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Population-based prevalence of bronchiectasis in the United States: 2018–2022

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Introduction: The prevalence of bronchiectasis in the U.S. appears to be increasing. This study aimed to provide a current assessment of the prevalence of bronchiectasis in the U.S.

Methods: The prevalence of bronchiectasis in the U.S. from 1 January 2018, to 31 December 2022, was estimated using data from Optum Clinformatics Data Mart. The study population comprised people with ≥1 day of registration during the study period, plus continuous registration for ≥365 days prior to the last day they were registered. A non–cystic fibrosis (CF) bronchiectasis case was defined as ≥2 outpatient claims on separate days with a diagnosis code of bronchiectasis or ≥1 hospitalization records with a principal/secondary diagnosis of bronchiectasis. A CF-related bronchiectasis case additionally required ≥2 outpatient claims on separate days with a diagnosis code of CF or ≥1 hospitalization record with a principal/secondary diagnosis of CF. People with missing or ambiguous age or sex information were excluded. The cumulative and annual crude prevalence of bronchiectasis was estimated, then stratified by age and sex. Additionally, the cumulative crude prevalence of CF-/non–CF-related bronchiectasis was estimated. The crude prevalences were standardized to the age and sex distribution of the 2022 U.S. population.

Results: This study identified 94,392 bronchiectasis cases. The standardized annual prevalence increased from 190.6 (95% confidence interval [CI]: 188.8–192.4) in 2018 to 234.1 (95% CI: 232.2–236.1) per 100,000 people in 2022, and increased with age. The standardized cumulative prevalence was 221.6 (95% CI: 220.1–223.1) per 100,000 people. The standardized cumulative prevalence of CF- and non–CF-related bronchiectasis was 5.0 and 216.5 per 100,000 people, respectively.

Conclusion: In the U.S., the prevalence of bronchiectasis is rising and increases with age. Therefore, the disease burden and health-care resource needs will continue to grow in this population, highlighting the need for new disease-specific therapies.

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Results from a phase II trial (Airleaf™) of a cathepsin C (dipeptidyl peptidase 1) inhibitor, BI 1291583, in adults with non-cystic fibrosis bronchiectasis

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Introduction: Uncontrolled neutrophil serine protease (NSP) activity contributes to the vicious vortex of airway dysfunction, inflammation, infection, and structural damage in bronchiectasis, resulting in morbidity and pulmonary exacerbations (PEx). Inhibition of cathepsin C (CatC or DPP1) can reduce NSP activity, thus dampening the impact of this vortex. We present the results of a phase II dose-finding study that assessed efficacy and safety of the CatC inhibitor BI 1291583 in adults with non–cystic fibrosis bronchiectasis (Airleaf).

Methods: In this double-blind, placebo controlled trial, 322 participants were randomized to one of three once-daily doses of BI 1291583 or placebo (24 up to 48 weeks of treatment). The doses covered the range from submaximal to maximal inhibition of CatC and neutrophil elastase (downstream effect). Participants had a history of PExs, requiring antibiotic treatment (either ≥ 2 PExs in the past year or 1 PEx and a St. George's Respiratory Questionnaire symptoms score > 40). A multiple comparison procedure and modeling approach (MCP-Mod) was used to assess the primary objective, to demonstrate a non-flat dose–response curve based on the primary end point, time to first PEx up to week 48. Adverse events (AEs) were monitored throughout the trial, including skin and periodontal AEs.

Results: The primary objective was met. A statistically significant dose–dependent benefit of BI 1291583 over placebo was observed. Analysis is ongoing, and detailed results will be presented at the congress.

Conclusion: These results support continuation of clinical development of BI 1291583 in bronchiectasis, with phase III planned to begin in 2025.

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Itepekimab reduces exacerbations in former smokers with moderate-to-severe chronic obstructive pulmonary disease regardless of blood eosinophil count at screening or disease severity at baseline

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Introduction: Itepekimab is a novel human IgG4P monoclonal antibody against interleukin-33. A phase 2 study showed that itepekimab significantly reduced moderate or severe exacerbations of chronic obstructive pulmonary disease (COPD) in former smokers (FS). This *post hoc* analysis assessed the effect of itepekimab on moderate or severe exacerbations in FS, stratified by high/low blood eosinophil counts (BEC) at screening or moderate/severe disease at baseline.

Methods: The phase 2 study (NCT03546907) enrolled 343 adult patients with moderate-to-severe COPD who had ≥2 moderate / ≥1 severe exacerbations on a stable double/triple inhaled regimen in the past year. Patients received either 300 mg itepekimab subcutaneously q2w (n = 172) or placebo (n = 171) for 24 to 52 weeks. Here, we report the adjusted annualized exacerbation rates by subgroups.

Results: At screening, 106/187 (57%) FS had low (<250 cells/μL) and 81/187 (43%) had high (≥250 cells/μL) BEC; 99/187 (53%) patients had severe (percent predicted forced expiratory volume in 1 s [$ppFEV_1$] < 50%), and 88 (47%) had moderate ($ppFEV_1$ ≥ 50%) disease at baseline. Baseline demographics were similar across treatment arms and subgroups; disease characteristics were generally more severe in patients with severe vs moderate disease at baseline. Annualized exacerbation rates (95% CI) for itepekimab vs placebo were 0.89 (0.66, 1.21) vs 1.55 (1.17, 2.05) in all FS; 0.86 (0.57, 1.28) vs 1.39 (0.96, 2.00) in FS with low BEC and 0.85 (0.53, 1.35) vs 1.77 (1.17, 2.66) in FS with high BEC. Exacerbation rates were 1.09 (0.75, 1.58) vs 2.13 (1.52, 2.98) in FS with severe disease and 0.76 (0.46, 1.26) vs 1.05 (0.66, 1.68) in those with moderate disease.

Conclusion: These results suggest that itepekimab reduces annualized exacerbation rates vs placebo in FS with moderate-to-severe COPD, regardless of BEC at screening or disease severity at baseline.

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Differences in the burden of chronic obstructive pulmonary disease in Medicare beneficiaries by race/ethnicity and income

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Introduction: Low income is associated with increased risk of chronic obstructive pulmonary disease (COPD) and disease progression. National survey data reports higher COPD prevalence in non-Hispanic White individuals than other race/ethnicities. However, the real-world health burden of COPD across race/ethnicity and income in Medicare beneficiaries is not well described in the literature.

Methods: Analysis was performed on 2021 Medicare 100% fee-for-service claims for beneficiaries aged 40+ with medical and pharmacy coverage and COPD diagnoses. Demographics and acute hospital-based utilization were reported. Race/ethnicity relied on voluntary self-identification to the Social Security Administration, supplemented with recategorization algorithms. Medicare-defined race/ethnicity included non-Hispanic White, Black/African-American, Asian/Pacific Islander, Hispanic, American Indian/Alaskan Native, Other/Unknown. Dual-eligibility (*i.e.*, enrollment in Medicaid and Medicare) proxied low income. Annual all-cause mortality was calculated from the reported date of death in the 2021 enrollment file. COPD-related inpatient (IP) and emergency department or observation (ED/obs) encounters not resulting in an IP admission were identified by COPD-related diagnoses.

Results: COPD prevalence per 1000 was highest in low-income non-Hispanic White beneficiaries (264.0) and lowest in non-low income Asian/Pacific Islander beneficiaries (56.5). Within most race/ethnicity cohorts, mortality (low-income: 10.7%–14.0% versus non-low income: 7.0%–11.7%) and percent with COPD-related

IP (low-income: 10.3%–15.7% versus non-low income: 8.7%–12.5%) and ED/obs (low-income: 3.9%–13.6% versus non-low income: 4.2%–9.9%) utilization were highest in low-income cohorts. Low-income beneficiaries had higher risk scores, indicating poorer overall health (2.1–2.3 versus non-low income 1.6–1.9).

Conclusion: COPD prevalence varied across race/ethnicity and income strata. Within race/ethnicity cohorts, low-income beneficiaries generally had higher COPD burden and poorer overall health. COPD-related utilization and overall health were relatively consistent among larger race/ethnicity cohorts. Unobserved factors likely contributed to observed variation across race/ethnicity and income cohorts, including differences in genetic and environmental risk factors, demographics, comorbidities, and treatment patterns. Understanding variation in COPD burden across race/ethnicity and income strata is key for evidence-based strategies to decrease disease burden disproportionately impacting certain populations.

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Not all that is hypoxia is a pulmonary embolism: A case of a pulmonary artery angiosarcoma masquerading as pulmonary embolism

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Introduction: Pulmonary artery angiosarcoma is a rare malignant vascular tumor with a poor prognosis. It arises from the proliferation of vascular endothelial cells, and its pathogenesis remains poorly understood. The resulting proliferation leads to hemodynamic compromise and respiratory difficulties. Symptoms are often nonspecific, mimicking a pulmonary embolus, leading to misdiagnosis. Diagnosis typically occurs late, after metastasis, complicating management.

Case Presentation: A 38-year-old male presented to the hospital with worsening hypoxia and pleuritic chest pain. Imaging revealed a suspected large pulmonary embolism in the right lower lobe with acute infarcts. The patient was placed on apixaban, advised to follow up outpatient. He returned with hemoptysis, dyspnea, and unintentional weight loss of 30 pounds. Imaging showed a large filling defect in the right main pulmonary artery, extending into the segmental branches. Right heart catheterization revealed a nearly occlusive right lower lobe obstruction from prior chronic pulmonary embolism. The patient was again discharged on anticoagulation. He returned with symptoms of a suspected embolic transient ischemic attack, then referred to a tertiary care center. A PET scan showed a large, FDG-avid mass in the right main pulmonary outflow tract, extending into the right hilum.

Discussion: Pulmonary angiosarcomas are often invasive by nature and involve vital structures such as the heart and great vessels. They can resemble a pulmonary embolism on imaging. However, FDG-avidity in filling defects can enhance diagnostic sensitivity. Surgical resection is complicated by the tumor's rarity and lack of treatment guidelines, contributing to its poor prognosis.

Conclusion: The patient was found to have a right-sided pulmonary artery angiosarcoma with possible pulmonary embolism versus *in situ* thrombosis from the angiosarcoma. He underwent right pneumonectomy with reconstruction of his right atrium. He is being monitored at the tertiary-care center now. His respiratory status has improved, now breathing comfortably on nasal cannula.

Successful management of tracheomediastinal fistula with massive pneumomediastinum and *Aspergillus* pneumonia

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Introduction: Tracheomediastinal fistula is a rare complication, primarily reported in prolonged intubation in the setting of tracheal cuff erosion into the posterior wall. We present a case of a more distally located tracheomediastinal fistula complicated by extensive pneumomediastinum.

Case: A 68-year-old female with no significant medical history presented to the emergency department with a reported seizure and hypoxia, requiring intubation in the field. On presentation workup revealed a CT of the chest significant for pneumomediastinum, subcutaneous emphysema, left lobe consolidation, left upper lobe cavitary lesion in addition to a tracheal diverticulum. Bronchoscopy revealed a tracheomediastinal fistula, extending from the posterior membrane of the distal trachea to the right main stem takeoff. Esophagogram ruled out esophageal perforation. A bronchoalveolar lavage of left upper lobe revealed *Aspergillus niger.* Extensive microbial cultures, including tuberculous, were negative. The patient was managed with right chest thoracostomy in the immediate period, then left upper lobe pneumonectomy on day 6 and a silicone Y-stent placement with tracheostomy on day 10. The Y-stent was subsequently removed on day 40 with complete healing of tracheomediastinal fistula. Tracheostomy tube was decannulated on day 45. The patient was discharged to rehabilitation facility.

Conclusion: Tracheomediastinal fistula is a rare but life-threatening condition that requires timely management. It was unclear how our patient developed the fistula, and traumatic intubation was considered the most likely cause. Timely decompression of pneumothorax and y-stent placement with tracheostomy can achieve complete recovery as was noted in our case.

Quick-onset severe pneumonitis induced by R-CHOP and GCSF

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Introduction: Pneumonitis, can be caused by numerous different agents, including certain medications, and generally presents weeks to months after with symptoms of dyspnea and cough. Rituximab, used frequently to treat diffuse large B-cell lymphomas (DLBCL), has previously been reported to cause pneumonitis, especially in combination with other chemotherapeutic medications (CHOP), although this remains rare. There have also been reports of pneumonitis in patients receiving R-CHOP and granulocyte colony-stimulating factor (G-CSF). Here we present the case of a patient who received R-CHOP and G-CSF, and quickly developed severe pneumonitis.

Case Report: A 73-year-old veteran diagnosed with DLBCL with histologic transformation in February began receiving the first cycle of R-CHOP at the beginning of August and subsequently received G-CSF for four days. The following day, he was admitted to the hospital for a COPD exacerbation in the setting of dyspnea and increased sputum. The second cycle of R-CHOP was given a week later, although at a lower dose of doxorubicin. In mid September, he was admitted to the intensive care unit for severe pneumonitis, requiring non-invasive ventilatory support and high-dose steroids. His oxygen support was weaned down over several weeks, although he never returned to his baseline respiratory status.

Discussion: In patients with DLBCL, R-CHOP therapy has become the standard of care, with drastic improvement in survival. Over the years, there have been an increasing number of reports of patients developing pneumonitis following treatment with this combination of drugs. There has been shown to be an increased prevalence of adverse events in patients treated with R-CHOP versus just CHOP alone, suggesting rituximab may play a key role. G-CSF has been shown to cause drug-induced lung injury, and one study showed a higher incidence of developing pneumonitis when patients were treated with both regimens as is reported above.

Conclusion: With the more frequent use of rituximab, especially with G-CSF, more studies into the implications of lung toxicity are needed to explore the safety of their use in combination.

A race against time: exploring ICU admission delays and their impact on ICU length of stay and mortality

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Introduction: Delays in ICU admission, defined as the time between deciding to admit a patient and arrival in the ICU, significantly impact patient care and healthcare efficiency. This study examines the relationship between ICU admission delays, ICU length of stay (LOS), and mortality rates, highlighting the implications of delayed ICU admissions in modern health care.

Methods: A retrospective observational study at HCA Florida Kendall Hospital analyzed EMR data for ICU admissions from the ED from January 2020 to September 2023. The study tracked the time from ICU admission orders to patient arrival in the ICU, ICU stay duration, and overall hospital stay. ICU admission delays were categorized as minimal (<120 minutes), moderate (120–240 minutes), and severe (>240 minutes). Patient demographics and comorbidities were controlled. The study also investigated delay reasons, including bed availability, staffing, ED delays, and transportation issues.

Results: Accounting for patient demographics and comorbidities, patients experiencing severe delays (>240 minutes) in ICU admission were 41% more likely to experience in-hospital mortality compared with those with minimal delays (<120 minutes) ($p < 0.027$, 95% CI [1.03, 1.92]). A severe delay (>240 minutes) in admission into the ICU increased the days in the ICU by 15% compared with those with a minimal ICU admission delay ($p < 0.0003$, 95% CI [1.06, 1.25]). Among those delayed because of bed availability, 54.3% had a severely delayed ICU admission, compared with those delayed due to emergency department issues (35.0%) or transportation issues (26.4%).

Conclusion: The study reveals the impact of delayed ICU admission on patient outcomes, emphasizing its significant associations with both mortality rates and ICU

LOS. By identifying specific factors contributing to delayed ICU admission, such as bed availability, emergency department issues, and transportation delays, our study provides actionable insights for health-care institutions to streamline admission processes, thereby enhancing patient care delivery and outcomes.

Non-cardiogenic pulmonary edema in amlodipine toxicity requiring VV-ECMO

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Introduction: Calcium channel blockers (CCB) overdose poses significant challenges in clinical management due to their profound effects on cardiovascular and central nervous systems. Dihydropyridine specifically exerts a high vasodilatory effect and less cardiac effect compared with non-dihydropyridine. We present a young female who ingested a toxic amount of amlodipine, leading to profound vasoplegia, non-cardiac pulmonary edema, and multiorgan failure.

Case Description: A 20-year-old female presented with somnolence and hypotension a few hours after ingesting 200–300 mg of amlodipine. Initial evaluation, including x-ray, revealed no abnormalities, and was intubated for airway protection. Treatment was initiated with glucagon, calcium drip, insulin bolus and drip, and norepinephrine. The patient's mentation improved while on minimal ventilator support, and she was extubated. For 1 day, she was interactive and communicating with her family. Her respiratory status suddenly declined, with increasing hypoxia, necessitating re-intubation. An x-ray reveals bilateral pulmonary edema. Subsequently, she developed profound vasoplegia with anasarca and worsening hypoxia despite maximal ventilator support. Echocardiogram was unremarkable with 65% ejection fraction. Given the refractory hypoxia and vasoplegia, we initiated VV-ECMO instead of VA-ECMO. Bilateral chest tubes were placed, and continuous renal replacement therapy (CCRT) was started for renal failure. Mean arterial pressure (MAP) was maintained, using high doses of norepinephrine, vasopressin, epinephrine, and phenylephrine, with addition of methylene blue and high-dose hydroxocobalamin. Respiratory status improved, VV ECMO was stopped after 8 days, and oxygenation was maintained on minimal ventilatory support again. The patient remained dependent on maximum vasopressor/ionotropic support, and was unable to tolerate CCRT due to persistent vasoplegia. The patient had a sudden cardiac arrest with asystole and expired despite resuscitative efforts.

Discussion: This case highlights the complexities and potential lethal effect of amlodipine toxicity. Amlodipine toxicity has a high mortality rate, estimated at 48%, and attributed to its long-acting effect and profound vasoplegia. Management with glucagon, high doses of insulin drip, calcium drip, and dextrose are well described in literature but optimal therapy to prevent or treat complex complications remains unclear. Non-cardiogenic pulmonary edema is rare and hypothesized to be due to precapillary vasodilation. VV ECMO with the addition of a chest tube improved respiratory status with resolution of pulmonary edema but profound systemic vasoplegia persisted. The patient's clinical deterioration underscores the challenges in managing severe overdoses with limited therapeutic options.

Decisions on anticoagulation: Unique dilemma regarding anticoagulation in a patient on veno-venous extracorporeal membrane oxygenation

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Introduction: Influenza viral infection is a common infection that can lead to ARDS in certain cases, necessitating venovenous extracorporeal membranous oxygenation (VV-ECMO) for pulmonary support. Per the ELSO guidelines, anticoagulation therapy is recommended in patients on VV-ECMO support. This invasive level of support induces a prothrombotic state secondary to foreign device presence and inflammation. Recent case reports indicate that patients can be supported on VV-ECMO without anticoagulation to minimize adverse events such as major and life-threatening hemorrhage.

Case Report: We present the case of a morbidly obese, 19-year-old male patient with a BMI of 42 who was cannulated for VV-ECMO for persistent respiratory failure despite escalation with mechanical ventilation, proning, and nitrous oxide administration. His respiratory failure was secondary to severe ARDS in the setting of an influenza A pneumonia. His ICU course was complicated by multiorgan failure due to persistent multifactorial shock from gram-positive bacteremia, influenza A pneumonia. Initially, his ECMO management was free of any anticoagulation from day 1 to day 41 on ECMO. On day 42, the patient's LFTs trended upward, prompting a right upper quadrant ultrasound that revealed a thrombus in the inferior vena cava. On day 44, the patient underwent percutaneous mechanical thrombectomy of the right hepatic vein, suprahepatic inferior vena cava, and intrahepatic inferior vena cava. On day 48, the patient underwent decannulation of his VV-ECMO and tolerated the procedure well. Despite a successful ECMO decannulation, the patient did not survive and expired on day 49 of his ICU stay.

Conclusion: ECMO creates a range of pathophysiologic hemostatic changes that creates both prothrombotic and paradoxical antithrombotic states. Emerging data, including case reports of successful ECMO therapy without systemic anticoagulation, have been published. In this case report, we attempted to manage ECMO without systemic anticoagulation due to issues with recurrent bleeding in the absence of anticoagulation.

Re-expansion pulmonary edema: Unraveling mechanisms and optimizing preventative approaches

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Introduction: Re-expansion pulmonary edema (RPE) is exceptionally rare, although it is highly cautioned against following the treatment of a pleural effusion or pneumothorax. The incidence is approximately <1%, but mortality is noted to be around 20%. Notable risk factors include prolonged lung collapse, the use of excessive negative pressure during fluid removal from the pleural space, and rapid lung re-expansion with the removal of >1.5 L of pleural fluid.

Case Description: A 62-year-old male with a significant medical history of hypertension, hyperlipidemia, coronary artery disease status post CABG × 3 (6 weeks before presentation), prostate cancer (under surveillance), and postoperative atrial fibrillation on Eliquis, presented with shortness of breath after a right-sided thoracentesis with 1.5 L removed. He developed a cough and worsening shortness of breath, prompting him to call EMS. Upon presentation, his vitals were significant for a heart rate of 144 bpm, respiratory rate of 22, and an oxygen saturation of 93% on a 6-L nasal cannula. A chest x-ray was negative for pneumothorax, but a CT of the chest demonstrated re-expansion pulmonary edema. He was placed on BiPAP, given 25 g of 25% albumin, and 40 mg of IV Lasix, resulting in the complete resolution of his symptoms.

Discussion: Various theories surround the pathophysiological process of RPE. A collapsed lung results in hypoxic vasoconstriction. After thoracentesis, the lung re-expands, leading to the reversal of hypoxic vasoconstriction. The reoxygenation and reperfusion of the lungs create free radicals that potentiate the recruitment of IL-8 and chemoattractant proteins, resulting in an inflammatory cascade that increases capillary permeability and causes pulmonary edema. Although RPE is rare, could widespread use of pleural manometry further decrease its incidence and associated mortality?

Myoclonus in a patient with an implantable hypoglossal nerve stimulator

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Introduction: Obstructive sleep apnea (OSA) is defined as an apnea-hypopnea index (AHI) of greater than 5 per hour of sleep secondary to pharyngeal narrowing. The prevalence in North America is ~22% in males and 12% in females. Moderate-to-severe OSA (AHI of 15 to 65) can be debilitating. Therefore, the advent of hypoglossal nerve stimulation (HNS) has proven beneficial for patients who are refractive to positive airway pressure therapy. However, there remains a gap in the literature centered on adverse outcomes and strategies for management.

Case Description: An 87-year-old male with a medical history of OSA with an HNS implant placed six months prior and normal pressure hydrocephalus with a ventriculoperitoneal shunt presented to the emergency department due to "body jerks" and lower extremity weakness. He experienced myoclonus associated with "shocks" at the implant site, worsened with inspiration. Workup with electroencephalogram and magnetic resonance imaging was unremarkable for acute pathology and/or seizure activity. Communication with the implant company was complicated by the inability to remotely deactivate the device because there was discordant cross-talk between the patient's remote and his implanted device. He was ultimately managed with supportive care with improvement and advised to follow up with the neurosurgeon who implanted the device.

Conclusion: This case underscores the importance of being cognizant of HNS adverse events. In Bestourous et al's review of the Food and Drug Administration's Manufacturer and User Device Facility Experience data base, they report only 5 known cases of "overstimulation," which encompasses myoclonus. As clinical leaders, we carry a responsibility to not only stay up to date on the latest innovations but

also to be aware of corresponding adverse effects to properly tailor management and facilitate shared decision-making. Future directions include advocacy and continued investigation in this novel field to enhance evidence-based medicine.

Uncommon presentation of small-cell lung cancer with brain metastases in a toxoplasmosis-endemic setting: A diagnostic conundrum

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Background: Small-cell lung cancer (SCLC) is a highly invasive form of cancer that is known for its early metastasis to the brain. Although brain metastases are common in SCLC, ring-enhancing lesions (RELs) are relatively uncommon and are typically associated with other conditions, the most common of which are infectious and inflammatory in nature. *Toxoplasma gondii* infection, which is prevalent in certain regions, can also result in the development of RELs, making diagnosis more challenging.

Case Report: We report the case of a 72-year-old male pig farmer from Cuba, a region with a high seroprevalence of *Toxoplasma gondii*, who was admitted to the hospital with altered mental status. An MRI of the brain revealed multiple RELs in the infratentorial and supratentorial regions. The patient's serologic tests yielded positive results for *Toxoplasma* IgG, which was expected given his background and occupation. Despite these results, the patient's clinical presentation warranted further investigation. Chest computed tomography showed extensive mediastinal and hilar lymphadenopathy as well as bilateral areas of basilar-predominant reticular opacities and consolidation. Subcarinal biopsy confirmed the diagnosis of metastatic SCLC. Immunohistochemistry of the tumor cells revealed positivity for TTF-1, synaptophysin, and chromogranin, and negativity for CK7, CK20, CDX2, and p40. Given the advanced stage of cancer and poor prognosis, the patient opted not to undergo treatment and instead entered hospice care.

Discussion: A comprehensive differential diagnosis is essential, especially in regions with high toxoplasmosis prevalence and occupations at risk for *Toxoplasma* exposure. Although initial findings suggested toxoplasmosis, a definitive diagnosis was established through histopathology and immunohistochemical testing, revealing metastatic SCLC. Despite the common occurrence of brain metastases in SCLC, RELs are rare and emphasize the need for thorough diagnostic evaluation.

Conclusion: Clinicians must use a thorough diagnostic method that incorporates clinical, serologic, and histopathological data to guarantee accurate diagnosis and suitable management.

A complex case of pulmonary alveolar proteinosis with worsening chronic hypoxemic respiratory failure after whole lung lavage

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Introduction: Pulmonary alveolar proteinosis (PAP) is a diffuse lung disease characterized by the accumulation of lipoproteinaceous material in distal air spaces. In autoimmune PAP, there is a disruption of granulocyte-macrophage colony-stimulating factor (GM-CSF) signaling, resulting in impaired clearance of the surfactant. Symptoms include cough, dyspnea on exertion, sputum production, fatigue, weight loss, and fevers. In patients with suspicion of PAP, flexible bronchoscopy is the gold standard for diagnosis. Those with moderate-to-severe autoimmune PAP can proceed with whole lung lavage (WLL) or treatment with GM-CSF. After WLL, most patients have improvement in symptoms. Here we discuss a case of autoimmune PAP where WLL did not result in improvement in symptoms or oxygenation.

Case Description: A 77-year-old female with autoimmune PAP, diagnosed a year ago, who presented with shortness of breath and worsening cough. The patient underwent WLL before initiation of recombinant GM-CSF. Post-procedurally, the patient remained intubated due to concerns of mild fluid retention. She was transitioned to high-flow nasal cannula (HFNC) and ultimately nasal cannula (NC). On hospital day two, the patient's respiratory status deteriorated, requiring re-intubation. Computed tomography (CT) of the chest revealed pneumonia. While admitted, she underwent an additional bronchoscopy with bronchoalveolar lavage (BAL) and initiated antibiotics. She was extubated after two days with improvement in respiratory status and without the need for supplemental oxygen. The patient was admitted one month later due to worsening dyspnea with minimal exertion and cough. CT findings were consistent with multifocal pneumonia. Desaturation study completed before discharge noted a 2 L NC oxygen requirement upon rest and 4 L NC requirement upon ambulation. The patient was discharged in a stable condition with antibiotics and follow-up with pulmonology.

Conclusion: Whole lung lavage has long been the standard of therapy for PAP. Even with the introduction of GM-CSF, WLL remains the standard, and it is often common practice to attempt improvement in symptoms of PAP with WLL first. In patients with autoimmune PAP who received WLL, 70% achieved a sustained remission with just one lavage and 30% noted no improvement in symptoms. Our patient is a rare case in which WLL worsened chronic respiratory failure.

A rare case of newly diagnosed HIV-associated with pulmonary strongyloidiasis

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Introduction: HIV/AIDS-associated infections have been extensively documented in the literature. To our knowledge, this is the first case report detailing an HIV patient with concurrent bacterial, fungal, parasitic, and viral infections who survived and recovered from ICU hospitalization.

Case: A 60-year-old male with a history of untreated HIV who presented with non-bloody watery diarrhea, and weight loss for two months. Blood work showed a CD4 count of 95 cells/μL, and a normal white blood cell count without eosinophilia. Chest and abdomen CT scans showed multiple nodules throughout the lungs and colon-wall thickening, suggesting diffuse colitis. The patient was intubated due to acute respiratory failure. Blood cultures identified cytomegalovirus and *Mycoplasma pneumoniae*. Bronchoscopy revealed thin whitish secretions from all lung lobes. Cytological evaluation of his BAL fluid was positive for strongyloidiasis, *Candida tropicalis*, and MRSA. The patient was treated with clindamycin, doxycycline, ivermectin, ganciclovir, and micafungin. After a 30-day hospitalization, microbiologic workup results were negative, and the patient was discharged with valganciclovir and Bactrim for prophylaxis.

Discussion: Disseminated strongyloidiasis is an uncommon but potentially fatal condition, with mortality rates of up to 85% to 100%, mostly due to gram-negative bacteremia and sepsis in an immunocompromised host. Hyperinfection with *Strongyloides stercoralis* has been scarcely described within HIV positive patients (5.1%), manly in those who received corticosteroids or during immune reconstitution inflammatory syndrome. Often, *S. stercoralis* is associated with gut translocation of bacteria as well as damage to the pulmonary capillaries during the migration of the larvae, leading to a port of entry to different microorganism and possible sources of infections.

Conclusion: This case represents a unique finding of *Strongyloides* hyperinfection in an HIV-positive patient with multiple co-infections and serves as a reminder to actively search for *S. stercoralis* infection in HIV infected individuals presenting with diarrhea and viremia/bacteremia.

Unusual case of cryptogenic organizing pneumonia resembling pulmonary malignancy

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Introduction: Cryptogenic organizing pneumonia (COP) is a rare pathologic diagnosis characterized by the formation of granulation tissue within alveolar ducts and alveoli. The clinical and imaging manifestations can resemble other diseases, such as infections and cancers, which can lead to a delay in diagnosis and inappropriate management of the underlying disease. Imaging often shows diffuse areas of consolidation in both lungs, often around the bronchovascular bundles. We present a case of COP originally presented as a solitary lung mass.

Case Description: A 73-year-old female with a history of Crohn disease and lower-extremity DVT presented due to dyspnea. The symptoms were transient and occurred even at rest. She was a prior smoker but quit 30 years ago, and her father passed away from lymphoma. A CTA revealed a round 5.4-cm mass in the right upper lobe (RUL), concerning for malignancy as well as lymphadenopathy. She tolerated room air and displayed no signs concerning for infection. She underwent bronchoscopy with a biopsy as well as EBUS of stations 4L and 7, which were all negative. A PET CT revealed a large centrally necrotic lesion within the RUL, demonstrating hypermetabolic uptake, likely representing a primary neoplasm. A CT-guided biopsy of the mass revealed organizing pneumonia with Masson bodies, with a final pathological diagnosis of COP.

Conclusion: Diagnosis and treatment of COP is not always straightforward and requires a combination of clinical information, radiologic expertise, and biopsy for histopathological evidence. Other diagnoses, such malignancy in our case, should be ruled out appropriately. The exact cause of COP is not well understood and is classified as "cryptogenic" or "idiopathic" because it typically occurs without a known

trigger. However, it is believed to involve an abnormal immune response, leading to inflammation in the small airways. Primary treatment is corticosteroid therapy, typically with prednisone, which reduces inflammation and improves symptoms.

Pulmonary arterial hypertension linked to congenital heart disease: an intriguing case study

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Introduction: Pulmonary arterial hypertension (PAH) frequently occurs as a complication of congenital heart disease (CHD), particularly in patients with systemic-to-pulmonary (left-to-right) shunts.

Case Study: Our patient is a 35-year-old female with a history of atrial septal defect (ASD), mitral valve prolapse, and chronic pulmonary hypertension (PH) presented for evaluation. Diagnosed with PH in Chile 11 years ago, she had been on sildenafil. A year ago, she experienced increased fatigue and dyspnea, and underwent right heart catheterization (RHC), showing a baseline pulmonary vascular resistance (PVR) of 11.8 Wood units, decreasing to 5.1 postvasodilator. Physical examination revealed a widely split S2, loud P2, 2/6 holosystolic murmur, and 2/6 diastolic murmur at the left upper sternal border. Previous ASD closure attempts had failed, and recent ECHO results deemed surgical closure impossible due to her RHC numbers. She was started on tadalafil and selexipag, and advised to avoid pregnancy. Three months later, on triple therapy with Adcirca, Opsumit, and Uptravi, she felt better. However, four months later, despite therapy, she still had functional class II symptoms and elevated PVR levels. Admitted to the ICU, she received intravenous epoprostenol, which improved her PVR to 5.1. The cardiovascular team planned to place a Gore-Tex patch on her sinus venosum, with a small fenestration for potential right-to-left shunt, to be closed later by interventional cardiology. She was discharged with a Hickman line and educated on Veletri administration. The ASD repair was performed a few weeks later.

Conclusion: The development of PAH in patients with CHD is associated with increased mortality and high morbidity. Advances in pediatric cardiology and surgery have led to a marked decrease in the prevalence of PAH-CHD in Western countries.

Cystic-fibrosis transmembrane conductance regulator related metabolic syndrome (CFTR) develops severe cystic fibrosis (CF) bronchiectasis

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Introduction: Cystic fibrosis (CF) is a recessive disorder defined by clinical symptoms consistent with CF or having a sibling with CF and elevated sweat chloride testing > 59 or presence of two disease-causing mutations in the *CFTR* gene. The leading cause of mortality in CF is lung disease. CF transmembrane conductance regulator related metabolic syndrome (CRMS), defined by high immunoreactive trypsinogen (IRT) levels with sweat test levels in the intermediate range (30–59) with one or no CF causing mutations, or a CF sweat test < 30 but two *CFTR* mutations with one mutation not causing physical symptoms, is generally asymptomatic. This case presents a CRMS patient that developed a severe case of bronchiectasis despite not having CF.

Case Description: A 56-year old woman with a medical history of childhood asthma and CF carrier gene developed a chronic productive cough that lasted greater than 6 months. Patient confirmed to be a carrier of gene *W1282X*. Immunodeficiency and α-1 antitrypsin workup were negative. A CT of the chest confirmed the diagnosis of bronchiectasis. Sweat chloride testing was 34. Given her history and intermediate sweat chloride testing, she met criteria for CRMS. The patient underwent bronchoscopy with broncho-alveolar lavage, which isolated mucoid *Pseudomonas aeruginosa.* She subsequently underwent antibiotic therapy to eradicate the pathogen with great symptomatic improvement.

Conclusion: Recent guidelines do not expound on the significance of CRMS. In most pediatric populations, there is evidence of prolonged monitoring past newborn stages because CRMS may develop into CF, but there is no such guideline in the adult population. Future research can further elucidate the connection between certain CF genes in CRMS and the clinical disease course.

A botched diagnosis: a Bochdalek hernia mistaken for pulmonary sequestration

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Bochdalek hernia with liver herniation into the hemithorax poses a diagnostic challenge, with nonspecific respiratory symptoms and imaging mimicry of other pulmonary pathologies.

A 42-year-old female patient with PMH of hypothyroidism presented to the pulmonary clinic with a three-month history of cough and chest discomfort. A CXR revealed mass-like opacity in the right medial lung base. A subsequent CT of the chest showed a 10-cm mass concerning for right interlobar pulmonary sequestration in the medial right lung base. The patient was referred to thoracic surgery for recommendations. A CTA was performed and noted pulmonary sequestration with pulmonary venous return into right portal vein. A nuclear medicine liver spleen study was then ordered to evaluate for hepatic herniation into the thoracic cavity and was diagnostic of hepatic dome herniation into the right hemithorax. In the absence of prior trauma, the patient was diagnosed with a Bochdalek hernia with herniation of the hepatic dome into the right hemithorax. After a multidisciplinary discussion, the patient elected for conservative management.

Common causes of hepatic herniation are trauma and penetrating lesions. In the absence of prior trauma, hepatic herniation can be due to an acquired or congenital defect in the diaphragm. Bockdaleks hernia is a congenital abnormality with an incidence of only 0.17% diagnosed in adulthood. Due to imaging similarities, hepatic herniation can be easily mistaken for lung mass or pulmonary sequestration, as with our patient. Utilization of nuclear medicine studies could be essential to achieve the correct diagnosis while avoiding invasive diagnostic techniques, including biopsy. Treatment is generally surgical, involving reduction of the hernia and repair of the diaphragmatic defect. However, in cases like ours, conservative management and observation is also optional.

Our case highlights the importance of considering rare anatomic abnormalities in the differential diagnosis and highlights the importance of utilization of different imaging modalities in the diagnosis before invasive interventions.

Long-term veno-venous ECMO used as bridge to lung transplant for a patient with acute respiratory distress syndrome in the setting of influenza A pneumonia

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Introduction: Patients with acute respiratory distress syndrome (ARDS), in the setting of viral or bacterial pneumonia, may undergo veno-venous ECMO (VV-ECMO) as a bridge to lung transplantation. However, the benefits of prolonged VV-ECMO treatment need further investigation due to its resource-intensive nature.

Case Presentation: A woman in her 50s was transferred to our facility for evaluation for ECMO after being intubated for ARDS caused by influenza A pneumonia. Upon arrival at our intensive care unit, the patient was put on pressure control and started on inhaled prostaglandin. The respiratory ECMO survival prediction (RESP) score was 2 – 57%. A bedside ultrasound revealed diffuse B-lines with minimal consolidative changes. An arterial blood gas showed a partial pressure of arterial oxygen of 66.3 mm Hg. A discussion about the potential benefits and risks of ECMO therapy took place with the family, and they expressed their wish to proceed. Subsequently, the patient was cannulated and started with an initial ECMO flow rate of 3.5 L/minute, revolutions per minute (RPM) of 2800, a sweep of 4 L/minute, and a fraction of delivered oxygen (FdO2) of 1.0. The patient underwent a tracheostomy on the 10th day of hospitalization. Despite the treatment, her respiratory condition did not improve significantly, leading to discussions about the possibility of lung transplantation evaluation. Her VV-ECMO settings at that time were a flow of 4.0 L/minute, RPM 3650, sweep of 6 L/minute, and FdO2 of 1.0. Consequently, she underwent bi-caval dual lumen catheter cannulation and was transferred to a transplantation center 40 days after VV-ECMO had been initiated.

Conclusion: The case report describes a situation in which prolonged VV-ECMO was helpful in transitioning the patient to a lung transplantation center. Whereas the prognosis for these patients is still poor, further analysis may offer more insight into the effectiveness of prolonged ECMO.

Acute hypoxia leading to a diagnosis of miliary tuberculosis and HIV coinfection

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Introduction: Extrapulmonary tuberculosis is a disease not commonly seen in developed countries. Coinfection of tuberculosis with HIV increases the risk of developing active tuberculosis or reactivation of primary tuberculosis. This case

describes presentation of acute respiratory failure in a patient without a medical history who was found to have miliary tuberculosis and HIV coinfection.

Case Presentation: This patient is a 44-year-old male with no known medical history who initially presented with a complaint of cough, fever, weight loss, and shortness of breath for three weeks. He recently immigrated from Haiti and has had no medical care leading up to this hospital admission. Initial vitals revealed hypoxia with saturation in the 70s, so the patient was intubated for acute hypoxic respiratory failure. CTA of the chest revealed innumerable nodules throughout the right lung up to 0.3 cm in size as well as consolidation of the left upper lobe. The patient underwent bronchoscopy, which gave the diagnosis of tuberculosis. He also tested positive for HIV with a CD4 count of 28. He was started on RIPE therapy and treated with sulfamethoxazole/trimethoprim for PJP prophylaxis. The patient was extubated after nine days but remained encephalopathic, so a lumbar puncture was performed, which revealed mildly low glucose and elevated protein. Cultures, including cryptococcal antigen and MTB PCR were negative from the CSF. Pancreatic mass was found on a CT of the abdomen and is pending a biopsy to confirm the presence of tuberculosis. As of now, the plan is to complete 6–8 weeks of RIPE therapy prior to initiating antiretroviral therapy.

Conclusion: Appropriately diagnosing miliary TB and initiating treatment in a timely manner are important because it is typically fatal within one year of diagnosis. Treatment is the same for pulmonary and extrapulmonary tuberculosis; however, the duration may differ. It is important to be aware of the abnormal presentation of miliary tuberculosis, so it can be treated appropriately.

Beyond bilaterally: Exploring etiology of unilateral interstitial lung disease

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Background: We present a unique case of asymmetric interstitial lung disease (ILD), suggesting that connective tissue disease (CTD) may be one of the etiologic factors in the development of unilateral nonspecific usual interstitial pneumonia (NSIP).

Case: A 73-year-old male, former remote smoker, with a medical history of heart failure with preserved ejection fraction, paroxysmal atrial fibrillation, OSA, peripheral eosinophilia, CAD status post recent planned CABG, and now chronic hypoxic respiratory failure on 3 L oxygen presents for hospital follow up for evaluation of ILD. A CTA of the chest completed during hospitalization was negative for pulmonary embolism, however, did reveal moderate mediastinal lymphadenopathy, patchy infiltrates in the right lung as well as small right pleural effusion. Repeated HRCT demonstrated the features consistent with fibrotic form of NSIP. The patient underwent extensive workup, including PET/CT, which was ultimately negative, with concerns for inflammatory findings. BAL was negative for malignancy and infectious etiology, and autoimmune workup revealed weakly positive CCP at one time, then negative, along with negative ANA, RF, and ANCA. IgE was within normal limits. Thoracentesis found to be exudative and RF negative. PFTs showed very severe restrictive lung disease with moderate reduction in DLCO. The patient initially improved on prednisone 40 mg daily and ultimately increased mycophenolate mofetil 1000 mg twice daily with a prednisone taper. The patient was evaluated by rheumatology with prior and current radiographic features favoring seronegative rheumatoid arthritis.

Conclusion: We report a compelling case of the initial presentation of unilateral findings of NSIP, exercising differential diagnoses to ultimately suggest etiology of seronegative RA supported by articular symptoms and radiographic findings.

Use of sildenafil in the management of group 2 pulmonary hypertension

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Introduction: Pulmonary hypertension is a multifactorial pulmonary disease categorized by the underlying etiology behind the elevated mean pulmonary artery pressure. This includes group 1, group 2, group 3, group 4, and group 5 categories. Identifying the group of pulmonary hypertension (PH) is important because it helps guide treatment. Group 1 PH is traditionally treated with phosphodiesterase-5 (PDE-5) inhibitors, such as sildenafil. However, in this paper, we aim to suggest that using PDE-5 inhibitors, particularly sildenafil, may be beneficial in other types of pulmonary hypertension, specifically in group 2 PH.

Methods: The patient, in this case, is a 77-year-old male with a medical history of multiple comorbidities who was admitted for cardiogenic shock in the setting of right-sided heart failure exacerbation with severe pulmonary hypertension and tricuspid regurgitation. The patient underwent therapeutic paracentesis with 14 L removed and a pericardial window with 1 L removed before sildenafil was added. In the meantime, the patient was optimized with diuresis, dialysis, vasopressors, and a tricuspid valve clip.

Results: Group 2 PH is defined by pulmonary vascular disease with elevated pulmonary capillary wedge pressure secondary to left-sided obstructive lesions or diastolic heart failure (HF). Sildenafil was historically discouraged in this population as pulmonary vasodilation can lead to pulmonary edema. However, the evidence suggests that sildenafil can help to treat the precapillary component of pulmonary hypertension. In this case study, the patient was monitored in the intensive care unit for adverse effects, including signs of pulmonary edema, while successfully treated with a PDE-5 inhibitor in addition to the diuresis.

Conclusion: Sildenafil is a PDE-5 inhibitor that plays an important role in treating pulmonary hypertension, particularly group 1 PH. However, this case highlights an example of when sildenafil may benefit other types of pulmonary hypertension with careful monitoring.

Wisdom tooth aspiration: A case report exploring retrieval challenges

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Introduction: Foreign body aspiration, though rare, is a critical emergency often seen in children or trauma cases, but it can also occur during dental procedures when objects used in treatment are aspirated. This can be life-threatening if the object occludes the airway, although smaller objecu may go unnoticed until symptoms manifest. Common symptoms include cough, dyspnea, hemoptysis, choking, fever, and vomiting. Bronchoscopy is the preferred method for retrieving foreign bodies from the airway due to its ease, safety, and cost-effectiveness. This report presents a case of a 47-year-old male who aspirated a third molar tooth during extraction, highlighting the complexities and tools used for successful extraction.

Case Presentation: The patient, with no significant medical history, experienced an intraprocedural coughing spell during the extraction of his right upper-third molar, leading to the aspiration of a tooth fragment. He presented to the emergency department with left-side chest pain and expiratory wheezing but no odynophagia or dysphagia. A chest x-ray and CT scan revealed a calcified foreign body in the left lower lobe, lodged in the left main stem bronchus. Initial retrieval attempts using a fiberoptic bronchoscope was unsuccessful, resulting in the tooth migrating to the lower right lobe. Despite multiple attempts, the tooth remained lodged. Interventional radiology was then consulted for image-guided retrieval. Under general anesthesia, various tools, including a store retrieval basket and an endovascular snare, were used. However, the stone retrieval basket lacked the strength to open the encapsulated tooth, and the endovascular snare could not engage it. Ultimately, an 8-mm balloon was inflated to reposition the tooth into the right mainstem bronchus, where the endovascular snare successfully retrieved it.

Conclusion: This case underscores the challenges in retrieving aspirated dental foreign bodies due to their delicate nature and complex locations within the bronchial tree. The use of diverse tools and techniques, including bronchoscopy and balloon repositioning, demonstrate the adaptability required in such scenarios. This report emphasizes the difficulties encountered and the variety of techniques and tools used in the successful retrieval of aspirated dental foreign bodies.

Beyond breathlessness: Managing anxiety-associated respiratory failure with mechanical ventilation

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Introduction: Anxiety is associated with mild dyspnea, whereas other cases can manifest as acute hypoxic respiratory failure (AHRF), necessitating aggressive intervention such as mechanical ventilation. The pathophysiology involves the brain responses to stress modulate immune pathways. We aim to create awareness of the multifaceted interplay between psychological stressors and respiratory pathology.

Case Presentation: A 65-year-old male with history of HFrEF 25% with AICD, A-Fib on Eliquis, COPD on 2L NC, CKD IV, DM2, anxiety and prior pulmonary embolism who presented to the ED due to progressive shortness of breath accompanied by dry cough and fear of dying that started two days before admission. Denied any fever, nausea, chest pain, or medication noncompliance. Hemodynamically stable, euvolemic with mild wheezing on auscultation of lungs and increasing work of breathing on physical examination. Basic laboratories were unremarkable. Normal procalcitonin, lactate, urine toxicology, and a negative viral respiratory panel. Elevated D-dimer 1.17

and BNP 858 (baseline). The patient was started on bilevel NPPV. Minute ventilation remained around 16–20 L/minute, despite escalating NPPV support. Intubated due to worsening AHRF. A chest x-ray with no clear pneumonia process or pulmonary edema. An echocardiogram bedside showed no change to a previous one obtained one month ago; showed collapsible IVC and a normal TAPSE score. A CT of the chest showed patchy opacity in the left lower lobe, consistent with atelectasis versus possible mild pneumonia. Started on dexmedetomidine and steroids. Successfully extubated the next day. Labile episodes of desaturation were observed afterward accompanied by anxiety episodes. Started on alprazolam in and SSRI showing improvement for his symptoms.

Conclusion: The overlap in symptoms between anxiety-induced respiratory distress and exacerbations of underlying respiratory conditions, such as COPD and HFrEF, underscores the diagnostic challenge clinicians face in such scenarios. Anxiety-induced AHRF is a rare but potentially life-threatening condition. The diagnosis is mainly clinical and by exclusion. Management with anxiolytics and, in severe cases, mechanical ventilation.

Unexpected extensive bullous lung disease in male ICU patient

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Introduction: Giant bullous emphysema remains a rare presentation. Findings include extensive emphysema encompassing the upper lung fields with very large bullae in otherwise healthy patients. Most data on presentation and management come from few case reports and retrospective studies on surgical intervention.

Report: A 47-year-old male presented to the emergency department for SOB. He was in benzodiazepine withdrawal, resulting in delirium with aggression. He was transferred to the ICU for hypoxia while agitated. In the ICU, he was managed with phenobarbital, quetiapine, dexmedetomidine, and ketamine. Over the next days, the patient continued having episodes of hypoxia. At that point, external documentation was obtained, mentioning pneumatoceles, and confirmed with CT imaging, which revealed extensive bullous disease bilaterally, with the upper two thirds of the lung fields being composed of giant bullae. Ultimately the patient required intubation and sedation due to impending respiratory arrest secondary to severe agitation related to withdrawal. The patient was not a surgical candidate for bullectomy and over the next few days failed all attempts at weaning off mechanical ventilation. The patient's family eventually decided to proceed with palliative extubation and comfort measures.

Conclusion: The trouble ventilating minimal lung volumes was complicated further by the high risk for interventional bullectomy. Due to the lack of data, there is little guidance on best practice treatments. What data we have have only reported one patient who was already on MV undergoing surgical intervention, and there were no reported significant comorbidities like this patient was treated for. There is one report that cocaine use has been linked with presentations of GBE; however, with so few cases, it is difficult to interpret this as a significant exposure. There have been many advancements in understanding and treatment of emphysematous diseases; however, there is still a long road ahead for these rare presentations.

Maintaining hemodynamic stability by preserving severe pulmonary hypertension in setting of large pericardial effusion

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Introduction: Pulmonary hypertension (PH) is defined by mean pulmonary arterial pressure of equal to or greater than 20 mm Hg at rest. The gold standard of diagnosis is right heart catheterization. There are 5 subtypes of PH: arterial, due to left heart disease, due to lung disease or hypoxia, pulmonary artery obstructions, and unclear/multifactorial mechanism. Cardiac tamponade is precipitated by increased intrapericardial pressure decreasing right ventricular filling. In turn, this leads to the Beck triad: tachycardia, tachypnea, and increased systemic venous pressure seen by increased jugular venous distention. In this case, the patient had a large pericardial effusion that did not exhibit tamponade physiology purely through severe PH.

Abstract: A 25-year old woman with a medical history of moderate PH had a hospital course complicated by acute hypoxic respiratory failure with desaturations in the 80s, requiring 3 L of nasal cannula. A CT of the chest revealed large pericardial effusion and a chronic dilated pulmonary artery. An ECHO was obtained to rule out tamponade physiology and revealed RVSP of 150 mm Hg, consistent with acute and severe pulmonary hypertension. On 5/25/23, right heart catheterization was completed with a leave-in Swan-Ganz catheter to help optimize medical management of pulmonary hypertension. On 5/26/23, the patient started intravenous Veletri. On 5/27/2023, the patient developed tachyarrhythmia with intact pulse that did not respond to β-blockade. Subsequently, the patient became hypotensive and developed asystole, unable to be resuscitated. Of significance, the patient had a large pericardial effusion that would generally compress the right atrium and ventricle. Because of the severe pulmonary hypertension, there was adequate ventricular filling of the right heart. Once the patient was started on IV prostaglandins, the patient became more hemodynamically unstable as the compensatory mechanism for adequate right ventricular filling diminished. As a result, the patient developed cardiac tamponade physiology and decompensated.

Discussion of Clinical Significance: This case report puts forward a study in the protective effect of PH in the setting of pericardial effusion. Previously, two retrospective studies have shown not to relieve the pericardial effusion because it would lead to hemodynamic collapse. This study puts forward that relieving the severe PH also leads to hemodynamic collapse because it helped compensate for the large pericardial effusion.

Insights into *Mycobacterium abscessus* complications, navigating the challenges in the intensive care unit.

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Introduction: *Mycobacterium abscessus* is rapidly growing mycobacteria that manifests as a chronic lung infection with its subspecies, including abscessus, massiliense, and bolletii. Individuals with underlying conditions such as bronchiectasis, COPD, or other pulmonary diseases are at increased risk for NTM infections, including *M. abscessus*. Diagnosis typically relies on two positive sputum cultures or one bronchoscopy culture. Although pulmonary disease is the most common clinical presentation, occurrences of empyema secondary to *M. abscessus* infection are exceedingly rare. In this case, we present a unique case of *M. abscessus* infection complicated by empyema.

Case Presentation: We present the case of a 63-year-old male patient with a complex medical history, including oxygen-dependent COPD and a significant smoking history spanning over 40 years. He was initially admitted to the hospital from his nursing home due to progressive dyspnea. The patient had been under outpatient treatment for *M. abscessus* infection, receiving a four-drug regimen. Upon admission, the patient was found to be in respiratory failure and required mechanical ventilation. Initial chest CT imaging revealed bilateral extensive severe emphysema, accompanied by a large cavitary lesion in the left upper lobe, exhibiting a fluid level. Subsequent analysis of fluid from a chest tube revealed positive cultures for both *Corynebacterium* and *M. abscessus*. Treatment was initiated with a combination regimen, consisting of azithromycin, ceftazidime/avibactam, amoxicillin, and meropenem. However, despite medical management, the patient experienced persistent air leakage through the chest tube, prompting further intervention. Consequently, he underwent thoracotomy with left lower lobe wedge resection and decortication to address necrotizing pneumonia complicated by a bronchopleural fistula. Despite aggressive surgical intervention, the patient remained unable to be weaned from mechanical ventilation and ultimately underwent tracheostomy placement for ongoing respiratory support.

Discussion: *M. abscessus* infections, typically associated with involvement in the lung parenchyma, with pleural involvement being a rare occurrence. The exact pathogenesis of pleural involvement remains uncertain, but it is believed to arise from the lung infection itself, often in conjunction with underlying structural abnormalities. In our patient's case, the presence of a bronchopleural fistula suggested pulmonary parenchymal infection, extending into the pleural space *via* this abnormal communication. Managing *M. abscessus* infections poses significant challenges for physicians. The choice of antibiotic therapy hinges on factors such as the presence of the *emr* (41) gene and the results of macrolide sensitivity testing after an appropriate incubation period. Success rates with antibiotic therapy alone range from 39% to 55%, whereas combining antibiotic treatment with surgical resection, as in our patient's case, demonstrates higher success rates, ranging from 65% to 88%. Additionally, our patient required chest tube management to address the pleural effusion and facilitate drainage. Surgical intervention, coupled with a multidrug antibiotic regimen, not only targeted the *M. abscessus* infection but also facilitated the closure of the bronchopleural fistula. Our case underscores the importance of aggressive medical and surgical management in achieving successful outcomes, even in the context of more severe manifestations of *M. abscessus* lung disease, extending to the chest wall. This suggests that, with timely and comprehensive intervention, including both medical and surgical modalities, successful treatment outcomes can be achieved, particularly when the infection remains confined to resectable areas.

Conclusion: In cases involving *M. abscessus* infection, the identification of specific species, evaluation of the *emr* gene, and determination of macrolide sensitivities play pivotal roles in tailoring an effective treatment regimen for patients. Despite the implementation of appropriate therapeutic strategies, combating *M. abscessus* infections remains immensely challenging due to its inherent resistance mechanisms. Consequently, patients afflicted with *M. abscessus* infections face elevated risks of morbidity and mortality.

Rhodococcus hoagii pneumonia with lung masses in an immunocompromised patient

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Introduction: Pulmonary infection is the most common tissue invasive infection in immunocompromised patients. *Rhodococcus hoagii* is an opportunistic zoonotic pathogen that can cause infection in immunosuppressed hosts, with pneumonia being the most common form of human disease.

Case Report: A 42-year-old female with a history of HIV/AIDS (CD4 count 41) on treatment with bictegravir-emtricitabine-tenofovir alafenamide, *Pneumocystis jiroveci* prophylaxis with Atovaquone, chronic hepatitis C, anemia of chronic disease, *Cryptococcus neoformans,* and atypical mycobacterial infections presented to the hospital with complaints of progressively worsening shortness of breath over the course of 4 weeks accompanied with cough and hemoptysis. Broad spectrum antibiotics and antifungals were initiated. A CTA of the chest demonstrated mass-like consolidations within the lingula, inferior left upper lobe, and anterior basilar left lower lobe, along with patchy ground-glass opacities within the lower lungs bilaterally. The patient underwent bronchoscopy with inferior lingula bronchoalveolar lavage for further evaluation. Microbiology results from bronchoalveolar lavage were positive for *R. hoagii* and *Aspergillus* infections. A CT-guided core biopsy of the lung showed fragments of benign lung tissue with dense histiocytic infiltrate with calcium-containing Michaelis-Gutmann bodies and patchy acute inflammation, compatible with malakoplakia. Antibiotics and antifungals were continued at discharge, along with anti-retroviral therapy treatment for HIV/AIDS and *Pneumocystis jiroveci* prophylaxis with plans to follow up as an outpatient.

Discussion: Malacoplakia of the lungs is a manifestation of *R, hoagii* infection, resulting in chronic granulomatous inflammation characterized by Michaelis-Gutmann bodies, which are aggregates of PAS positive histiocytes with lamellated iron and calcium inclusions. Pulmonary masses from malakoplakia may mimic lung tumors in appearance and, therefore, require a multidisciplinary approach for accurate pathological diagnosis to help guide appropriate treatment with antimicrobials.

77-year-old male survives suicide attempt with a blood alcohol concentration of 824 mg/dL

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Introduction: Over 85,000 American deaths annually are attributed to alcohol use, with ~1 in 10 deaths among working adults due to excessive drinking. With the legal blood alcohol concentration (BAC) of 80 mg/dL, admitting patients with BAC over 100 mg/dL is common, with the prior highest BAC being 778 mg/dL. Our patient survived a suicide attempt, with BAC of 824 mg/dL.

Case Presentation: A 77-year-old male with a history of a prior suicide attempt by overdose and major depressive disorder presented for alcohol intoxication and drug overdose. He was found unresponsive, with two open fluoxetine bottles and two open 1-L spirit bottles over three-fourths empty. Vital signs were 78/36 mm Hg, T 37.0 C, RR 16 breaths/minute, saturating 92% on 15-L non-rebreather mask; EKG noted QTc above 650 ms. BAC was 824 mg/dL. He was comatose, with absent corneal and gag reflexes, no withdrawal to pain, and was transferred to the ICU for close monitoring after prompt intubation for airway protection. On day 1, he regained consciousness, followed commands, and, on day 2. was extubated. He returned to baseline functional status and was discharged to a psychiatric facility on day 9.

Discussion: This patient's BAC surpasses previous records of 740 mg/dL in 2010 and 778 mg/dL in 2021. Whereas BAC of 300 mg/dL induces stupor and respiratory depression among infrequent drinkers, BAC over 400 mg/dL may demonstrate minimal symptoms in chronic users; infrequent and chronic users usually experience lethality at BAC over 500 mg/dL and 600–800 mg/dL, respectively. Such consequences highlight the importance of alcohol cessation resources, like cognitive behavioral therapy and 12-step programs alongside pharmacotherapy, in reducing the $250 billion annual burden of alcohol use.

A case of HSV encephalitis in a 73-year-old female: From elective phlebectomy to intensive care

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Introduction: HSV-1 is the most common cause of sporadic encephalitis globally and is potentially fatal if left untreated. The clinical presentation of HSV encephalitis is non-specific, posing challenges in early recognition and treatment.

Methods: We conducted a retrospective review of an unusual presentation of HSV-1 encephalitis in an elderly patient in the ICU service at our institution, along with a review of relevant literature published by using PubMed.

Results: A 73-year-old female presented for an elective outpatient procedure. Preoperatively, the patient developed lightheadedness, generalized weakness, and confusion, and she was transferred to the ED for emergent evaluation. Her brain MRI and chest CT were unremarkable. The patient was initially alert, awake, and oriented but deteriorated rapidly during hospitalization, with a decline in mentation, spiking high fevers, and worsening hyponatremia. On day 6, she developed respiratory distress and required ICU admission with endotracheal intubation. A repeated brain MRI revealed abnormalities of the right temporal lobe, hippocampus, right insular cortex, and right inferior frontal gyrus. Lumbar puncture revealed normal opening pressure with lymphocytic pleocytosis, elevated protein, and normal glucose levels. CSF PCR for HSV-I was positive and HSV-I IgG antibodies were present. Treatment with acyclovir and broad-spectrum antibiotics controlled her fevers, but she subsequently developed status epilepticus, requiring treatment with valproic acid. Repeated brain MRI revealed worsening brain inflammation. Repeated lumbar puncture for CSF PCR for HSV-1 was negative. The patient was extubated on day 41, with plans to transfer to hospice and complete postexposure prophylaxis with valacyclovir.

Conclusion: Approximately 97% of patients with HSV encephalitis will be unable to return to their baseline cognitive function after recovery. The sudden onset of prodromal symptoms should prompt clinicians to include HSV encephalitis as a differential diagnosis. Our case signifies the importance of considering HSV encephalitis when a patient presents acutely with atypical symptoms.

One of the rarest of respiratory failures: osteosarcoma with pulmonary metastasis resulting in multiple complications

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Introduction: Osteosarcoma is a rare disease; however, it is the most common primary bone tumor in children and young adults. Estimated incidence is 4 cases per million annually in people younger than 40. Prior reports have detailed complications, including spontaneous pneumothoraces, hemorrhage, and respiratory failure with tumor burden. This case describes a presentation of respiratory failure in a patient with multiple complications associated with metastatic osteosarcoma.

Case Presentation: Our patient is a 27-year-old male who presented with five days of dyspnea, cough, and fever. His history is significant for osteosarcoma diagnosed 15 years prior with remission achieved after surgical resection. He developed recurrence with metastasis treated with stereotactic radiation of lung masses, complicated by development of radiation pneumonitis, requiring chronic prednisone therapy. Recent PET/CT scans showed progression of disease. The patient developed hypoxia and required transition to high-flow nasal cannula. A CT of the chest showed large pulmonary masses with diffuse extension in the bilateral lungs and mediastinum in addition to ground-glass and consolidative changes. He was managed as acute hypoxic hypercapnic respiratory failure with broad antimicrobial coverage for likely superimposed pneumonia. The patient was transferred to the ICU where his course was complicated by bilateral spontaneous pneumothoraces. Despite chest tube thoracostomy, the patient's respiratory status worsened, and he required intubation. Bronchoscopy yielded negative culture results. Ultimately, with development of refractory acidemia with respiratory failure, the patient passed away four days postintubation.

Conclusion: Although the most common site of metastatic disease, pulmonary metastasis of osteosarcoma is a rare condition, which may result in several potential complications, associated with both disease and treatment, contributing to development of respiratory failure. In this case, the patient's respiratory failure was impacted by tumor burden, radiation pneumonitis, pneumothoraces, and pneumonia. Knowledge of

complications as well as vigilant monitoring is important for long-term outcomes of patients with osteosarcoma.

Catastrophic anti-phospholipid syndrome: A rare phenomenon

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Introduction: Catastrophic anti-phospholipid syndrome (CAPS) is a rare variant of anti-phospholipid syndrome (APS) that can occur in less than 1% of cases.

Case Description: An elderly female with right congenital renal agenesis, hypertension on hydralazine, and recently positive p-ANCA antibodies presented with malaise and acute kidney injury. Due to worsening renal function, a renal biopsy demonstrated pacui-immune necrotizing and crescenteric glomerulonephritis in the setting of ANCA vasculitis. High-dose steroids were initiated. Due to the high index of suspicion for APS, further investigation demonstrated confirmatory results with low complement levels and positive ANA, lupus anticoagulant, C-ANA, P-ANCA, histone antibodies, and β-2 glycoprotein. Her hospital course was complicated by acute hypoxic respiratory failure, concerning for diffuse alveolar hemorrhage, and acute renal failure, requiring emergent renal replacement therapy. Based on the clinical presentation and multiorgan involvement, she was diagnosed with CAPS, resulting in ICU admission for multiorgan support. She was started on anticoagulation, high-dose steroids as well as five sessions of plasmapheresis. This multimodal therapy produced gradual improvement, therefore, biologic agents were initiated for refractory CAPS.

Discussion: CAPS is a rare, life-threatening form of APS in which systemic microangiopathy and intravascular thrombosis occur, causing a massive systemic inflammatory response, resulting in multiorgan ischemia. Diagnostic criteria include positive antiphospholipid antibodies with multiorgan involvement and intravascular thrombosis within one week. Of the multiple organs affected, the kidneys are eventually involved in 71% of patients as well as the lungs in 64% of patients. CAPS requires early aggressive multidisciplinary intensive care treatment, with a combination of anticoagulation, glucocorticoids, plasma exchange, and intravenous immunoglobulins. Despite urgent initiation of therapy, constant surveillance is required to avoid the > 30% mortality rate from multiorgan failure. Despite our patient having a positive outcome, the high mortality rate highlights the importance of having a high index of suspicion for CAPS, prompt diagnosis, and initiation of treatment.

Butterfly bronchiectasis: Peculiar CT findings caused by the iron lung machine?

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Introduction: The poliovirus was notable for its ability to cause respiratory failure due to its paralytic effects on the diaphragm and intercostal muscles. The iron lung was a negative pressure ventilatory machine used during the polio pandemic to assist in ventilating patients. We present an interesting case of a bronchiectasis patient whose computer tomography (CT) of the chest showed unique bronchiectasis changes, which uniquely appears to be in the distribution of the negative pressure ventilation enforced by the iron lung.

Case Report: A 75-year-old female with a history of stable non-cystic fibrosis bronchiectasis diagnosed 20 years ago presented to the clinic to establish care. She complained of worsening cough, sputum production, and dyspnea on exertion. She was told she had an abnormal imaging of the chest, but no etiology was given for her bronchiectasis. She subsequently underwent testing, including rheumatoid factor, anti-nuclear antibodies, anti-cyclic citrullinated antibody, Sjogren antibody, and immunoglobulin levels, all of which were within normal limits. Infectious workup, including sputum cultures, viral panel testing, and bronchioalveolar lavage, were all negative. A CT scan of the chest showed biapical and bibasilar pleuro-parenchymal scarring and bronchiolitis with associated architectural distortion. She was treated with muco-ciliary clearance therapy and was followed up with repeated CT chests over the next year, which showed stable disease.

Discussion: The poliovirus has broad effects on the body, including inflammation of the spinal cord, gut, and respiratory muscles. Its effects led to respiratory muscle weakness and failure as well as superimposed infections due to clearance impairment caused by bulbar muscle paralysis. The iron lung was a negative pressure ventilatory machine used during the polio pandemic to assist in ventilating patients by providing sub-atmospheric pressure, causing thoracic expansion and a resulting pressure gradient from biapical and bibasilar chambers. Our patient had no known cause of her bronchiectasis with the exception of a history of polio and exposure to the iron lung. Although postpolio syndrome has been seen to include obstructive lung disease, to the best of our knowledge, there is no known direct link with bronchiectasis or with the use of the iron lung in published data.

Conclusion: Although there are no studies particularly linking a history of poliovirus infection and its use of the iron lung in patients with bronchiectasis, our patient's very unique CT imaging with biapical and bibasilar may shed some light into exploring this further.