中文題目： 一個年輕男性因服用過量 Metformin 導致嚴重乳酸中毒的個案報告

英文題目： Severe lactic acidosis in a young man with metformin overdose

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Introduction

Metformin, a biguanide, is the most commonly prescribed oral antidiabetic drug in the world. The pharmacologic mechanism includes decreased hepatic and intestinal gluconeogenesis, enhanced glucose utilization, and modulation of mitochondrial oxidation of fatty acids. The adverse effect of metformin-associated lactic acidosis is rare but fatal. The high mortality about 25-50% was reported based on previous studies. The most common factor contributing of toxicity is impaired kidney function because the elimination of metformin is predominantly by the kidneys. The present case report is of a young man without previous chronic kidney disease who developed severe lactic acidosis with attempting suicide by metformin overdose.

Case Presentation

A 34-year-old man had past history of type 2 diabetes mellitus, hypertension, dyslipidemia under regular medical treatment with Glimepiride 2mg/Metformin 500mg BID, Dapagliflozin 10mg QD, Valsartan 80mg QD, Atorvastatin 10mg QD for more than one year. He was brought to local hospital emergency department (ED) in the morning and presented with severe abdominal dull pain (verbal rating scale: 10/10). It was reported he had attempted suicide by ingesting around 30 Glimepiride 2mg/Metformin 500mg combination tablets (total metformin dose 15 g) after quarrelling with his wife last night.

On arrival, his level of consciousness and vital signs were stable except tachypnea. The physical examination showed abdominal tenderness but no muscle guarding or rebounding pain. Laboratory data revealed severe metabolic acidosis (pH: 7.167, pCO2: 12.4mmHg, HCO3-: 4.4mmol/L), lactate (40.1mmol/L), acute kidney injury (BUN/Cr: 18.9/2.75mg/dL) and high glucose level (156 mg/dL). Then he was transferred to intensive care unit (ICU) with continuous venovenous hemofiltration (CVVH) and fluid resuscitation.

However, the patient developed hypotension later although he had received massive fluid supply and CVVH with sodium bicarbonate. The peak level of lactate was 42.31mmol/L after 5 hours. Then, he was referred to our hospital ICU for further managements.

After admission to our ICU, his vital signs started to stabilize and following data disclosed improving although we kept the current treatment with hydration, CVVH and aggressive sodium bicarbonate. The vasopressor was discontinued on hospital day 2 and CVVH were removed on day 3. The lactic acidosis and renal function were corrected. He was transferred to the endocrine ward and eventually discharged without sequelae on day 8.

Discussion

Metformin-associated lactic acidosis (MALA) reports high mortality rate. Renal replacement therapy (RRT) is recommended for high lactate, severe acidosis and failure of supportive therapy. The better choice of RRT in various conditions is still debated. Intermittent hemodialysis is usual preferable to continuous renal replacement therapy (CRRT) cause it is superior to remove drugs, adjust level of acidosis and lactate. The latter is an acceptable alternative if hemodialysis cannot be performed due to unstable hemodynamic status.

Moreover, lactate level is known as marker of mortality of MALA. However, the association of metformin concentration between lactic acidosis is also controversial. The more recent studies show the positive relationship even the animal model trial. More research is needed to clarify the correlation, understand the optimal timing to obtain data and find the new marker of mortality of MALA.