An emblematic case of lactic acidosis in a metformin treated patient

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Argomento: Funzione renale e metabolica in terapia intensiva

Case report:

A 64 years old woman presented in the emergency department with progressive tachypnea and weakness and a history of nausea and vomiting during the previous week. Arterial blood gas analyses revealed severe metabolic acidosis with pH 6.77, pCO_2 11 mmHg, HCO_3^- 3.5 mmol/L, standardized calculated base excess -33.9 mmol/L and severe hyperlactatemia (Lac 17 mmol/L). She had acute kidney injury with creatinine 9.87, urea 210 and no electrolyte's alterations. Non-specific inflammation indexes were increased. Her past medical history included type 2 diabetes treated with metformin and gliclazide and arterial hypertension treated with perindopril and bisoprolol.

In the first hours after the admission she developed respiratory and cardiocirculatory failure and needed mechanical ventilation and hemodynamic support. She was treated with continuous veno-venous hemodiafiltration for 3 days. Blood, urine and pulmonary microbiologic exams were negative. She progressively improved her general health conditions and was discharged from the intensive care unit at day 6.

Discussion:

Lactic acidosis in metformin threated patients is a rare and underestimated condition, with an incidence of < 10 cases per 100,000 patients-year of exposure and it is associated with high mortality rates (30 – 50%)[1]. Blood metformin concentration (> 5 mg/l) can confirm the diagnosis of metformin-associated lactic acidosis (MALA), however this measurement is often not a priority in an emergency context[1]. Acute renal failure and MALA may develop during blockade of renin angiotensin system under conditions associated with angiotensin II-dependent glomerular filtration, as during dehydration and hypovolemia[2].

Metformin has large distribution volume and slow rate of elimination from the deep compartment, is excreted largely by the kidneys and binds only negligibly to plasma proteins. It is, therefore, easily dialyzable[2]. Early beginning of renal replacement therapy is crucial.

1. Lalau, J.D. et al. Diabetes Obes. Metab. 19, (2017)

2. Gudmundsdottir, H. et al. Clin. Nephrol. 66, (2006)