COVID-19 vaccine induced rhabdomyolysis in a 53 year old female

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Background

- **COVID-19 infection** cases linked to causing COVID -19 induced rhabdomyolysis with very few cases linked to **COVID-19 vaccine** to rhabdomyolysis.
- **Rhabdomyolysis** is a breakdown of skeletal muscles, causes release of intracellular components with release of enzymes, like creatinine kinase. In turn. severe electrolyte abnormalities and acute renal failure, or death can occur (.). Etiologies have been studied extensively.
- Rhabdomyolysis secondary to vaccines, like influenza vaccine(). These cases presented similar histopathological features(.) on biopsy to our patient: small number of lymphocytes, almost exclusively associated with necrotic and regenerating myofibers, minimal inflammation, HLA Class I immunohistochemistry: negative, supporting non-immune (non-inflammatory) myopathy.
- **Non-inflammatory myofiber necrosis** (or regeneration) has many potential causes, including, but not limited to: toxin (e.g. statin induced), electrolyte abnormalities, errors of metabolism, fever, flu infection, **post-infectious**, ischemic or dystrophic.

Purpose

- This case presentation addresses an adverse effect in a 53-year-old female who develops rhabdomyolysis after receiving the COVID-19 vaccine. The most common etiologies pertaining to rhabdomyolysis were ruled out leaving with the most likely diagnosis of COVID-19 vaccine induced rhabdomyolysis

Case Presentation

53 year-old female presented with **3 weeks of progressive weakness**. Medical history of Diabetes Mellitus and Dyslipidemia. Medications included Atorvastatin 40 mg (decreased from 80 mg 1 month prior), Metformin 500 mg without known allergies.

Reported bilateral proximal upper/lower extremities pain, described as muscle soreness from a work out session. Also, endorsed Neck and lower back pain attributing to sedentary job.

Patient reported 2nd dose of Pfizer-BioNTech COVID-19 Vaccine, 7 weeks prior to presentation, with nausea and vomiting 2 weeks after receiving the vaccination.

Patient's **statin medication was discontinued on day 1** of admission. Patient also received aggressive IV fluid hydration for approx. 41 days, with kidney function remaining stable. **Prednisone** was given in days 1-42 and given IVIG on day 37-42, due to suspicion of autoimmune process. Patient symptomatically improved and discharged on day 43.

Results

EXAMINATION:
Abnormal labs included creatine kinase more than 7800 initially and was trended during the hospitalization (Table 1)

CSF Analysis was obtained which showed colorless fluid with results inconsistent with Guillain-Barre syndrome.

Imaging:
Chest X-Ray: which demonstrated no abnormalities.

MRI without contrast of cervical spine/lumbar spine/extremities: demonstrated mild degenerative changes in the disc throughout the region with mild diffuse annular disc bulging and spondylosis at C5-6, and C6-7. Lumbar region findings included mild degenerative changes in disc, otherwise, no acute abnormality. Extremities were noted to have no significant abnormality.

Right Thigh Muscle Biopsy
Right thigh skeletal muscle biopsy consistent with necrotizing myopathy, without specific diagnostic features without chronic myopathic disorder. HLA class 1 immunohistochemistry was negative.

CSF	RESULTS
CSF Volume	3.5 cc
CSF Appearance	Clear
CSF Color	Colorless
CSF WBC	0 mm^3
CSF RBC	1 mm^3
CSF Protein	24.7 mg/dL
CSF Glucose	66 mg/dL

LABS	RESULTS
WBC	10.4 K/mm3
TSH	7.18 uUI/mL
T4	1.15 ng/dL
AST/ALT	241/384 U/L
T Bilirubin	1.2 mg/dL
CPK MB	292.3 ng/mL
Hemoglobin A1c	6.3%
Rheumatoid Factor	<10.0 IU/mL
c-ANCA	<1:20
p-ANCA	<1:20
Atypical p-ANCA	<1:20
JO-1	<0.2 AI
SS-a Antibody	<0.2
SS-B Antibody	<0.2
Ma Antibody	0.2
Anti-ds DNA IgG	<1
Anti-smooth Muscle Antibody	14 (0-19)
Mycoplasma IgM	<770 U/mL

Table 1: Trend of CPK throughout hospitalization

Day	CPK(U/L)
1-7	>7800
8	5960
9	5721
10	4155
11	4525
12	4122
13	3979
14	3479
15	3651
16	3933
17	3143
18	2960
19	2847
20	3189
21	3094
22	3604
23	3690
24	3855
25	4444
26	4242
27	4147
28	4261
29	4001
30	3874
31	3632
32	3836
33	4240
34	3897
35	3928
36	4234
37	3672
38	3174
39	3116
40	3661
41	3189
42	3714

Discussion

- **Rhabdomyolysis** typically presentation of myalgia, generalized weakness, darkened red to brown urine, with CPK value five times the upper limit of normal. In the setting of COVID-19, we first have to rule out other possible causes.
- **Traumatic** being crushed or direct injury. Generalized weakness and myalgia began prior to patient working out, therefore trauma related rhabdomyolysis was ruled out.
- **Nontraumatic etiologies** include seizures, overexertion, intoxication (substance use, carbon monoxide), ischemia, infection, drug reactions (neuroleptics, statins), inflammatory myopathies (poly/dermatomyositis), and genetic/metabolic disorders. Due to our patient's history, limited differential to infection and adverse drug reactions.
- Atorvastatin 80 mg for 3 years was decreased to 40mg, 1 month prior. Statin induced myopathy was ruled out with Statins discontinued on day one of hospitalization.
- Of note, statin-associated muscle symptoms clinical index (SAMS-CI) scoring cannot be used in this case, as the patient was not re-challenged.
- Furthermore, biopsy results in statin induced myopathy would be consistent with non-specific finding that includes necrosis, degeneration, regeneration of fibers and phagocytic infiltration (4).

Conclusion

- Though rare and requires more study, vaccine induced rhabdomyolysis should be on the differential when patients present with neuromuscular complaints. Proper surveillance should therefore include questions regarding recent vaccines as well as recent infections when eliciting a history of present illness.

References

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