

Emphysematous cystitis resolved with medical treatment. A case report and literature review

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To the Editor,

Emphysematous cystitis is a rare infectious complication mainly seen in diabetic patients.

Here, we present the first case of this disease examined by our Department. A 69 years old male patient with insulin-dependent diabetes and poor metabolic control was admitted due to an acute fever accompanied by nausea, vomiting and pneumaturia. The patient also had arterial hypertension, stent revascularisation for coronary heart disease, and had been diabetic for 20 years. He presented diabetic retinopathy, neuropathy and nephropathy. He had been monitored for obstructive uropathy secondary to adenoma of the prostate.

He was conscious and alert during the physical examination: arterial blood pressure 110/60; heart rate 80bpm; axillary temperature 38°C; jugular veins flat. The rest of the examination was uneventful.

Laboratory testing delivered the following results: haemoglobin: 12g/dl; leukocytes: 6500; glycaemia: 738mg/dl; blood urea nitrogen: 68mg/dl; creatininaemia: 1.4mg/dl; [Na⁺] = 127mmol; [K⁺] = 5.4mmol; [Cl⁻] = 88mmol; [HCO₃⁻] = 27mmol.

The urine test revealed leukocyturia, red blood cells >100 per field and abundant bacteria. The urine culture showed extended-spectrum beta lactamase-producing *Escherichia coli*.

The CT urography (a specific CT technique) showed air within the bladder lumen near its ventral face.

The patient received hydration, insulin therapy and treatment with ertapenem.



Figure 1. CT Urography showing intravesical air

Progress was excellent, with no septic shock and easy-to-manage hyperosmolar syndrome.

Emphysematous cystitis was discovered by Eisenlohr¹ at the end of the 19th century and Bailey² described this illness. It may present asymptotically until the onset of severe sepsis, or it may pass through stages with pneumaturia and acute abdomen. For the case in question, the key symptom was pneumaturia and the presence of air in the bladder as shown by the CT (Figure 1).

In the series described by Thomas et al.³, the most common bacterial strain was *E. coli*, followed by *Klebsiella*. The mean age was 66 years, most affected individuals were women (64%) and most were diabetic (67%). The patient treated in our Department was similar in age to those in the other study, and also suffered diabetes with poor metabolic control. It has been postulated that air is produced by the fermentation of glucose in urine.⁴

Treatment is usually medical, as in our case, and the mortality rate is close to 7%. In isolated cases, treatment has been combined with surgery or a hyperbaric chamber.

Conflicts of interest

The authors declare they have no potential conflicts of interest related to the contents of this article.

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Rhabdomyolysis and acute renal failure following hard physical activity in a patient treated with rosuvastatin

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To the Editor,

Muscular problems constitute one of the most important adverse effects of statin drugs, and they range from myalgias to myositis/rhabdomyolysis.^{1,2} The incidence rates of myalgia and rhabdomyolysis due to statins are 5-10% and 0.01% respectively.¹ However, this is the drug type that is most frequently involved in rhabdomyolysis.³

Risk factors for developing rhabdomyolysis due to statins include, but are not limited to, high doses, intense physical exercise and interactions with other drugs.^{2,4}

We describe a patient treated with rosuvastatin who developed rhabdomyolysis and acute renal failure following intense physical activity.

Male patient diagnosed with dyslipidaemia and arterial hypertension 3 months prior to the event. He began treatment with rosuvastatin (10mg/day), olmesartan and torasemide; creatinine level was 1.1mg/dl.

One week before being admitted, he was hired to install antennas, which required considerable physical effort. About three days before admission, he experienced muscle soreness in the lower limbs and took 2 ibuprofen 600mg tablets. The pain did not subside and he experienced nausea and vomiting, so he came to the hospital. Physical examination findings were normal. Diagnostic tests provided the following results; haemoglobin 14.6g/dl; urea 141 mg/dl; creatinine 9.33mg/dl; uric acid 12.2mg/dl; total calcium 7.7mg/dl; phosphate 4mg/dl; sodium 137mEq/l; potassium 6mEq/l; chlorine 103mEq/l; bicarbonate 24mEq/l; albumin 4g/dl; creatine kinase (CK) 6243U/l (nv: 38-174); lactate-dehydrogenase 768U/l (nv: 140-300); triglycerides 253mg/dl; CRP 42.5mg/l; coagulation, platelets, and other basic biochemical parameters were within normal values. Normal thyrotropin. Urine: d 1030, proteinuria 30-70mg/dl; sediment 80/90 leukocytes/field, 5-10 red blood cells/field; sodium 59mEq/l; urine culture negative. Serology for hepatitis B, C and HIV was negative. Thoracic radiography: normal; electrocardiogram: sinus rhythm, right bundle branch block. Ultrasound showed normal kidneys. Medication was suspended and we prescribed hydration/electrolyte replacement. The patient maintained good urine production and creatinine levels and other biochemical parameters improved. After 11 days, the patient was discharged with a creatinine level of 1.29mg/dl and normal CK; the decision was made later to prescribe atorvastatin 20mg every other day.

Rosuvastatin is a synthetic HMG-CoA reductase inhibitor with pharmacological characteristics that, in theory, imply a lower risk of myotoxicity: 1) it has a

low liposolubility, which makes it less able to penetrate muscle tissue;¹ 2) it is potent, and generally speaking, low doses of potent statins are less myotoxic than high doses of less potent drugs;¹ and 3) it is eliminated through biliary (90%) and renal (10%) excretion. Metabolism by cytochrome P450 is minimal, and performed by the CYP2C9 and CYP2C19 subfamilies and not by CYP3A4. This means that there is less possibility of it interacting with other drugs.^{1,5} However, cases of rhabdomyolysis and kidney failure associated with rosuvastatin have been reported.^{6,7}

Renal failure appears in approximately 40% of cases of rhabdomyolysis due to statins, which gives a poorer prognosis.³ In the case of this patient, the renal failure, which could also have been affected by the ibuprofen and the olmesartan, resolved favourably.

The patient had been taking rosuvastatin with no incidents until he engaged in hard physical labour. Statin-related rhabdomyolysis is related to: 1) depletion of intermediary metabolites in the pathway of mevalonate, such as geranylgeranyl pyrophosphate and farnesyl pyrophosphate, causing myocyte apoptosis and 2) mitochondrial dysfunction.⁸ Decreases in Q10 coenzyme and changes in membrane stability due to lower cholesterol levels may also be contributing factors.² Hard physical activity has an additional myotoxic effect by increasing oxygen consumption and provoking mitochondrial overload.⁸

The course of action to take with patients who develop statin-related rhabdomyolysis and need hypolipidaemic agents afterwards is a matter of debate. Some recommend atorvastatin every other day, or fluvastatin or rosuvastatin on alternate days or administered once weekly.^{1,2}

To conclude, patients receiving statin drugs must be aware that hard physical labour, whether exercise or occupational, may trigger muscular complications.

Conflicts of interest

The authors declare they have no potential conflicts of interest related to the contents of this article.

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