

# The Use of Nebulized Glutathione in the Treatment of Emphysema: a Case Report

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## Abstract

We present the case of a 95-year-old man with an acute respiratory crisis secondary to emphysema and apparent bronchial infection. Treatment with nebulized glutathione led to a rapid resolution of the crisis, as well as a marked improvement in the chronic course of the disease. This treatment has been used since for a number of patients with emphysema. The safety and bioavailability of this method of delivery have been established in human studies. Preliminary results suggest efficacy for nebulized administration of glutathione in this patient population. We suggest this treatment can be considered an option for acute respiratory crises due to COPD.

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## Introduction

Chronic obstructive pulmonary disease (COPD), a designation which includes emphysema, is a leading cause of death in America. This case study reports on the successful treatment of both acute and chronic emphysema with a novel agent.

Much of the tissue damage in emphysema is thought to be mediated by an oxidative down-regulation of the activity of  $\alpha$ -1-proteinase inhibitor.<sup>1</sup> This down-regulation has been shown *in vitro* to be slowed by glutathione, a sulfhydryl-containing tripeptide known to be a major antioxidant in the lung.<sup>2</sup>

Glutathione concentrations in bronchoalveolar fluid have been found to be inversely correlated with the degree of inflammatory activity in the lungs of smokers.<sup>3</sup> Thiol compounds (i.e., compounds containing an -SH group) like glutathione have a history of use as mucolytics as well.<sup>4</sup> Previous clinical trials of nebulized reduced glutathione have demonstrated the bioavailability and safety of up to 600 mg twice daily.<sup>5,6</sup> The absorption of oral glutathione remains controversial, with animal studies suggesting significant absorption and some human studies showing little to none.<sup>7,8</sup> Based on these findings, it appears inhalation might be the preferred route of administration for respiratory and perhaps systemic effect. We report the case of a man with an acute respiratory crisis due to emphysema and apparent bronchial infection that responded favorably to treatment with nebulized glutathione.

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## Case Report

In 1997, a 95-year-old male with emphysema presented in a wheelchair and using an oxygen tank and mask necessitated by his acute illness. He was alert, responsive, and reported a productive cough with colorless sputum. His breathing was obviously labored. He refused hospitalization and antibiotic treatment. We chose to try a single trial dose of 2 ml of a 60 mg/ml glutathione solution (prepared by Apothecure Pharmacy, Dallas, TX) nebulized and inhaled over a 5-10 minute period. Due to the obvious immediate benefit, it was decided to continue this treatment with twice-daily administration and close monitoring by his family of his overall condition. He returned to the office in three days without wheelchair or oxygen tank. He showed no signs of respiratory distress, and no adventitious lung sounds were noted on auscultation. The patient reported his breathing was better than it had been in years. He continued daily treatment with glutathione until his death from congestive heart failure over two years later.

## Conclusion

While resolution of the acute episode due to a mucolytic effect was the desired outcome of the glutathione treatment, the lasting improvement in breathing was unexpected. Since we have no serial spirometry data available on this patient, placebo effect cannot be ruled out as an explanation for his marked response. However, given the progressive nature of his disease, the dramatic and rapid change in physical findings, and the emphatic insistence of the patient for continued treatment, we believe placebo response to be an unlikely explanation.

We have subsequently prescribed this preparation for six patients with emphysema, five of whom reported improved breathing after a single in-office application and who later requested to continue treatment. We also have found nebulized glutathione is best

administered daily from 4 ml vials. We have also seen improved respiratory function associated with nebulized glutathione treatment in cases of chronic bronchitis and asthma.<sup>9</sup> In the case of asthma patients we feel it is advisable to check urinary sulfite excretion to verify proper metabolism of sulfur compounds, as certain individuals appear to experience exacerbation of respiratory symptoms from exogenous sulfur compounds.<sup>10</sup> In three cases of non-small cell lung cancer with effusion, the effusion resolved completely. Given the safety and promise of this treatment, combined with the paucity of other effective treatments for emphysema, we suggest this treatment be considered for widespread use.

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Please contact me with any questions or comments you may have about this announcement. Thank you for your consideration.

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