

Project: Ghana Emergency Medicine Collaborative

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Compartment Syndrome

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Case Presentation

- 23yo deaf male with Left lower extremity injury after motocross event
- Questions?



History that's Important

- Mechanism of Injury
- Associated Complaints
- Associated Injury
- P Q R S T



Physical Findings ?

- ABC's
 - Vital Signs
- Associated Injury
- Local Examination
- Joint Above & Below
- Neurovascular Status



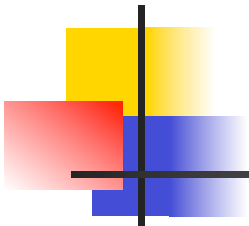
What's the Differential Dx?

- Life threatening
- Most Common
- Bizzare Stuff
- Things to Impress your Attending



What YOUR Assessment & Plan ?

1. Anti-inflammatory medications ?
2. Narcotics ?
3. Imaging ?
4. Consultation ?
5. Ask the Attending ?



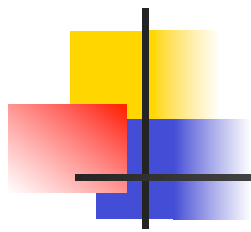
- Your Interpretation
- Want another view ?



Lower Extremity
Tibia/Fibula AP
Series #1 - *mm*

w/l: 4093/2048





- Diagnosis ?

- YEP...ITS NORMAL



Lower Extremity
Tibia/Fibula LAT
Series #3 - *mm*

w/l: 4096/2048



What's the ED Disposition ?

1. Admission
2. Observation
3. Discharge
4. Consultation for Specific Procedure

3. DISCHARGE



Guess What.....

- The patient came back with.....
 - Increasing PAIN, especially with Passive range of motion
 - Paresthesia
 - Pallor
 - Pulselessness
 - Paralysis

- And had COMPARTMENT SYNDROME



Objectives

- Define Compartment Syndrome
- Understand the Pathophysiology
- Consider Anatomic Factors
- Identify Signs & Symptoms
- Define Diagnostic & Treatment Options



Compartment Syndrome

- TRUE EMERGENCY
- Increase Pressure in Closed space (compartments)
- Most Common with Leg Injury/Fracture
- Can occur with thigh, forearm, arm, hand, or foot injury



Mechanism Associated

- Crush Injury
- Fractures (closed)
- Burns
- Prolonged Procedures/Pressure
- Spontaneous Hemorrhage
- External Pressure (cast, MAST)
- Overuse Syndromes



Pathophysiology

- Increased Pressure in a CLOSED compartment
 - Increased Compartment Contents
 - Decreased Compartment Space/volume
 - Increased External Pressure



Cellular Physiology

- Compartment Pressure $>$ Diastolic
 - Venous vascular congestion
 - Tissue Ischemia
 - Release of Histamine increasing membrane permeability
 - Increasing Compartment Pressure
- Arterial Vasospasm plays a minimal Role



Anatomic Considerations

- CAN affect ANY
CLOSED COMPARTMENT
- **Leg**
 - Anterior – MOST FREQUENT
 - Lateral
 - Deep Posterior
 - Superficial Posterior



Other Extremities

- Thigh

- Quadriceps

- Hand & Foot

- Interosseous

- Forearm

- Dorsal
- Volar

- Arm

- Biceps
- Deltoid



CLASSIC "5 P's"

- Pain
 - Paralysis
 - Paresthesia
 - Pallor
 - Pulselessness
- Said together, but if they're all there
...**the 6th P.....PATIENT is in trouble**



Clinical Presentation

- Pain
 - Out of Proportion to exam
 - Deep, burning,
 - Unrelenting

- Frequent Revisit for MORE PAIN MEDS
 - THEY AIN'T DRUG SEEKERS !!!!



Physical Exam

- Pain with PASSIVE stretching
- Pain with Active Flexing
- Paralysis (secondary to pain)

- Tense or “full” compartment
 - Be Careful....some you can't palpate



The other 3 P's

- Paresthesia – earlier sign
- PALLOR
- Pulselessness
 - LATE, OMINOUS SIGNS



Diagnosis

- High Index of Suspicion
- GOOD H&P
- Insure neurovascularity Intact
- Consider extremity XR
- Early Orthopedic Consultation
- Compartment Pressure Measurement
 - >30 mmHg



Pressure Measurement

- **Stryker Machine** (needle with transducer)
 - Baseline machine to atmosphere pressure
 - Should Read ZERO
 - Prep Area
 - 18 G Needle into Compartment
 - Sometime hard with SMALL compartment
 - Inject small amount of Saline
 - Measure Plateau Pressure At Least 2 times



Tissue Pressure Gradient

- 0 mmHg NORMAL
 - 10-30 mmHg Variable
 - 30 mmHg Microcirculation Impaired
-
- Within 30 mmHg of diastolic BP
 - Tissue Ischemia



Complications

- Tissue Necrosis & Loss
 - Nerve damage
 - Contractures
 - Amputation
 - Cosmetic Deficit
- Rhabdomyolysis---Renal Failure
- Hyperkalemia
- Myoglobinuria



Fasciotomy

- Definitive Treatment
 - OPEN the Closed Compartment

- Indication For Fasciotomy
 - Pressures >30
 - Pressures within 30mmHg of Mean Arterial Pressure



Back to the Patient

- Had Clinical findings of Compartment syndrome
 - LATE Findings
 - Flown to Tertiary Care Medical Center
 - Fasciotomy
 - Prolonged Course



The OUTCOME

- He still has his Leg
- BUT with a
Significant Cosmetic
& Functional Defect



QUESTIONS ?

THANK YOU !!!!!