References

1. Nava S, Fracchia C, Callegari G, Ambrosino N, Barbarito N, Felicetti G. Weakness of respiratory and skeletal muscles after a short course of steroids in patients with acute lung rejection. *Eur Respir J* 2002; 20: 497–499.
2. British National Formulary 43. British Medical Association and Royal Pharmaceutical Society of Great Britain. London, Royal Pharmaceutical Society of Great Britain, 2002; p. 343.
3. Shee CD. Risk factors for hydrocortisone myopathy in acute severe asthma. *Respir Med* 1990; 84: 229–233.
4. Knox AJ, Mascie-Taylor BH, Muers MF. Acute hydrocortisone myopathy in acute severe asthma. *Thorax* 1986; 41: 411–412.

From the author:

First of all we would like to thank C.D. Shee for the very useful comments. We agree with most of his conclusions except with the sentence "as many chest physicians commonly use other corticosteroids" (*i.e.* than methylprednisolone), since the large majority (three quarters) of the randomised controlled trials performed during an acute exacerbation of chronic obstructive pulmonary disease have employed methylprednisolone, though using different dosages [1, 2, 3].

As correctly stated by C.D. Shee, the daily dose at which respiratory muscle weakness and eventually myopathy occurs is critical, but this still needs to be clearly identified for the different kinds of corticosteroids (*i.e.* fluorinated and nonfluorinated) that may have different effects on the muscles when chronically administered at moderate doses [4]. However, when given acutely at massive doses, both fluorinated and nonfluorinated steroids may have similar effects on the contractile and histopathological properties of the diaphragm [5]. A difference between the deleterious clinical effects of low *versus* high doses of steroids is therefore likely.

Massive doses of steroids (*i.e.* methylprednisolone >500 mg·day^{-1}) are usually employed, apart from cases of acute lung rejection after transplantation, in severe asthma requiring mechanical ventilation. These patients, as highlighted by C.D. Shee, also receive a neuromuscular blocking agent (NMBA), and consequently it is difficult to assess the independent effect of each drug, and the interactive effect of concurrent use, even though it has been suggested that muscle weakness is limited to patients who had received both steroids and NMBA, rather than steroids alone [6]. Our recent study however, seems to partly contradict this statement, since none of our patients were taking NMBA [7].

From a clinical point of view we agree with C.D. Shee that we should be "aware of the acute muscle weakness problem" that has been shown to occur in 28% [7], 30% [8] and 46% [6] of the patients treated with massive doses of steroids.

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References

1. Niewoehner DE, Erbland ML, Deupree RH, *et al.* Effect of systemic glucocorticosteroids on exacerbations of chronic obstructive pulmonary disease. *N Engl J Med* 1999; 340: 1941–1947.
2. Emerman CL, Connors AF, Lukens TW, May ME, Effron D. A randomized controlled trial of methylprednisolone in the emergency treatment of acute exacerbations of COPD. *Chest* 1989; 95: 563–567.
3. Albert RK, Martin TR, Lewis SW. Controlled clinical trial of methylprednisolone in patients with chronic bronchitis and acute respiratory insufficiency. *Ann Intern Med* 1980; 92: 753–758.
4. Dekhuijzen PNR, Gayan-Ramirez G, de Bock V, Dom R, Decramer M. Triamcinolone and prednisolone affect contractile properties and histopathology of rat diaphragm differently. *J Clin Invest* 1993; 92: 1534–1542.
5. Nava S, Gayan-Ramirez G, Rollier E, *et al.* Effects of acute steroid administration on ventilatory and peripheral muscles in rats. *Am J Respir Crit Care Med* 1996; 153: 1888–1896.
6. Nava S, Fracchia C, Callegari G, Ambrosino N, Barbarito N, Felicetti G. Weakness of respiratory and skeletal muscles after a short course of steroids in patients with acute lung rejection. *Eur Respir J* 2002; 20: 497–499.
7. Leatherman JW, Fluegel WL, David WS, Davies SF, Iber C. Muscle weakness in mechanically ventilated patients with severe asthma. *Am J Respir Crit Care Med* 1996; 153: 1686–1690.
8. Behbehani NA, Al-Mane F, D′yachkova Y, Pare P, FitzGerald M. Myopathy following mechanical ventilation for acute asthma. The role of muscle relaxants and corticosteroids. *Chest* 1999; 115: 1627–1631.