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Rehabilitation of a Patient with Diabetic Myonecrosis: A Case Report

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ABSTRACT

Setting: Inpatient rehabilitation unit at a university hospital

Patient: 37-year-old male with diabetic myonecrosis.

Case Description: The patient had a long-standing history of uncontrolled diabetes mellitus with multiple comorbidities, including end-stage renal disease on dialysis and diabetic myonecrosis of the left biceps femoris diagnosed by biopsy and magnetic resonance imaging (MRI.) On this admission, he presented with right leg pain and swelling, found to be a reoccurrence of diabetic myonecrosis in the vastus lateralis, medialis, and intermedius, diagnosed by MRI only. Prior to admission, he lived alone in a wheelchair inaccessible duplex and required minimal assistance with housekeeping.

Assessment/Results: Upon initial consultation, he ambulated 25-50 feet at a minimum assistance level with a single point cane. As he was unsafe to return home alone, he was transferred to inpatient rehabilitation after a two week acute hospitalization. During his rehabilitation stay, he increasingly was unable to tolerate standing secondary to pain, and at discharge, he was non-ambulatory despite many attempts at pain control and assistive devices for ambulation. His right leg swelling persisted throughout his stay. After five weeks on our unit, he was discharged to a long-term care facility at a wheelchair independent level. One year later he still was not ambulating, and still lived in the long-term care facility.

Discussion: Diabetic myonecrosis is an uncommon complication of both insulin-dependent and non-insulin dependent diabetics. Symptoms usually resolve on their own with rest and analgesics within weeks to several months. There are reports of physical therapy prolonging the recovery period and exacerbating symptoms, which may have happened with our patient.

Conclusions: For patients with diabetic myonecrosis who are unsafe to return home, arrangements should be made for short term placement with 24 hour assistance during the recuperation period.

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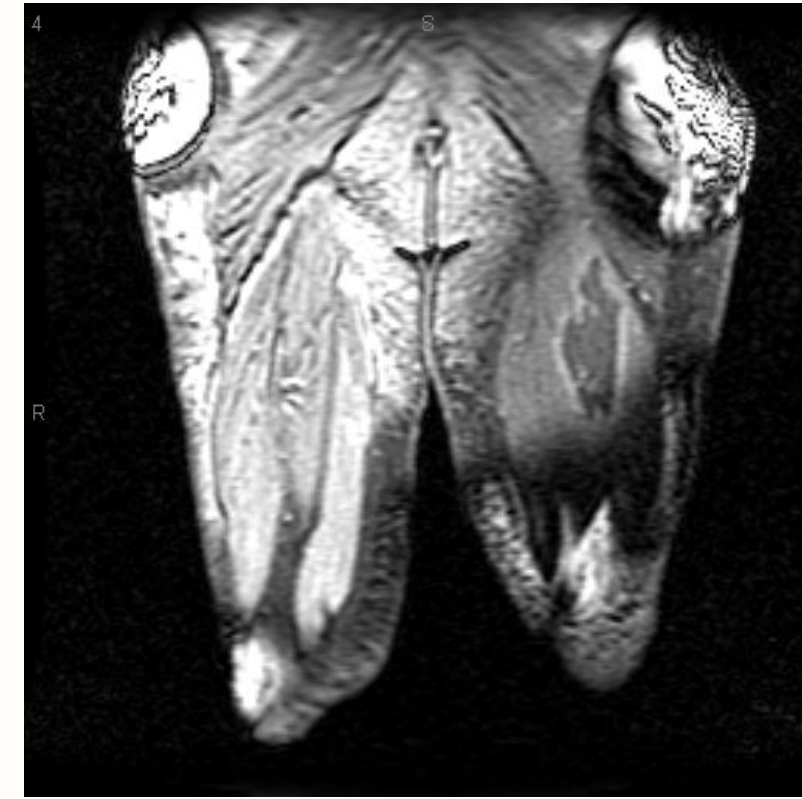


Figure 1: T1 weighted post contrast magnetic resonance image from late September showing a focal area of non enhancing necrosis in the left biceps femoris.



Figure 2: T1 weighted post contrast magnetic resonance image from early December of the same year showing a focal area of nonenhancing necrosis of the right vastus lateralis. Other images from the study show right vastus medialis and intermedius involvement. Resolution of the previous left biceps femoris necrosis was also noted in this study.

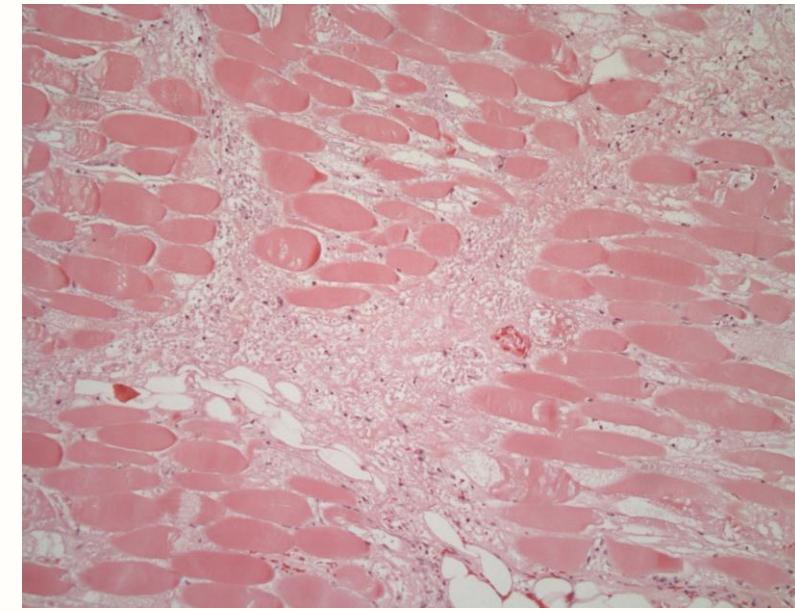


Figure 3: Photomicrograph of core needle biopsy taken from the left biceps femoris muscle in early October showing necrotic skeletal muscle.

Day #	Assist level		Device		Distance ambulated	
	#1	#2	#1	#2	#1	#2
	Walk		Walk		Walk	
1-6						
7	Min A		SPC		25'	25'
8-11					No therapy	
12	CG A	Min A	SPC		50'	50'
13	CG A	Min A	SPC		60'	60'
14	CG A		RW		75'	75'
15-17					No therapy, waiting for acute rehab bed	
18	S	S	SPC	None	100'	100'
19					No therapy / Christmas	
20					Declined therapy; fatigue after hemodialysis	
21	Min A		RW		20'	20'
22					Weekend	
23	CS		RW		75'	
24	CG A		RW		110'	
25	CG A		RW		150'	75' x 2
26					No therapy / New Year's Day	
27					No therapy / medical procedure	
28	CG A		RW		150' x 2	150' x 2
29					Weekend	
30	S		RW		150'	
31	S		RW		75'	75'
32	Min A		RW		50'	100'
33	Min A		RW		120'	100'
34	Min A	Mod A	RW	2 SPC	120'	25'
35	Min A		RW		75', 80'	50' x 2
36					Weekend	
37	Min A		RW		15'	25'
38					Declined; pain	
39					Held because of concern for right lower limb DVT	
40-42					Declined; pain	
43					Weekend	
44-46					Declined; pain	
47	Mod A		RW		6 steps	
48					Declined; pain	
49					Weekend	
50-55					Declined; pain	
56					Weekend	
57					Declined; pain	
58					Discharged at a wheelchair independent level Standing 30 sec with min A limited by pain	

Table 1: Ambulation status from acute hospital admission to rehabilitation discharge. Abbreviations: Min A-minimum assistance; SPC-single point cane; CG A-contact guard assist; RW-rolling walker; CS-close supervision; S-supervision; Mod A-moderate assistance; DVT-deep venous thrombosis.

DISCUSSION

Diabetic myonecrosis is a rare end-organ complication of diabetes. As of 2002, 115 patients with 166 occurrences of diabetic myonecrosis have been reported in the literature. It presents clinically with an acute onset of focal, painful swelling of the affected muscle. The gold standard for diagnosis is histopathology, however, magnetic resonance imaging is also useful. Diabetic myonecrosis most often affects the thigh, with the quadriceps most often involved. It has a high frequency of reoccurrence in the contralateral limb, as with our patient. The pathophysiology is unclear, with the two most common hypotheses being that the necrosis is due to a vascular process such as diabetic microangiopathy, or as a result of a hypercoagulable state.

Most patients recover within 2-17 weeks with symptom management and ad lib activity alone. However, there is little to no discussion in the literature of the functional status of these patients or what their activity level is during recovery. There are reports of physical therapy exacerbating pain and swelling. However, this appears to be related to activity causing hemorrhage after excision biopsy. Patients who have had core needle biopsy have lower risk of hemorrhage.

Our patient made gains while in the acute hospital, where he had physical therapy in the gym four times during the 2 week hospitalization. He did not have therapy for several days before his acute rehabilitation admission, but at our initial evaluation, he was able to walk farther and with less assistance than he needed in acute care. Therapy consisted of occupational and physical therapy and involved quadriceps strengthening along with the regular acute rehabilitation program. He did not make consistent gains in ambulation related to fluctuating leg pain levels, though he seemed to walk farther after a period of rest. By three weeks into his rehabilitation stay, his right lower limb swelling and pain increased to where it prevented him from ambulating despite aggressive pain management efforts.

It is possible that the increasing demands placed on his muscles as the distances walked increased and the amount of assistance given lessened contributed to his increase in symptoms. He also developed hamstring and ankle plantar flexor contractures despite stretching during the rehabilitation admission, the presence of which may have resulted in increased eccentric contraction of the necrosed muscles during ambulation. It is known that repeated strenuous eccentric muscle contractions can produce muscle damage in healthy individuals.

Follow up magnetic resonance imaging study of the lower limbs was not obtained, however both deep venous thrombosis and large vessel peripheral vascular disease were ruled out via doppler ultrasound and an aortogram. The aortogram did show distal small vessel disease. It remains unclear if his symptom increase was due to an exacerbation of the myonecrosis in the current location, reoccurrence of diabetic myonecrosis in another location, or another disease process altogether.

CONCLUSION

- For patients with diabetic myonecrosis who ambulate, but who are unsafe to return home, arrangements should be made for short term placement with 24 hour assistance during the recuperation period.
- Measures should be taken to protect the necrosed muscles, including continuing protected ambulation with an assistive device that allows both upper limbs to support the body, and preservation of range of motion.
- Further study is required to determine if activity exacerbates diabetic myonecrosis.