

International E-Conference on

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## Role of Nurses in Effective Management of Compartment Syndrome

**Acute Compartment syndrome (ACS)** - is a painful condition caused by critical increase in interstitial pressure (intra compartmental pressure – ICP) within a closed osteofascial compartment that diminishes regional circulation. It is a surgical emergency that requires immediate intervention. (Gumbs 2019) The spaces most prone to developing ACS are the lower limbs, arms, and abdomen (American Academy of Orthopedic Surgeons-2018). It commonly develops after severe injury such as fractures or crush injury, but it can also occur after a relatively minor injury or it may be iatrogenic. (Alessio.G.V et al 2015) and anabolic steroid use (American Academy of Orthopedic Surgeons-2018). The incidence of ACS is estimated to be 7.3/1000,000 in malea & 0.7 /100,000 in females (Torlincasi et al 2019)

### Risk factors for Acute compartment syndrome:

**Site of fracture** - Acute compartment syndrome from any cause occurs most commonly in the lower leg and most often follows a fracture of the tibia. McQueen et al. reported in their epidemiological study that 36 % of all compartment syndromes occurred in association with a tibial shaft fracture (Mark E.H & Cyril. M 2015).

**High Energy Trauma**-Many physicians believe that high-energy trauma should be a risk factor for ACS. The soft tissue damage that occurs with a high energy transfer is likely to produce more necrosis, hypoxia, lactic acidosis, capillary leak and more interstitial fluid collection, leading to swelling of the compartment (McBirnie).

**Poly trauma** - Multiple injuries that affect a number of anatomical sites have a profound effect on the homeostasis of the body and the ensuing “chemical storm”, systemic inflammatory response syndrome (SIRS) vs compensatory anti-inflammatory response syndrome (CARS) and endothelial damage is linked with occurrence of ACS. Polytrauma patients are often aggressively resuscitated with high volumes of fluid that can then enter the extravascular space in injured compartments and increases the intra-compartmental pressure (Mc Queen).

**Tight casts & wraps** - Several causative factors have been delineated and may be divided into those that are intrinsic (fracture hematoma, swelling, spontaneous bleeding, and inadvertent extravascular infusion of fluids through an infiltrated intravenous catheter ) or extrinsic (external compression sustained during prolonged crush injuries and tight, circumferential dressings that

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become restrictive as the volume of the compartment increases). (John.T.C et al 2014).

**Traction** Compartment pressures were measured before and after the application of traction or commencement of intramedullary nailing for patients with tibial shaft fracture. Studies show that traction as an aid unnecessarily increases the compartment pressures (Matson & Clawson)

**Age**-ACS occurs more readily in younger patients. This is due to younger people having larger muscle bulk within a tight fascia with very little room to expand before the intra-compartmental pressure rises.(Park .S et al)

**Animal bites & Stings** (Andrea.S 2018)

## **Prevention of acute compartment syndrome:**

- Early recognition and identification of the signs of ACS is crucial for a positive clinical outcome (Algahtani et al 2018)
- Placing a suspicion on all patients with a potential for ACS can prevent the condition.
- People with casts should be cautious if pain and oedema increases despite analgesic, to consult the healthcare provider immediately (my.clevelandclinic.org 2016)
- Donning correct fitting shoes.
- Altering gait patterns in athletes and improving flexibility may reduce ACS in chronic patients
- Surgical consultation for emergent fasciotomy & resuscitation is the modality of management. (Long .B. et al ,2019).

## **Nurses responsibility in caring for a patient with AcuteCompartment syndrome:**

- Nurses being the first level of contact with patients should be vigilant in assessing the susceptible patient & closely monitor for the evolvement of ACS thus enhancing timely and precise intervention.(Lollo& Grabinsky 2016)
- Nurse should be aware of the signs of ACS namely: pain, poikilothermia pallor, pulselessness, paralysis and paresthesia. (Joanne Pechar et al 2017)
- On observing the impending signs of ACS , the nurse should - or instigate the orthopedic surgeon and the team to
- Split plaster casts and release constrictive bandages. It has been shown that either of these actions will reduce compartmental pressure by 50-85 per cent (Phillips, et al).
- Position the limb so that it is not elevated above the level of the heart, because this can significantly increase ischemia.
- Administer colloid or crystalloid fluids; replace blood, and maintain coagulability by replacing platelets and plasma.
- When the pressure in a compartment reaches 30mmHg, prompt decompression of the threatened compartment by open fasciotomy is indicated (Apley and Solomon, et al ; Frederick, ). This involves dividing the fascia along the length of the compartment to

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release the pressure.

- Educating & encouraging patients to report pain, numbness, tingling.
- Ensure periodic neurovascular assessment.

**Conclusion:** Nurses who are involved in direct patient care can help prevent catastrophic deterioration of patient's due to compartment syndrome. Nurses should be competent to attempt early identification, intervention and escalation to the on-call team. Compartment syndrome if recognized late can be fatal, leading to mortality during hospital stay, thus increasing the in-hospital mortality rate- a quality indicator of patient care.

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## Biography:

I am currently working as a Lecturer at Sultan Qaboos University, Sultanate of Oman. I have completed my BSN from Government College Of Nursing & MSN from St.John's National Academy Of Health Sciences. (Rajiv Gandhi University of Health Sciences). I have worked as a bedside registered nurse, technical officer for the WHO funded research projects and coordinator for GFATM (Global Fund To Fight AIDS, TB & Malaria) project. I have clinical teaching experience in the surgical, intensive care and emergency units. My area of interest in research is related to non-pharmacological interventions for pain management