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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?
- Diagnosis?

- YEP...ITS NORMAL
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 neurovasculartiy 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 !!!!!