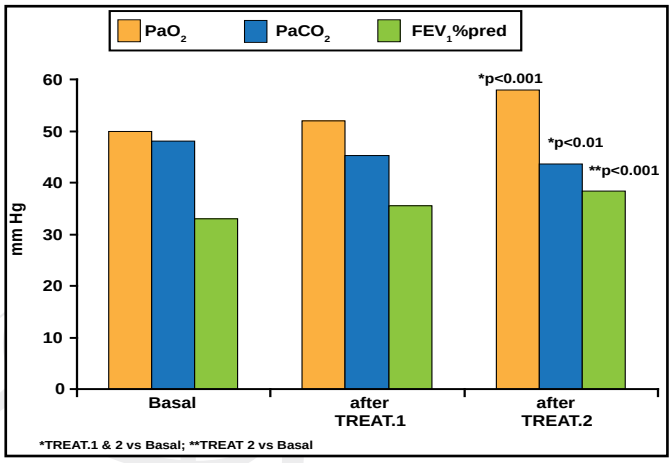
LABA, mean PaO_2 increased to 53.7 mm Hg and FEV_1 to 35% predicted, and $PaCO_2$ had decreased to 45.1 mm Hg.

Successively, following 12 months of treatment with inhaled steroids plus LABA and tiotropium, mean PaO_2 was 57.4 mm Hg, $PaCO_2$ was 43.3 mm Hg, and FEV_1 was 38.1% predicted. All three parameters improved significantly as compared with the standard therapy ($p<0.01$ to $p<0.001$; Figure 1).

Figure 1. Changes in PaO_2, $PaCO_2$ and FEV_1.



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These results have potential implications for health policy and economics. The public health system of Brazil has provided patients access to inhaled corticosteroids plus LABA for severe asthma since 2002, but severe COPD patients from the Federal University of Sao Paulo started having access to these medicines in 2004. However, patients with severe COPD gained access to corticosteroids plus LABA and tiotropium only in 2007, provided by the public health system from the State Government of Sao Paulo.

After July 2007, the opportunity to report pre- and post-tiotropium experiences in a cohort of severe COPD patients who were enrolled in a long-term oxygen therapy (LTOT) program for hypoxemic COPD at the Federal University of Sao Paulo was available. Study results show significant improvement in lung function, including arterial blood gas levels, after tiotropium therapy in these patients.

Additionally, because stable hypoxemic COPD outpatients experienced an improvement in all parameters after use of tiotropium and corticosteroids plus LABA and because severe hypoxemia, hypercapnia, and lung dysfunction are recognized independent markers of worst survival and usually are associated with frequent COPD hospitalization, this study suggests that the three drug combination can also bring clinical and socioeconomic benefits for these patients and health care systems.

Early Intervention in COPD

Patients with symptomatic minimal airflow limitation had significant improvement in spirometric and plethysmographic parameters following early intervention with a long-acting bronchodilator, reported Heung Bum Lee, MD, Chonbuk National University, Jeonju, South Korea.

Statistically significant improvement at 6 months was observed in forced expiratory volume at one second (FEV_1), forced vital capacity (FVC), and residual volume ($p<0.05$ to $p<0.01$). Improvement was evident as early as 4 weeks after initiation of tiotropium treatment, Dr. Lee and colleagues reported.

The rationale for the study came from recognition that chronic obstructive pulmonary disease (COPD) is a progressive condition. Early intervention could help slow or stabilize the disease process, investigators noted.

The study involved 16 patients who had minimal airflow limitation that did not meet COPD diagnostic criteria. At enrollment, the patients had a mean FEV_1/FVC ratio of 0.7-0.8, FEV_1 <80% of predicted, smoking history >10 pack-years, and dyspnea on exertion.

The patients were evaluated by spirometry and body plethysmography 2 weeks prior to starting treatment with tiotropium and again after 4 weeks and 6 months of treatment. Prescribed therapy was 18 µg tiotropium, administered once daily.

Spirometry was performed after administration of 400 µg of salbutamol. The FEV_1/FVC ratio did not change significantly from baseline. However, other parameters improved significantly, beginning as early as 4 weeks.

- Prebronchodilator FEV_1: 1.59, 1.66, and 1.74 L; $p<0.01$
- Postbronchodilator FEV_1: 1.66, 1.72, and 1.78 L; $p<0.01$
- Prebronchodilator FVC: 2.10, 2.22, and 2.31 L; $p<0.01$
- Postbronchodilator FVC: 2.24, 2.40, and 2.41 L; $p<0.01$
- Residual volume: 2.75, 2.63, and 2.16 L; $p<0.05$

Additionally, inspiratory capacity increased at 4 weeks and 6 months from baseline, but the improvement did not achieve statistical significance (1.25, 1.32, and 1.41 L; $p=0.33$).

Dr. Lee and colleagues concluded that "these results strongly support that early pharmacologic intervention can be effective in patients with symptomatic minimal airflow limitation."