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Improved rehabilitation and functional outcome with dedicated joint irrigation at the end of ACL reconstruction

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ABSTRACT

Background: ACL is most common ligament injured during sports. Postoperative pain and swelling is one of the major limiting factors for the rehabilitation of ACL reconstructed patients. Cryotherapy and intra-articular bupivacaine injection are few measures to reduce the pain. One of the main reason for pain is inflammatory mediators, by joint irrigation it reduce the inflammatory mediator that reduce pain and swelling.
Methods: We treated 33 patients of ACL injury with arthroscopic ACL reconstruction from July 2015 to April 2017. Postoperative pain and swellings were assed with VAS and suprapatellar fullness. VAS assessment done on 1st day, 2nd day and 12th day and for swelling 2nd day and 12th day. We had used closed loop endobutton for femur and bioscrew for tibia. In twenty patients at the end of the surgery we used 2 liter saline for joint irrigation.
Results: As a result of wash of pro inflammatory mediators and debris, there were reduced inflammation which reduces pain and swelling. Patients who received irrigation had less VAS score and suprapatellar fullness than the other group. There was better knee flexion on 12th day.
Conclusions: Adding up a dedicated joint irrigation at the end of surgery does not deviate from standard surgical protocol. No studies have stress upon joint irrigation. It reduce the pain and swelling by reducing inflammation which gives better result.

Keywords: Anterior cruciate ligament, Visual analogue scale, Suprapatellar fullness

INTRODUCTION

Knee is the frequent site for the sports injury. ACL is one of the frequently injured ligament in young athletes performing cutting and pivoting sports.[1] Untreated patients predispose it to subsequent injury due to instability and early osteoarthritis.[2-4] Arthroscopic ACL reconstruction is common and effective method for restoring joint stability.[5-8] One of the main aim post reconstruction is to return to normal activity. Post operative pain and swelling is one of limiting factor for initiation and progression of rehabilitation. Cryotherapy is one of the common tools to reduce the post operative pain and swelling.[9-14] Cryotherapy depends upon many variables like, temperature used, duration for the cryotherapy, time between surgery and the cryotherapy and the thickness of the dressing.[15] Recent animal studies shows that drilling into inter-condylar notch increases Synovial expression levels of IL-1β, IL-6, and IL-8 as well as IL-1Ra were increased 2-3 which subsides after 3 to 4 weeks.[16] Several studies focused on cell/tissue for source of soluble pro-inflammatory product and enzyme mediator (protein of MMP& ADAMT) that initiate inflammation and progressive cartilage loss.[17] Theoretically like any other joint knee joint is also very sensitive to the debris arises from the drilling during

tunnels, shaver and threads. With this concept, we changed our closing end of surgery by irrigating knee with two liter of saline post surgery to reduce the debris that initiate the inflammatory response.

METHODS

We treated 33 patients of ACL injury with arthroscopic ACL reconstruction between July 2015 to April 2017 at school of medical sciences and research, sharda hospital, greater noida. As the post operative protocol we assess patient's pain on VAS on the day one, day two and day twelve at the time of suture removal. Swelling assessment done on the 2nd day and on 12th day depending upon suprapatellar fullness. All our patients received cryotherapy starting immediate post op till 72 hours for 20 minutes 4 times in a day. We had used closed loop endobutton (insta button, HIB surgical) for femur fixation and bioscrew (Stryker) for the tibial fixation. Informed written consent taken from all patients for arthroscopic ACL reconstruction. It's a comparitive study where we have compared our earlier patients with the patients who received joint irrigation. In initial 13 patients surgery come to end with the fixation of the tibia with bioscrew. In further 20 patients we started using 2 liter of saline irrigation of the joint post fixation of tibia with 5.8 mm cannula sheath for inflow and outer sheath of shaver blade for out flow using pressure created by BP bulb with 16 gauge niddle in saline bottle (Figure 1). We had applied one standard gamjee roll from mid thigh to mid leg (Figure 2) and one 6 inch crepe bandage to all patients (Figure 3).

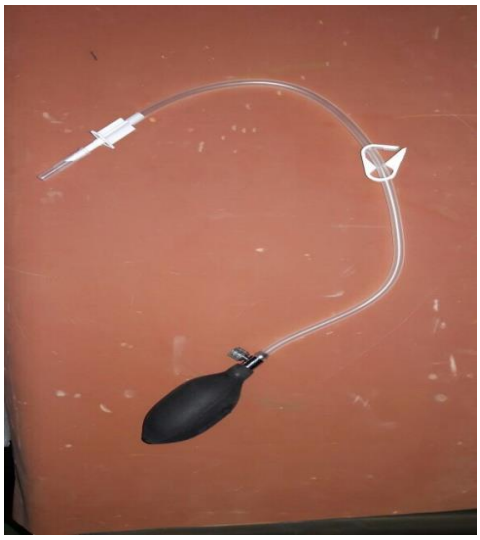

Figure 1: Apparatus to attached to saline bottle to create pressure for irrigation.

Debunking of the dressing done on the second day and surgical site sealed with T shaped dynaplast. Weight bearing started on second day with knee brace with support of axillary crutch. Amount of weight bearing and removal of axillary crutch was on patient's pain tolerance.

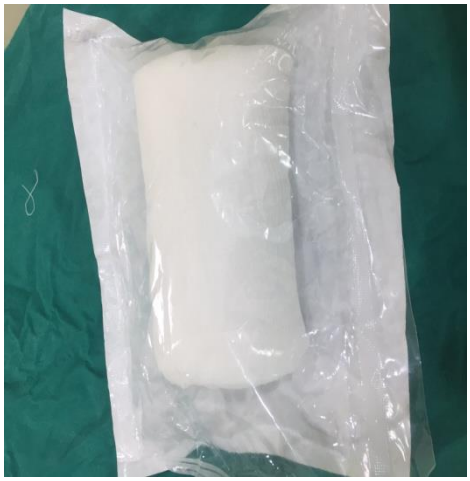

Figure 2: Gamjee roll.

Figure 3: 6" crepe bandage.

Straight leg rising, static hamstring and heel touch knee flexion with passive knee extension was started on day two.

RESULTS

As a literature female athletes are 6 to 8 time more prone for ACL injury. Majority of our patients were male. We had 29 male and 4 female patients. 31 patients had injury while playing, one patient had a fall from height and one patient had road traffic accident. Out of 31, 20 of our patients had injury while playing Kabbadi, rest 11 had injury while playing football. None of our patients were trained competitive sports person. Average age of presentation to our hospital was 26.2 years. Average duration from trauma to first consultation was 5.8 months. All patients seek the second consultation due to instability symptom like fear of falling from the stairs, inability to walk on uneven surface. Average duration of surgery was 72.8 minutes. All surgery was performed by same surgeon with same nursing assistant. As we divided the patients in groups, patients who did not receive irrigation were group A and patients who received irrigation were Group B. In our study it was an observation and institutional modification of treatment on theoretical phenomena, no ethical clearance was required.

VAS was the integral part of our post op rehabilitation as a standard.VAS was recorded maximum pain experienced on the days when patients need a supplementation along with its regular anti-inflammatory drug and on day 1 it was almost 10 for all patients. VAS for group A patients on days 1, 2, and 12 were respectively 10, 7.6, 2.1 VAS for group B patients on days 1, 2 and 12 were respectively 10, 6.2, 1.3. As it was an observation but suprapatellar fullness was less in Group B patients. Average knee flexion with heel touch was in group A 80 degree while in group B it was 86 degree on 4th week follow up.

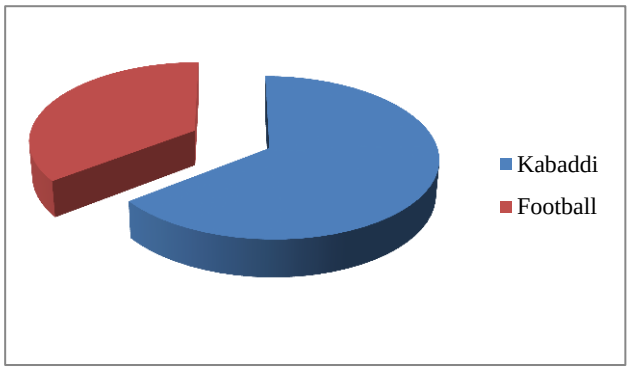

Figure 4: Mode of injury.

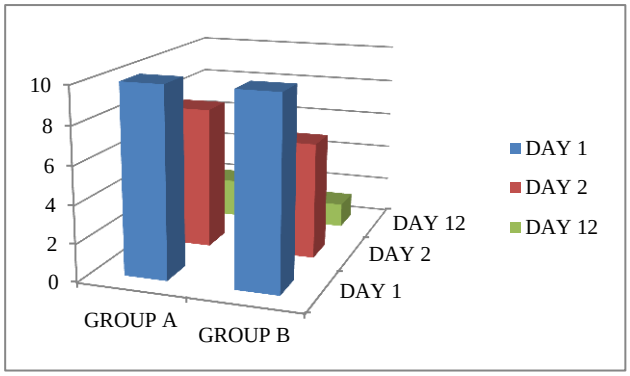

Figure 5: VAS on post operative day 1, day 2 and day 12.

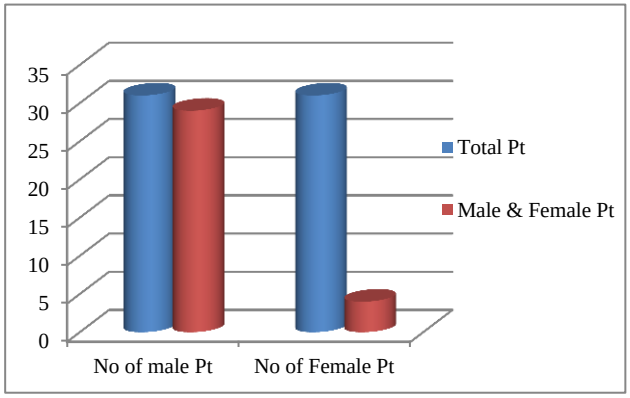

Figure 6: Number of male or female patients.

DISCUSSION

ACL reconstruction is most common arthroscopic surgery performed in the knee joint. Post reconstruction rehabilitation is one of the major determining factors for the outcome. Pain and swelling is main limiting factor for the initiation of rehabilitation. Intra – articular injection of bupivicane or mixture of bupivicane and morphine, use of cold saline are few alternative to reduce the pain. Intra articular injection has a role for 48 hours without any significant advantage and its main function is by its analgesic effect.[18] Use of cold saline shows that, there was no significant difference between cold and normal temperature solution used for arthroscopy.[19] It has shown that multiple joint tissues contribute to inflammation particularly after injury, synovial macrophages, fibroblasts and chondrocytes are sources of cytokines and chemokines and other inflammatory molecules.[20] It's a comparative study between our two groups. Our concept of using post surgery irrigation was to wash out all debris and pro inflammatory mediators, that reduces inflammation and inflammation is one of the mainstay for pain and swelling. No other study had a stress upon dedicated irrigation of the joint at the end of surgery. Long follow up with large sample size is needed.

CONCLUSION

Post tibial screw fixation, irrigation of knee joint with normal saline does not deviate from any major changes in the surgical protocol. It gives us a chance look for reconstructed ACL along with wash of all content in the joint. We found out that pain and swelling were decreased in the group B. Though our sample size was small but no other addition to the treatment required. It's a more of a clinical practice which is cost effective.

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Ethical approval: The study was approved by the institutional ethics committee

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