patients had valves implanted or were in the final stages for workup (**Figure 1A**).

Similarly, a BLVR SeleCT™ Screening pilot study was conducted at Memorial Hospital Gulfport (a community practice) from March 2023 to June 2023. Data have been extrapolated to an annualized basis and are therefore estimates. In total, 3,500 chest CT scans were screened, of which 450 met the selection criteria and were identified for QCT analysis. Of these 450 patients with severe emphysema, 300 radiologically qualified for BLVR, with a fissure integrity of  $\geq 90\%$  and sufficient emphysema severity, and we estimate that they could have had approximately 110 patient candidates for valve treatment (**Figure 1B**).

Notably, in both the academic center and community practice settings, the traditional

workup approach yielded approximately 1–2 cases/month versus 4–8 cases/month with SeleCT™ screening. Corresponding time to valve implantation was 30–90 days versus <30 days, respectively.

#### Conclusion

The Olympus SeleCT™ Screening tool addresses critical gaps in diagnosing and treating severe emphysema. The tool significantly enhances the identification of patients within the ~70% of the underdiagnosed COPD population by screening all non-contrast chest CT scans across the healthcare system. This proactive approach helps identify potential candidates who might otherwise go undetected. In addition, the SeleCT™ Screening tool may reach COPD patients who are not currently under the care of a specialist, broadening access to advanced interventional treatments such as BLVR with the SVS. Finally, the tool streamlines the patient workup process

by prioritizing radiographic assessments as the initial step, reducing unnecessary tests, and improving overall efficiency for healthcare providers and patients. The success of SeleCT™ Screening in both academic and community practice settings highlights its potential to improve patient outcomes, theoretically improving quality of life and ability to perform activities of daily living, by increasing access to life-changing treatments for severe emphysema, while alleviating burden on the healthcare system and accelerating time to intervention. Additionally, it may have a positive impact on COPD readmission rates through more effective COPD management and related benefits, while also solidifying network referrals and enhancing the overall care provided to patients with COPD within the health system.

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