

Case report

Rescue therapy for refractory status asthmaticus with updosed omalizumab adjusted for IgE level, body weight and effect

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ABSTRACT

Status asthmaticus is a life-threatening condition with a high mortality rate of up to 10.3% [1].

Milger et al. recently described a rapid clinical improvement and a reduction in serum IgE levels in a patient with status asthmaticus who received salvage therapy with omalizumab [2]. This treatment is not approved for status asthmaticus. Therefore, the authors based their dose finding on the recommendations approved by the by the European Medicines Agency for the treatment of severe persistent allergic asthma. For this indication the maximum dose generally does not include an option for patients with a higher body weight and high IgE levels [2].

A significant number of patients with persistent severe allergic asthma cannot be treated because there are insufficient data to support the administration of omalizumab above the recommended maximum dose of 600mg every 2 weeks [3]. In contrast, there is a lot of evidence in the existing literature for a very good safety profile for omalizumab [4,5].

Objective: Here we report for the first time the successful treatment of a patient with refractory status asthmaticus by salvage therapy with updosed omalizumab adjusted for actual baseline IgE level, body weight and effect.

1. Case presentation

A 41-year-old man (190 cm, 90 kg) with a history of intrinsic asthma was admitted to a peripheral hospital with symptoms of severe airway obstruction. Despite inhalation of salbutamol and ipratropium bromide and i.v. administration of high-dose prednisolone and reproterol, magnesium i.v., ketamine i.v. and terbutaline s.c. the symptoms gradually worsened. The patient was intubated and transferred to the university hospital. The arterial blood gas analysis showed severe ventilatory failure (pH 7.14, p_aCO₂ 11.7 kPa, p_aO₂ 12.9 kPa below 60% oxygen, TV 420 ml, f 20/min, PEEP 15 mbar, PIP 30 mbar), (Fig. 1A). Even after i.v. methylprednisolone therapy (250 mg on 3 consecutive days), additional continuous administration of ketamine i.v. (2.2 mg/kg bw/h), magnesium in several boluses i.v. and isoflurane by inhalation (approx. 0.8 vol% endexp.), the bronchoobstruction persisted unchanged for the following 72 h. After mechanical ventilation remained difficult on day 3 it was switched to superposed high-frequency jet ventilation for 48 h. A salvage therapy with omalizumab was started as a consequence of the elevated baseline IgE levels of 2200kIU/L. Dose determination was estimated based on the patient's baseline IgE level and body weight of 90 kg, accepting that the assessment was well above the recommended maximum dose limit [3]. One day later (day 4), there was a slight clinical improvement allowing spontaneous ventilation on the ventilator, and a slight decrease in IgE level (1681 kIU/L) was measured on day 5. Further omalizumab 600 mg were

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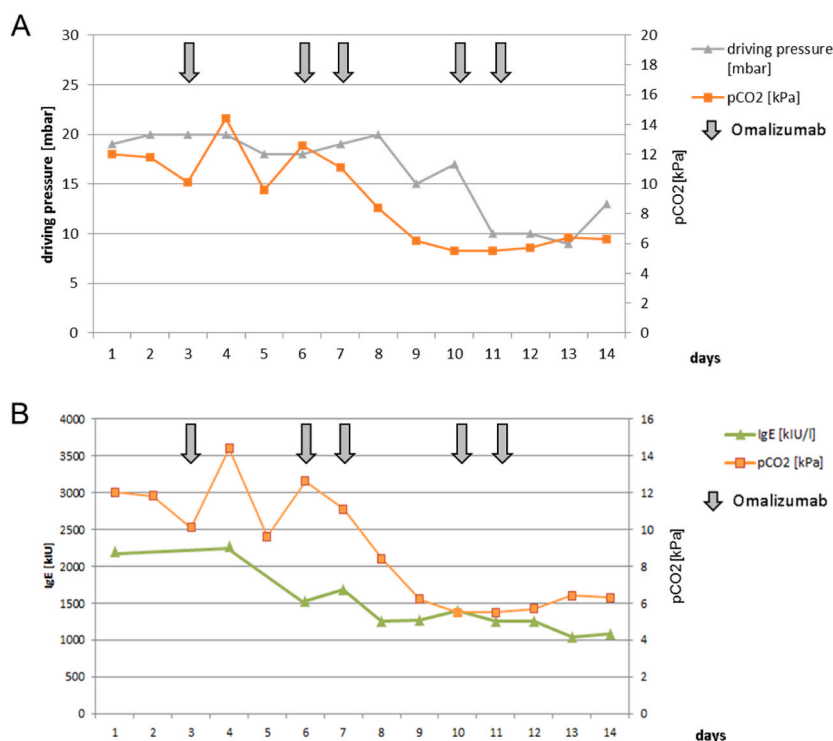


Fig. 1. (A) PaCO₂ and driving pressure progression during therapy with omalizumab (B) PaCO₂ and IgE level progression during therapy with omalizumab.

administered on days 6, 7, 10 and 11. In parallel, ventilatory support gradually could be reduced. On day 8 the patient was able to breathe on his own for the first time. On day 16, the IgE level had decreased to 753 kIU/L (Fig. 1B). From day 17, the patient breathed 16 hours per day without ventilator support. Two weeks later, complete weaning from the ventilator was possible. The administration of omalizumab was continued at a dose of 600 mg every 2 weeks and, after measuring normal spirometric parameters, was reduced to every 4 weeks after 3 months. Since then, the patient has had normal lung function and good exercise tolerance.

2. Discussion

Inspired by the case report of Milger et al. we used omalizumab in this comparable patient [2]. Due to a lack of study data, the manufacturer's dosing table excludes therapy with omalizumab in patients who require more than the maximum dose of 600 mg every 2 weeks [6]. In several clinical trials the safety profile of patients receiving the highest serum concentrations of omalizumab were comparable to those receiving a lower dose. We thus adjusted the dose according to the actual IgE level, the body weight and the effect during the treatment, which led to a remarkably fast improvement of the patient's condition. The patient's total dose of 3000 mg applied within 2 weeks was lower than the 4000 mg that in toxicological studies was well tolerated by patients as a single i.v. dose [5].

3. Conclusion

In this and similar life-threatening specific cases, we suggest to updose omalizumab as rescue therapy based on the appropriate weight, IgE level and effect, as this option has the potential to save the lives of patients in this desperate situation.

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Declaration of competing interest

HS and MB report no conflicts of interest regarding this case report.

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