Is oral prednisone as effective as high-dose IV steroids as initial treatment in a patient with a COPD exacerbation?

Evidence-Based Answer
Yes. For the initial inpatient management of chronic obstructive pulmonary disease (COPD) exacerbations in noncritically ill patients, oral steroids are associated with similar outcomes as intravenous (IV) steroids. In addition, patients treated initially with oral steroids appear to have shorter hospital stays and lower hospital costs. (SOR: B, based on an RCT and a cohort study.)

In 2007, a double-blind RCT evaluated patients hospitalized for an acute COPD exacerbation. One group of 94 patients received a 5-day course of 60 mg oral prednisolone with an IV placebo, while 99 patients received 60 mg IV prednisolone and an oral placebo. The primary outcome included early (within 2 weeks) and late (2 weeks to 3 months) treatment failure defined as death, admission to intensive care unit, readmission within 90 days, or intensified treatment with further steroids, antibiotics, or theophylline.¹

This was a noninferiority study design that used the lower bound of a one-sided 95% CI; a difference in the treatment failure rate of <15% would deem oral treatment not inferior to IV treatment.¹

The results revealed no difference in the overall treatment failure rate (61.7% vs 56.3%, IV-treated group vs oral-treated group; one-sided 95% CI lower bound for the difference, −5.8%), early failure rate (17.8% vs 18.4%, respectively; one-sided 95% CI lower bound for the difference, −9.4%), or late failure rate (54% vs 47%, respectively; one-sided 95% CI lower bound for the difference, −5.6%).¹

A recent large retrospective cohort study including 79,985 patients admitted with COPD exacerbation from 414 hospitals compared treatment failure rates in 73,765 (92%) patients initially treated with high-dose IV steroids (120–800 mg prednisolone equivalents per day on hospital day 1–2) versus 6,220 (8%) patients initially treated with low-dose oral steroids (20–80 mg prednisolone equivalents per day). Primary treatment failure was defined as initiation of mechanical ventilation after hospital day 2, death during hospitalization, or readmission for COPD within 30 days of discharge. Secondary outcomes included length of hospital stay and costs.²

A total of 1.4% (95% CI, 1.3%–1.5%) of patients initially treated with IV steroids died, compared with 1.0% (95% CI, 0.7%–1.2%) of patients initially treated with oral steroids. A total of 10.9% of IV-treated patients had treatment failure (95% CI, 10.7%–11.1%), compared with 10.3% of oral-treated patients (95% CI, 9.5%–11.0%).²

A multivariable analysis was conducted to create a propensity-matched cohort (matched for comorbidities and multiple measures of severity), which paired a patient in the oral therapy group with a similar patient in the IV treatment group. This analysis revealed patients treated with oral steroids had a lower risk of treatment failure (OR 0.84; 95% CI, 0.75–0.95), shorter length of stay (OR 0.90; 95% CI, 0.88–0.91), and lower hospital costs (OR 0.91; 95% CI, 0.89–0.93). In models adjusting for patient, hospital, and physician characteristics and controlling for the early use of other treatments and diagnostic tests, the risk of treatment failure with oral treatment was not significantly different from that with IV treatment (OR 0.93; 95% CI, 0.84–1.02). But patients treated with the oral regimen again had a shorter length of stay (OR 0.92; 95% CI, 0.91–0.94) and lower costs (OR 0.93; 95% CI, 0.91–0.94).²

A 2007 evidence-based guideline by a collaborative working group (that was published before the above studies) states that oral or IV glucocorticosteroids are recommended for hospital management of an acute exacerbation of COPD (based on multiple RCTs with consistent findings) and that the exact doses are unknown, but an overall recommendation of 30 to 40 mg oral prednisolone daily for 7 to 10 days was a reasonable compromise between efficacy and safety (based on nonrandomized trials and observational studies).³

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