

## Isolated Anterior Compartment Syndrome Caused by Chronic Alcohol-Induced Rhabdomyolysis

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**A fifty-three-year-old Indian male patient developed isolated compartment syndrome of the leg caused by chronic alcohol induced rhabdomyolysis. The patient was admitted with altered level of consciousness and was intubated. Exploratory fasciotomy was performed which confirmed the diagnosis of isolated anterior compartment. His postoperative period was uneventful.**

*Bahrain Med Bull 2017; 39(1):54 - 56*

The human limb muscles are divided into fascial compartments by strong fibrous connective tissue called fascial membranes. In the lower limbs, there are four main fascial compartments, each compartment contains its group of muscles and usually have nerve and blood supplies. The four compartments are: anterior, lateral, posterior and superficial posterior. Compartment syndrome develops when there is an increased pressure inside compartments which compromises circulation and function of muscles within that particular compartment<sup>1</sup>.

Historical synonyms for acute compartment syndrome are anterior tibial pain, calf hypertension, rhabdomyolysis and March gangrene<sup>2</sup>.

Any patient who develops a condition which causes a rise in the intra-compartmental pressure by either decreasing the capacity of a muscle compartment or increasing the volume of fluid contained has a risk of developing acute compartment syndrome (ACS). ACS in many instances develops after a significant trauma, involving long bone fractures. In other minor instances, it may also develop from non-traumatic causes and minor traumas. The leg and the forearm are considered to be the most common sites for developing ACS; however, it is also reported to develop in the foot, thigh and gluteal regions.

Non-traumatic causes still play a role in ACS, but is less frequently seen, such as thrombosis, bleeding disorders, ischemia-reperfusion injury, vascular disease, nephrotic syndrome, extravasation of IV fluids, prolonged limb compression due to drug/alcohol intoxication<sup>3</sup>.

The aim of this report is to present a case of non-traumatic isolated compartment syndrome due to alcohol intoxication. Early recognition and treatment can prevent morbidity and mortality of those patients.

### THE CASE

A fifty-three-year-old Indian male patient was known to have Diabetes mellitus, Hypertension, Hyperlipidemia and chronic alcohol consumption (daily consumption as history given by relatives). The patient was brought to Emergency Department in June 2015 with a history of convulsions and altered level of consciousness.

The patient's Glasgow Coma Scale was 6/15; hence, he was intubated to protect the airway. CT brain revealed a hypodense area in the left occipital region and was suspected to have a cerebral stroke.

The patient was admitted to Intensive Care Unit (ICU) and started on Anti-seizure medication, prophylactic antibiotic third generation cephalosporin and low molecular weight Heparin. Laboratory results showed deranged liver functions and his Creatine Kinase, CK-MB was very high; therefore, a tentative diagnosis of alcohol-induced hepatitis and rhabdomyolysis were contemplated. However, neurologically patient was showing improvement, see table 1.

On the second day, the patient was extubated, but he was noticed to have a swelling in the anterolateral aspect of the right leg and mild discoloration of the anterior aspect of the upper third region of the leg.

Examination of the patient revealed swelling of anterolateral aspect of the leg and very mild tenderness with very weak dorsiflexion of the foot, also inability to dorsiflex the great toe and associated tenderness with passive dorsiflexion of the foot, see figure 1.

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**Table 1: Latest Biochemistry Results History**

Test	Test Date	25/06/15	25/06/15	25/06/15	Test Unit
	Test Time	18:39:22	9:09:52	4:44:05	
URIC ACID		423.000	882	487.000	umol/L
CREATININE		103.000	99	106.000	umol/L
eGFR MDRD		60.000	60	60.000	ml/mi/1.7m
CALCIUM		1.560	1.67	2.140	mmol/L
INORGANIC PHOSPHATE		0.540	0.94	2.010	mmol/L
MAGNESIUM		0.780	1.02	0.990	mmol/L
TOTAL PROTEIN		48.800	58.2	68.000	G/L
ALBUMIN		27.200	33.5	43.400	G/L
GLOBULIN		22.000	25	24.600	G/L
BILIRUBIN TOTAL		26.400	24.8	31.600	umol/L
BILIRUBIN DIRECT		10.900	9.8	10.100	umol/L
BILIRUBIN INDIRECT		16.000	15	21.500	umol/L
ALKALINE PHOSPHATASE (ALP)		70.000	90	118.000	IU/L
ALKALINE AMINOTRANSFERASE (ALT)		111.900	111.3	127.100	IU/L
G-GLUTAMYLTRANSFERASE (GGT)		70.000	89	104.000	IU/L
ASPARATE AMINOTRANSFERASE (AST)		397.300	315.8	339.500	IU/L
LACT. DEHYDOGENASE (LDH)		692.000	769	807.000	U/L
CREATINE KINASE(CK)		#####	#####	#####	IU/L
CREATINE KINASE (CK-MB)		122.000	121.7	177.300	IU/L
TROPONIN I				0.210	ug/L

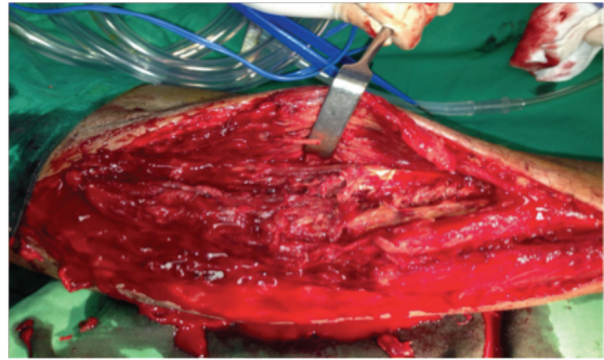


**Figure 1: Pre-Surgical Condition of the Compartment Syndrome of Right Leg with Weakness of Dorsiflexion of Ankle and Great Toe (Foot Almost Dropped)**

Exploratory fasciotomy was performed (Alcohol-induced rhabdomyolysis causing acute compartment syndrome), see figure A and B.



**Figure 2A: Myo-Necrosis of Anterior Compartment Muscles of the Right Leg Involving Tibialis Anterior and Extensor Hallucis Longus Muscle**



**Figure 2B: Intra-Operative Picture Following Debridement of Necrotic Tissue of Anterior Compartment Muscle**

The muscles of the anterior compartment of the leg (Tibialis anterior and Extensor hallucis longus) showed myonecrosis and areas poor contractility; other compartments of the leg were normal and muscles were healthy.

The general condition of the patient improved after fasciotomy and his CK, CK-MB reduced. The patient was taken to the operation room for a fasciotomy wound second look, debridement and vacuum assisted closure (VAC), and delayed primary closure of leg wound, see figure 3. Postoperative period was uneventful, and the wound was healing satisfactorily without complication. Planned for Tibialis posterior tendon transfer for foot drop at a later date.



**Figure 3: Post-Operative Picture after Delayed Primary Closure of Fasciotomy Wound of Anterior Compartment**

## DISCUSSION

Isolated Compartment Syndrome caused by rhabdomyolysis following a heavy binge of alcohol (Acute alcoholic rhabdomyolysis) develops in the leg similar to our case. The patient in our report was a known case of chronic alcoholism<sup>4</sup>.

Isolated compartment syndrome was reported after a bimalleolar-equivalent ankle fracture<sup>5</sup>. Ankle fractures resulting in compartment syndrome with involvement of multiple compartments were reported. Our case report is non-traumatic cause of isolated compartment syndrome caused by chronic alcoholic rhabdomyolysis.

It is not clear why the anterior compartment is involved and other compartments were spared, perhaps a focal compartment started then followed up by entire compartment progression. In our case, there was no facility to perform bedside measurement of compartmental pressure, and we were depended only on clinical examination.

## CONCLUSION

**A Focal or Isolated compartment syndrome is difficult to diagnose specially with those patients who are presenting with other distracting symptoms of rhabdomyolysis. Therefore, a careful clinical examination of musculo-skeletal system of those patients is always important to prevent morbidity and mortality.**

**Author Contribution:** All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

**Potential Conflicts of Interest:** None.

**Competing Interest:** None.

**Sponsorship:** None.

**Acceptance Date:** 16 February 2017.

**Ethical Approval:** Approved by the Department of Surgery, Bahrain Defense Force Hospital-Royal Medical Services, Bahrain.

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