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Acute Kidney Injury secondary to Rhabdomyolysis in COVID 19 – An exquisite

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INTRODUCTION

- SARS-CoV-2 (COVID-19) patients commonly present with fever, cough, myalgia, and fatigue, whereas expectoration, headache, hemoptysis, and diarrhea are relatively rare.
- Rhabdomyolysis is a life-threatening disorder that manifests with myalgia, fatigue, and myoglobinuria and acute renal failure.
- Viral infection, especially influenza virus infection, can lead to rhabdomyolysis.
- This is a case report of rhabdomyolysis in COVID-19 from SVIMS Tirupati.

CASE HISTORY

- A 78-year-old gentleman presented with weakness in both thighs and pain. He could not stand up due to the pain and weakness of both thighs and complained diffuse body aches.
- He admitted dry cough of 4 days duration which however did not bother him much.
- He did not complain fever, breathlessness and chest pain. He had no oliguria, dysuria, haematuria or graveluria. He had neither diarrhoea nor vomiting. He had no history of heavy exercise and largely confined himself to the orphanage.
- He had been a patient of diabetes and hypertension for the past 15 years. His medications included insulin, metformin, telmisartan and atorvastatin. He was also on tamsulosin for benign prostatic hyperplasia.

GENERAL EXAMINATION

- He had pedal oedema. There was no pallor, icterus, cyanosis, clubbing, koilonychia and lymphadenopathy.
- Pulse: 80 bpm, normal volume, regular, all peripheral pulses equally felt, no radio femoral delay, blood pressure: 130/90 mmHg, respiratory rate: 16/min, temperature: 100.4 °F .
- NERVOUS SYSTEM: Conscious, disoriented to time place and person. Cranial nerves were normal. Power in is >3/5 in all limbs. However, he had restriction of limb movement due to pain. DTR were 2+ and plantar reflex: bilateral flexor. Rest of the examination was normal.
- Other systems examination: normal.

Investigations:

INVESTIGATION	REPORT
Haemoglobin (g/dL)	13.5
Total leucocyte count (cells/cumm)	10,100
Differential leucocyte count (%)	P53L32E8M4
Platelet count (/cumm)	2.53
Blood urea (mg/dL)	34 -> 41
Serum creatinine (mg/dL)	0.8 -> 3.7
Serum sodium (mEq/L)	141 -> 135
Serum potassium (mEq/L)	4.2 -> 6.2
Serum calcium (mg/dL)	7.9
Serum phosphorus (mg/dL)	7.8
Serum uric acid (mg/dL)	8.0
Serum proteins (g/dL)	6.1
Serum albumin (g/dL)	3.8
Serum alkaline phosphatase (U/L)	35
Serum glutamic-oxaloacetic transaminase (U/L)	225
Serum glutamic pyruvic transaminase (U/L)	286

INVESTIGATION	REPORT
Total bilirubin (mg/dL)	0.3
CRP (mg/L)	12 (reference range: <6 mg/L)
Procalcitonin (ng/mL)	0.2 (reference range: 0.1-0.5)
D-Dimer (µg/mL)	0.46 (reference range: 0.1-0.5)
Complete urine examination	pH - 5.0, Sp gravity - 1.0, Alb: trace, Sugar - Nil, Ketones - Negative, RBC: nil/hpf, Epithelial cells – 3-6/hpf, pus cell – 3-4/hpf, blood present
HBsAg	Negative
HIV	Negative
Antibodies to HCV	Negative
HbA1C	5.0%
Chest radiograph	Patchy, ground-glass opacity in peripheral zones and mid-to-lower lung zones on both sides
CPK:	9400 U/L (reference range: 22–198 U/L)
urine myoglobin:	24,418.0 µg/L (reference range: 0–1000 µg/L)
RT-PCR for SARS-COV-2 infection – with a nasopharyngeal swab returned	positive
CT scan of the chest	CO-RADS-5.

DIAGNOSIS

- The striking features in the patient's clinical features and the investigations were the presence of pedal oedema and the disorientation.
- He also had elevated blood urea and serum creatinine, low serum calcium and high serum phosphorus and uric acid.
- The elevation of serum creatinine was disproportionate to that of elevation of blood urea.
- In our patient, the blood urea to serum creatinine ratio was 11.08:1.
- When we consider the causes listed in the Table, we realised that except rhabdomyolysis, the other causes are not possible

Acute kidney injury: Causes of disproportionate blood urea and serum creatinine elevation

- Reduced blood urea: Serum creatinine ratio
- Severe liver failure
- Low protein intake - low protein diet, malnutrition, malabsorption, alcoholism
- Muscle breakdown - bodybuilding, rhabdomyolysis
- Pregnancy

Possibilities in the present patient

Condition	Possibility
Reduced blood urea: Serum creatinine ratio	
Severe liver failure	Serum bilirubin: normal
Low protein intake - low protein diet, malnutrition, malabsorption, alcoholism	Serum albumin: 3.8 g/dL Teetotaller
Muscle breakdown - bodybuilding, rhabdomyolysis	No history of strenuous exercise. Rhabdomyolysis due to other causes is possible
Pregnancy	Impossible
Hypercatabolic acute renal failure	
Trauma	No history
Rhabdomyolysis	Possible
Septicaemia	No fever, total leucocyte count: normal, procalcitonin: normal
Acute pancreatitis	Not an alcoholic, no pain abdomen

- The urine examination of this patient had no erythrocytes yet blood was detected. Myoglobin can give a pattern identical to that caused by haemoglobin, however erythrocytes are absent in myoglobinuria but seen in haematuria.
- We suspected rhabdomyolysis when the raise of serum creatinine was disproportionate to the blood urea.
- We reviewed the history to confirm the body aches and weakness of the thighs.
- Raised CPK and urine myoglobin: supported the evidence of rhabdomyolysis.
- RT-PCR for SARS-COV-2 infection - turned positive and CT scan of the chest suggested CO-RADS-5.

Discussion:

- The rhabdomyolysis could be the cause of hypercatabolic acute renal failure.
- The manifestations of the massive necrosis of the muscle are limb weakness, myalgia, swelling and commonly gross pigmenturia without hematuria.
- The common causes of the rhabdomyolysis fall in the categories of the trauma, exertion, muscle hypoxia, genetic defects, infections, body temperature changes, metabolic and electrolyte disorders, drugs and toxins and idiopathic.
- In our case, the patient had three possibilities – infections, drugs and toxins and idiopathic.

- Indeed, the present patient had been on a statin.
- The US Food and Drug Administration Adverse Event Reporting System database reports rates of statin-induced rhabdomyolysis of 0.3–13.5 cases per 1,000,000 statin prescriptions.
- The risk factors for the statin-induced rhabdomyolysis in our patient were – advanced age and diabetes mellitus.
- It is, therefore, a rare adverse effect of statin.
- With the clinical symptoms and chest radiograph findings An index of suspicion points towards severe acute respiratory syndrome (SARS)-COV-2 infection/COVID-19 disease.
- Creatine phosphokinase, urine myoglobin, serum myoglobin, RT-PCR for SARS-COV-2 infection, CT of the chest confirmed the diagnosis.

Conclusion:

- Rhabdomyolysis is one of the potential complication that can manifest in COVID-19 patients.
- It is important to monitor CK levels in COVID-19 patients, especially when they complain of muscle pain and weakness.
- Rapid clinical recognition and positive hydration treatment of COVID-19–associated rhabdomyolysis can reduce the risk for serious outcomes.