PERCUTANEOUS FASCIOTOMY IN IMPENDING COMPARTMENT SYNDROME-A PROSPECTIVE STUDY OF 25 PATIENT

KEYWORDS
compartment, fasciotomy

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INTRODUCTION
➤ Compartment syndrome is an orthopedic emergency. Approximately 40% of all compartment syndromes occur after fractures of the tibial shaft. The classical clinical features of five Ps (pain, pallor, paralysis, paresthesia, pulselessness) cannot be always relied upon for early diagnosis of a developing acute compartment syndrome. Early diagnosis and treatment are of the utmost importance in order to avoid long-term disability.

➤ Younger patients are more prone to get ACS as compared to older patients with the same nature of trauma.

➤ Males are more prone to develop ACS which is ten times higher than females.

MATERIAL AND METHODS
Type of study: Prospective Study
Study Setting: Govt. T.D. MCH Vandanam

➤ We studied 24 patients with closed fractures and one of wringing injury leg by rope between 2010 and 2016. Only those patients presenting within six hours of injury were included in the study. Informed consent was taken from each individual patient.

➤ There were 17 male and 8 female (fig. 1) patients with the majority in the age group of 15-50 years, the mean age being 35.32 years.

➤ 15 patients with tibial plateau fracture, 8 patients with fracture tibial shaft, 1 with type 2 epiphyseal injury proximal tibia and one with wringing injury by rope.

➤ 19 patient having right side involved, 6 having left side involved.

➤ All the patients were evaluated for the presence of any associated life-threatening emergency and as such resuscitation was carried out for these patients.

➤ A careful physical examination was carried out to look for the clinical features of compartment syndrome including pain out of proportion with firmness of the compartment, pain on passive stretching of the involved muscles as well as paralysis, paresthesia and pulselessness.

➤ Sole criteria for diagnosis was clinical (specificity and negative predictive value were each 97% to 98%).

➤ The limb elevation was provided with the help of Bohler-Braun splint. Serial clinical examinations were done to identify the signs of impending compartment syndrome. Patients were operated within 6 hours of appearance of symptoms.

➤ Antibiotic prophylaxis (intravenous cefuroxime 1.5 g) was administered and it was continued twice daily by intravenous route for 5 days.

➤ Oxygen saturation checked with pulse oximeter.

Patient with tibial plateau fracture (type 6) showing skin blebs as sign of increased compartment pressure. Figure 3
Patient with impending compartment syndrome with normal Doppler findings.

Figure 4

MRI Of patient with impending compartment syndrome showing evidence of increased compartment pressure.

PROCEDURE FOR ANTERIOR COMPARTMENT
2 to 3cm transverse incision lateral to shin
First at 2 inch bellow tibial tuberosity.
Second at 2 inch above ankle joint
One or two incision in between.

Figure 5
Picture showing incision for anterior compartment release.

Retract skin, identify and palpate white tense deep fascia

Figure 6
Arrow showing white tense deep fascia. (fig.6)
Make a transverse cut in the deep fascia.

Figure 7
Picture showing transverse cut in the deep fascia. (fig.7)

Figure 8
Pass halfopen scissor with edge of fascia between blades and advance

Figure 9
Arrow showing tip of scissor passed from one incision to other. (fig.9) to next incision.
Cut the fascia till scissor comes out through second incision. The next incision repeat same procedure till reach up to the ankle joint.

**POSTERIOR COMPARTMENT**

A 2cm Incision at One inch behind posterior margin of tibia

Same technique to release superficial compartment

With fingers passing through the posterior border of tibia reach the deep compartment. If tense we can incise that also.

Soleus insertion should be released to adequately decompress the posterior compartment

Surgeons should be careful about superficial peroneal-nerve which comes across around 10-12 cm proximal to the lateral malleolus while exiting from the fascia.

**LATERAL COMPARTMENT**

➤ 2 cm 3to 4 incision over fibula 5cm below head of fibula and 5cm above the ankle joint.

➤ Same technique followed to incise fascia.

➤ Skin sutured with subcuticular (fig.10) method for best cosmetic result.

➤ Oxygen saturation measured with pulse oximeter.

➤ Limb elevated over Bohler-Braun splint.

**POST-OP PROTOCOL**

➤ Patient evaluated for compartment syndrome after 12 hrs. of fasciotomy with stretch-pain, pulse, oxygen, saturation, circumference of calf compared to normal fellow limb.

➤ 10 days post op patient treated with definitive fixation for fracture.

➤ Static quadriceps exercises and non-weight bearing knee mobilization were started as soon as patient became pain-free.

**RESULTS**

➤ In our study it’s found that there is decrease in swelling of average of 40% in circumference, with obvious relaxation of compartment.

➤ Oxygen saturation increased by approximately 7 percent.

➤ No patient required secondary procedure for soft tissue management.

➤ No post op skin necrosis or infection noted.

➤ No neurological injury noted (one patient developed saphenous neuropraxia which fully recovered in 14 days).

➤ All fractures united (Reverte et al. mentioned significantly high incident of delayed union or nonunion of tibial shaft fractures with compartment syndromes9. They reported 55% nonunion or delayed union in ACS versus 17.8% in fractures without ACS in a meta-analysis study.)

➤ Hospital stay is reduce by 2 week as no secondary procedure required. (NPWT reduces the risk of infection but it ends up with high chance of skin grafting)

**CONCLUSION**

➤ This study shows importance & methods of detecting a specific condition ‘Impending compartment syndrome’ & limited intervention during this period will prevent a full fledged compartment syndrome & subsequent permanent disability.

➤ Similar studies are very rare in the literature.
REFERENCES