New Insights into the management of Acute Compartment Syndrome: A retrospective case series review

Dr Ehab.F. Girgis

&

Dr Daniel S.Z.M. Boctor

TAKE HOME MESSAGES

1. THINK ABOUT SOFT TISSUE INJURY

2. COMPARTMENT SYNDROME CAN BE SPONTANEOUS

3. COMPARTMENT SYNDROME CAN BE SPONTANEOUS & UPPER ARM

4. COMPARTMENT SYNDROME AND OPERATIVE POSITIONING!!!

5. ANALGESIA AND COMPARTMENT SYNDROME!!

SO DON'T MISS THE DIAGNOSIS!!

INCLUSION CRITERIA

- Retrospective review of clinical and radiological records of 41 patients diagnosed with ACS.

- 1999 to 2013 done under the care of orthopaedic team

EXCLUSION CRITERIA:

1- Patients diagnosed with chronic compartment syndrome.
2- Patients with post-ischaemic acute compartment syndrome (ACS) done by the vascular surgeons.
3- Patients with ACS who had fasciotomy carried out by the plastics team.

CAUSES OF ACUTE COMPARTMENT SYNDROME:

1- Fractures (25 patients)

2- Soft tissue injury: (14 patients)
   A) Crush Injury (10 patients).
   B) Crush Syndrome (6 limbs in 4 patients)

3- Spontaneous (2 patients)

CRUSH INJURIES

"Acute compartment syndrome in the absence of fracture"
Hope M.J . and M.M.
Journal of Orthopaedic Trauma, 2004.

Patients with ACS in the absence of fracture were:

- Older
- More co-morbidities
- Significantly greater mean delay to fasciotomy of 12.4 hours compared with those with fractures.
- At fasciotomy, they had 20% muscle necrosis compared with 8%.

TAKE HOME MESSAGE 1:

THINK ABOUT SOFT TISSUE INJURY

CASE PRESENTATION NUMBER 1

- 20 year old female with IDDM
- Sudden pain in the calf whilst walking
- Attended ED and given analgesia for muscular pain
- 4 days later: Pain severe, throbbing, intermittent below the knee and became throbbing
- Area of redness plus tenderness over the lateral aspect of the lower leg: ?cellulitis or DVT

- Next morning numbness in the foot: Fasciotomy
- Findings: dead muscle throughout the lateral compartment - Debrided
- Loss of eversion (peroneal muscles)

TAKE HOME MESSAGE 2:

COMPARTMENT SYNDROME CAN BE SPONTANEOUS

Always consider spontaneous ACS in your differential diagnosis of rapid onset of painful swollen limb without history of injury. Doctors usually think about infection or DVT.

CASE PRESENTATION NUMBER 2

- 70 year old female
- In-patient under the medical team for COPD
- On Clopidogrel and prophylactic low dose of anti-coagulant
- Developed swelling over the antero-medial aspect of upper arm
- Medical doctor on-call at night suspected axillary DVT: Prescribed therapuetic dose of anti-coagulant

- Increased size and pain with numbness in the left hand

- O/E:

- Tender swollen biceps
- Radial pulse is palpable
- Median nerve symptoms

- CT scan: haematoma left biceps and distal part of deltoid.

- Urgent decompression:
  On release of biceps muscle sheath 700ml of blood



Body part affected

Lower leg	24	
Forearm	13	
Thigh	3	(one plus gluteal)
Foot	2	
Upper arm	1	

TAKE HOME MESSAGE 3:

COMPARTMENT SYNDROME CAN BE SPONTANEOUS & UPPER ARM

- Only the second reported case of spontaneous upper arm compartment syndrome

- The first reported case in a patient who was not on warfarin.

Spontaneous Compartment Syndrome of the Upper Arm in a Patient Receiving Anticoagulation Therapy"
David C. Zimmerman, Tushar Kapoor, Mikhail Elfond, Paul Scott
(JOURNAL OF EMERGENCY MEDICINE 2013)

CASE PRESENTATION 3

- 42 year old male, Overweight 113Kg
- Elective operation for anterior resection of Cancer rectum
- Legs were elevated in Lloyd-Davis leg holders.
- Prolonged operation for 6 hours as tumour was adherent
- Post-operative epidural analgesia infusion (Bupivicaine 0.1% + 2mg/ml Fentanyl)

- Thirty six hours later:

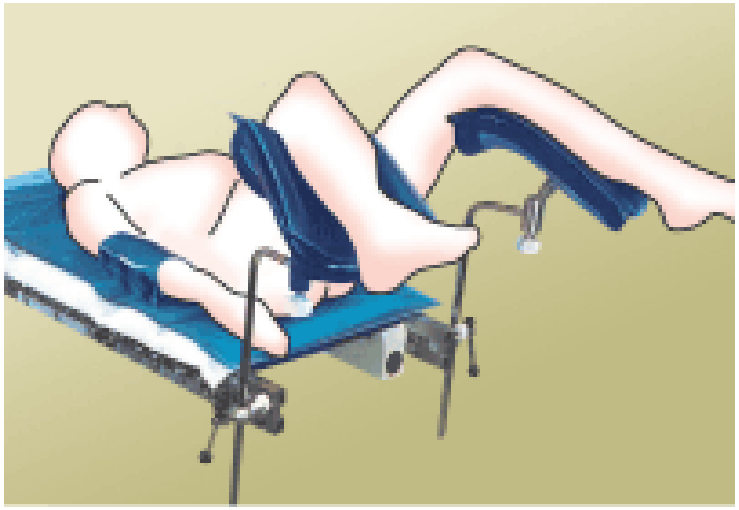
- Patient developed severe pain with tense swollen lower legs
- Pain on dorsiflexion of the ankle
- Decreased sensation in all the nerves distribution except the saphenous nerve.

- Bilateral fasciotomy 4 hours later

- FINDINGS: All 4 compartments bilaterally were tense with muscle escape but healthy muscles.

TAKE HOME MESSAGE 4:

COMPARTMENT SYNDROME AND OPERATIVE POSITIONING!!!



Crutch Stirrup Pad

Courtesy of normadnd.com

CASE PRESENTATION 4

- 19yo male motorbike RTA: Femoral fracture
- Difficult IM nail – long operation
- Patient on traction table
- Post-op: Vague and fluctuating Symptoms:
  - Numbness in leg, lower leg & foot
  - Increasing pain (no longer controlled by analgesia) (7 doses x 20mg Oramorph)

"All pain killers not working, doctor called"

- Later lower leg tense – taken for fasciotomy

- Surgery:

1st Look: Some debridement anterior compartment

2nd look: Most of anterior compartment dead

- Foot drop

  Required tendon transfer

  NCS: Peronal nerve – ischaemic axonopathy

- Follow up at 1 year: Same numbness present

TAKE HOME MESSAGE 4:

COMPARTMENT SYNDROME AND OPERATIVE POSITIONING!!!

ACS can develop in a compartment distal to the compartments with the fractured bone

TAKE HOME MESSAGE 5:

ANALGESIA AND COMPARTMENT SYNDROME!!

OUR STUDY

- 1 patient: Diagnosis or masking of the pain
- 1 patient had post-operative epidural analgesia infusion which did not mask his ACS symptoms.

LITERATURE

Postal survey to anaesthetists: They had seen cases of ACS being masked by regional anaesthesia.

"The use of regional anaesthesia in patients at risk of acute compartment syndrome" Davis et al. Injury. 2006

Vs

Systematic review of 32 patients, symptoms and signs of ACS were present in the presence of epidural analgesia.

Mar G.J. et al. British Journal of Anaesthesia. 2009

TAKE HOME MESSAGES

1. THINK ABOUT SOFT TISSUE INJURY

2. COMPARTMENT SYNDROME CAN BE SPONTANEOUS

3. COMPARTMENT SYNDROME CAN BE SPONTANEOUS & UPPER ARM

4. COMPARTMENT SYNDROME AND OPERATIVE POSITIONING!!!

5. ANALGESIA AND COMPARTMENT SYNDROME!!

SO DON'T MISS THE DIAGNOSIS!!