

PICO: In the COPD patient population, how does the prevalence and management of comorbidities pre- versus post-transplant affect morbidity and mortality rates?

| Author, Year, Journal, Title | Purpose of Study, Study Design | N= Number of Subjects, Type of Subject | Methods | Outcome Measures | Results | Analysis/ Conclusions | Clinical Relevance |
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| Schnell, et al., 2012, <i>BMC Pulmonary Medicine</i> , The prevalence of clinically-relevant comorbid conditions in patients with physician diagnosed COPD: a cross-sectional study using data from NHANES 1999-2008 | To estimate the prevalence, and describe the complexity of clinical decision making or self-management of comorbidities in COPD using nationally-representative data, cross-sectional | Without physician-diagnosed COPD n=14,828; With physician-diagnosed COPD n=995. Aged 45+ | Multi-year analytic sample joining five NHANES waves (1999-2000, 2001-2002, 2003-3004, 2005-2006, 2007-2008); Sample represents 100 million people, 10 million with COPD | National Health and Nutrition Examination Survey (NHANES) from 1999-2008; BMI, visual acuity score | COPD with co-existing: CHF (12.1%), CHD (12.7%), HTN (60.4%), hypercholesterolemia (47.6%), CVA (8.9%), cancer (16.5%), DM (16.3%), osteoporosis (16.9%), arthritis (54.6%), depression (20.6%), anxiety (8.6%). Clinical factors affecting COPD: dizziness/balance problems (41.1%), obesity (40.3%), urinary incontinence (34.9%), anemia (9.3%), low GFR (16.2%), >4 prescription meds (51.8%), frailty (9.5%). Health status factors affecting COPD: memory problems (18.5%), mobility difficulty (55.6%), hearing impairment (12.1%), visual impairment (14%). | COPD management may need to take into account a complex spectrum of comorbidities. Identified the most common conditions in a nationally-representative set of COPD patients. Found that 96.4% of adults 45 and older with COPD have at least 1 condition that can complicate their treatment. | Research and clinical practice guidelines need to address COPD within the context of comorbidity. For example, polypharmacy reactions (beta-blockers for cardiovascular disease may worsen lung function; bronchodilators for COPD may worsen tachyarrhythmias). Guidance for potential interactions, and recommendations would be useful to clinicians working with this patient population. |
| Garcia-Olmos, et al., 2013, <i>BMC Family Practice</i> , Comorbidity in patients with chronic obstructive pulmonary disease in family practice: a cross-sectional study | To quantify the prevalence of COPD and related chronic comorbidity among patients aged >40 visiting family practices in an area of Madrid | N=198,670 total (104,003 women, 94,667 men) out of 129 family practices, >40; observational, descriptive, cross-sectional study | Patients within the Comunidad Autonoma de Madrid totalled 198,670 out of 129 practices. They were deemed to have COPD if this diagnosis appeared on their clinical histories. Data was calculated for prevalence of COPD, prevalence of a further 25 chronic diseases in patients with COPD, and standardized prevalence ratios. | GOLD criteria, prevalence of comorbidity and COPD, pre-established criteria of 40 chronic expanded diagnosis clusters (EDC) identified 26 "high prevalence-high impact" (HP/HI) | COPD prevalence was 3.2% in family medicine (95% CI 3.0-3.3), 5.3% men, 1.4% women. 90% of patients presented with comorbidity with a mean of 4+/- 2.04 chronic diseases per patient: most common were HTN (52%), disorders of lipid metabolism (34%), obesity (25%), DM (20%), and arrhythmia (15%). After controlling for sex/age, the observed prevalence of the following ten chronic diseases was higher than expected: heart failure, chronic liver disease, asthma, generalised atherosclerosis, osteoporosis, ischemic heart disease, thyroid disease, anxiety/depression, arrhythmia, and obesity. | Patients with COPD who are frequent in family practice, have a complex profile, and pose a clinical and organizational challenge to family practices. | Patients with COPD and one or more comorbidities have an increased risk of disease related complications. The evaluation and awareness of these various diseases associated with COPD is important in the interventions we choose. For example, more frequent COPD exacerbation hospitalizations are associated with CVD. Thus, addressing these patient risk factors associated with the cross-over of these comorbidities (i.e. medication effects) can be detrimental to decreasing mortality pre- and post- lung transplant. |

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| <p>Mannino et al, 2008, <i>Eur Respir J</i>, Prevalence and outcomes of diabetes, hypertension and cardiovascular disease in COPD</p> | <p>To determine the relationship between COPD and common chronic comorbid conditions of cardiovascular disease, hypertension, and diabetes mellitus, and hospitalizations and death; cohort study</p> | <p>N=20,296 subjects aged >45 years old. Cardiovascular Health Study (CHS) cohort n=5,201 (4,955 completed) males and females; Atherosclerosis Risk in Communities Study (ARIC) cohort n=15,792 (15,341 completed) (age 45-64).</p> | <p>Baseline data from the ARIC and CHS cohorts were combined and analyzed. The sample was stratified based on baseline lung function data, according to the GOLD criteria. Comorbid disease at baseline and death and hospitalizations over a 5-year follow-up were then searched for.</p> | <p>Spirometry (volume displacement, water-sealed spirometer); Global initiative for Chronic Obstructive Lung Disease (GOLD), smoking status, BMI, education (years), hospitalizations and deaths (total number)</p> | <p>Lung function impairment was found to be associated with more comorbid disease. In logistic regression models adjusting for age/sex/race/smoking/BMI/education, subjects with GOLD stage 3 or 4 had a higher prevalence of DM (OR 1.5, 95% CI 1.1-1.9), HTN (OR 1.6, 95% CI 1.3-1.9), CVD (OR 2.4, 95% CI 1.9-3.0). In general, increasing age, higher BMI, lower education, and male sex were associated with a higher risk of all three comorbidities. Comorbid disease associated with higher risk of hospitalization and mortality that was worse in people with impaired lung function.</p> | <p>Lung function impairment is associated with a higher risk of comorbid disease, which contributes to a higher risk of adverse outcomes of mortality and hospitalizations. A significant relationship was found between respiratory impairment and the presence of CVD, DM, and HTN. Patients with COPD were more likely to have at least two of these conditions.</p> | <p>Addressing the symptoms related to comorbid conditions in patients with COPD is important in decreasing their risk for further complications. Especially prior to and following lung transplantation, evaluating and addressing comorbid diseases can decrease their risk for mortality and rehospitalization.</p> |
| <p>Janssen et al., 2011, <i>Journal of Palliative Medicine</i>, Symptoms, comorbidities, and health care in advanced chronic obstructive pulmonary disease or chronic heart failure</p> | <p>To assess severity of symptoms, presence of comorbidities, and current provision of health care in outpatients with advanced COPD and CHF; cross-sectional observational study</p> | <p>N=105, clinically stable advanced COPD patients (GOLD stage III or IV), n=80 patients with CHF (NYHA class III or IV)</p> | <p>Patients were assessed for demographics, clinical characteristics, self-reported comorbidities, and severity of symptoms. Health care and symptom related interventions were also assessed.</p> | <p>GOLD, Visual analog scales, (HADS-D) hospital anxiety and depression scale, (Health care checklist-addressing: medications, contacts of professionals, long-term oxygen therapy, noninvasive positive pressure ventilation, home adaptation, and medical aids), Charlston Comorbidity Index</p> | <p>Comorbidities were reported in 96.3% of CHF patients, 61.9% of COPD patients. They suffered from multiple symptoms including: dyspnea, fatigue, muscle weakness, coughing, low mood, sleeplessness, and frequent micturition. Only a minority of patients had received symptom-related treatment. Involvement in allied health professionals was low. Majority of COPD and CHF patients had received home adaptation and medical aids. Physical therapists were the most regularly seen health care professionals in this patient population.</p> | <p>Patients with COPD and CHF often experience comorbidities and suffer from multiple symptoms that are undertreated. A regular assessment of patients' comorbidities and symptoms as well as the provision of patient-tailored interventions is needed in the outpatient setting. Improving patients' quality of life can be addressed by improvement of associated symptoms and functional limitations.</p> | <p>Advocating the importance of patients interacting with their health care professional team can help lower their risk of worsening symptoms and health complications. Addressing the prevalence of multiple comorbidities in this patient population is key towards the complete intervention of patient-centered goals. Especially when preparing for lung transplant, educating and treating patients' on their symptoms will help to reduce their risk of pre- and post surgical complications and improve overall outcome. *(The importance of physical therapists as a direct line of communication has a great impact on the reduction of comorbid complications and self management.)</p> |

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| <p>Janseen et al., 2011, <i>Qual Life Res</i>, Impaired health status and care dependency in patients with advanced COPD or chronic heart failure</p> | <p>To assess health status and care dependency in patients with advanced COPD or CHF and to identify coorelates of an impaired health status; cross-sectional study</p> | <p>COPD patients n=105, CHF n=80; GOLD standard III or IV, or NYHA class III or IV out of five general hospitals in 2008-2009.</p> | <p>Assessment of each patient was done by a number of measures including general health status, quality of life, disease-specific health statud, physical mobility, and care dependency.</p> | <p>EuroQoL-5 Dimensions (EQ-5D), Assessment of quality of life instrument (AQoL), medical outcomes study 36-Item Short-Form Health Survey (SF-36), St. Georges Respiratory Questionnaire (SGRQ), Minnesota living with heart failure questionnaire (MLHFQ), Timed up and go (TUG), Care Dependency Scale (CDS), visual analog scale (VAS), Charlson comorbidity index</p> | <p>Patients with COPD or CHF may have impaired health status and require care dependency. Multiple regression analyses show that physical and psychological symproms, care dependency and number of drugs were correlated with health status in COPD and CHF.</p> | <p>Clinical care should regularly assess symptom burden and care dependency to identify patients with advanced COPD and CHF at risk for impaired health status.</p> | <p>Symptom burden can greatly affect patient outcomes pre-and post-lung transplant. Therefore, the incorporation of intervention strategies for each comorbidity specific to each patient is important in improving health status and quality of life. Reducing the need for these patients to have medical aids secondary to their limitations by addressing these needs in rehab is important.</p> |
| <p>Arenas-de Larriva et al., 2010, <i>Transplantation Proceedings</i>, Bone mineral density in lung transplant candidates</p> | <p>To describe the prevalence of BMD loss among patients evaluated as candidates for lung transplant; cross-sectional study</p> | <p>N=156 patients, n=64 with COPD, n=55 with interstitial lung disease (ILD), n=21 with cystic fibrosis (CF). Candidates evaluated from 2007-2009, > 17.</p> | <p>Hospital medical records and patient databases were assessed with clinical practice and ethical principles. Identification of the risk for fracture was assessed by BMD through densitometry of the femoral neck and lumbar spine.</p> | <p>BMD T-scores (based on World Health Organization criteria)</p> | <p>Only 2 (3.1%) patients with COPD had densitometry prior to referral for lung transplant, only 9 (16.4%) of patients with ILD, only 3 (14.3%) of patients with CF. 116 (74.4%) patients who hd BMD below normal values included 84.4% of COPD, 67.3% of ILD, and 81% of CF. Detection of these patients allowed initiation of preventative treatment depending on the degree of risk of bone fracture. Half of the patients evaluated were eventually included on the lung transplant waiting list, with 70% receiving a transplant.</p> | <p>Bone mineral loss is highly prevalent in this population, but is rarely investigated before referral for lung transplantation. Its identification can allow the start of treatment, reducing the risk of fracture, before or after lung transplant.</p> | <p>Medications used for COPD place an increased risk of reduced BMD prior to transplant. Patients awaiting lung transplant should be assessed for comorbidities such as osteopenia or osteoporosis in order to address interventions to reduce their risk of fracture prior to or after surgery. Osteoporosis is often the "silent disease" because most people do not know they have it until a fracture- therefore identifying their risk before hand will reduce related morbidity and mortality.</p> |

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| <p>Reed et al., 2010, <i>Respiratory Medicine</i>. Elevated HDL cholesterol levels are associated with osteoporosis in lung transplant candidates with chronic obstructive pulmonary disease</p> | <p>To review the data from a cohort of advanced, primarily hypoxemic, COPD patients evaluated for lung transplantation to assess the relationship between HDLc (High density lipoprotein cholesterol) with OP (osteoporosis);</p> | <p>N= 245 COPD patients referred for lung transplantation between 1995-2009.</p> | <p>Records were reviewed for each of the referred patients. Osteoporosis was defined by either dual energy x-ray absorptiometry (DXA) scan or use of osteoporosis medications. The presence of absence of OP could be ascertained in 152 subjects. Cholesterol values and other clinical variables were assessed for their association with OP.</p> | <p>DXA, OP medication use, World Health Organization (WHO) criteria for fracture risk, demographics, anthropometrics, pulmonary function, medical comorbidities, fasting lipid profile values.</p> | <p>152 were included in the analysis (116 had OP- 76%). Clinical factors associated with OP included lower BMI (OR 0.81, 95% CI 0.73-0.90), higher HDLc (OR 1.04, 95% CI 1.02-1.07), and worse lung function. HDLc was an independent predictor of OP and demonstrated an inverse linear correlation with T-scores ($r=-0.21$, $p=0.05$), which was stronger in males ($r=-0.45$, $p=0.004$). Prevalence of CVD, CAD, and other comorbidities were similar with HTN being the most common in the OP group.</p> | <p>In COPD patients referred for lung transplantation, OP is highly prevalent. Raised HDLc levels are common in this group and are independently associated with OP.</p> | <p>Abnormal BMD is highly prevalent in the COPD population. This can be assessed through OP medication, or DXA scanning. When referred to have a lung transplantation, management of OP is important to reduce future fractures or mobility limitations. HDLc levels are also important in the assessment of COPD patients awaiting lung transplant, because elevated levels can be directly correlated with OP risk.</p> |
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COPD=Chronic Obstructive Pulmonary Disease; CHF=Congestive Heart Failure; CHD=Coronary Heart Disease; HTN=hypertension; CVA=stroke; DM=diabetes mellitus; GRF=glomerular filtration rate; BMI=body mass index; CAD= Coronary artery disease; CVD= Cardiovascular disease; OR= Odds ratio; CI= Confidence Interval; GOLD= Global initiative for Chronic Lung Disease; NYHA= New York Heart Association.

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