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Research Article

ARTHROSCOPIC ACL RECONSTRUCTION: AVERAGE RATE BLOOD LOSS IN POSTOPERATIVE DRAINAGE IN 210 PATIENTS IN 24 HOUR DURATION

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A B S T R A C T

Background: suction drains have frequently been used after surgical procedure for the removal of blood or discharge and prevention of haematoma formation. Little data exist on the effect of routine use of postoperative drainage after arthroscopic anterior cruciate ligament reconstruction (ACL), although literature has failed to support the benefit to this practice. However, its use after ACL reconstruction is practiced by number of surgeons. This study evaluates post operative drainage following primary arthroscopic ACL reconstruction using quadrupled hamstring graft in 210 patients.

Material and methods: A prospective study was conducted 210 patients underwent ACL reconstruction with hamstring graft between January 2011 to December 2012 for postoperative blood loss in intra-articular placed closed suction drain in 24 hour duration. Drain output was noted for the first 24 hours postoperatively

Results: Mean drain output at the end of 24 hours was found to be 157.7mL. Out of 210 patients, notchplasty was performed in 39 patients. The mean blood loss was found to be 222.6 ml in the patients who underwent notchplasty as compared to 142.9 ml in patients without notchplasty. This difference in blood loss was found to be higher in the notchplasty group and was statistically significant (p value <0.001).

Conclusions: The average rate of post-operative drainage following ACL reconstruction is 157.7ml/24hr which increases significantly following notchplasty. Suction drainage can be beneficial in ACL reconstruction especially in patients having notchplasty to reduces pain and improves the range of movement of the knee in the early postoperative period

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INTRODUCTION

Drains have been widely used following orthopedic surgical procedures to evacuate heamatomas, which in theory decrease pain and swelling and thus hasten the recovery and rehabilitation. (Chandratreya *et al*, 1998; Chen ZY *et al*, 2013; Cobbs JP 1990; McCormack RG *et al*, 2006) The routine arthroscopic surgeries are relatively benign interventions in comparison to total joint replacement and less drainage associated complications are expected. Nevertheless, post operative use of drainage apparatus following ACL reconstruction is practiced by many of surgeons (Matava MJ *et al*, 1998).

The literature has failed to support this perceived benefit and have questioned the necessity of drains (Widman J *et al*, 2002; Willett KM *et al*, 1988**)** However, the fear of local complications has constrained the surgeons not to abandon the practice of using the drains.

Majority of studies focus on postoperative blood loss in suction drains in arthroplasty procedures with relative paucity of studies evaluating the amount of post operative drainage following arthroscopic ACL reconstruction although various clinical studies have not shown benefit to this practice (Dhawan A *et al*, 2003; Straw R *et al*, 2003). This study aims at estimating the amount of post operative drainage following primary arthroscopic ACL reconstruction using quadrupled hamstring graft.

MATERIAL AND METHODS

A prospective study was conducted on 210 patients admitted during January 2011 to December 2012 for ACL reconstruction surgery. Consecutive patients with an ACL reconstruction, who underwent 4-strand hamstrings autograft from the ipsilateral knee, were enrolled. Revision cases and patients with increased risk of bleeding were excluded.

All surgeries were performed by the single senior author. The choice of anaesthesia was regional anaesthesia in all the cases and the procedure was done under tourniquet. Quadrupled hamstring graft was used in all cases and notchplasty was performed wherever impingement of the graft was felt. A

vacuum suction drain was placed into the joint before wound closure and connected to identical 600 mL plastic suction bottles in all cases. The tourniquet was released after application of dressing and elastic bandage and the drain was then unclamped.

Drain output in first 24 hours after surgery was recorded in each patient. All patients underwent standardized rehabilitation supervised by a physiotherapist to emphasize early range of motion, immediate full extension, and weight bearing as tolerated.

RESULT

Arthroscopic ACL reconstruction was carried out in 189 males and 21 females during the period of two years from January 2011 to December 2012. The mean age of surgery was 27.7 years (range = 7-61 years). Majority of the patients were involved in active sports. Right sided Knee was involved in 120 patients while 90 cases presented with left sided symptoms. Mean drain output at the end of 24 hours was found to be 157.7mL (range 50-350mL). Diagrammatic tabulation of the drain output is depicted in **Table 1**. Majority of patients had a drain output ranging from 151-200 ml.

Table 1 Shows drain output in ml in total number of patients.

Drain Volume	Number of Patients	Percentage (round Figure)
0-50	20	9.5
51-100	38	18.2
101-150	47	22.3
151-200	80	38.1
201-250	15	7.1
251-300	8	3.9
301-350	2	0.9
Total	210	100

Out of 210 patients, notchplasty was performed in 39 patients. The mean blood loss was found to be 222.6 ml in the patients who underwent notchplasty as compared to 142.9 ml in patients without notchplasty (**Figure1,2**).This difference in blood loss was found to be higher in the notchplasty group and was statistically significant (p value <0.001).

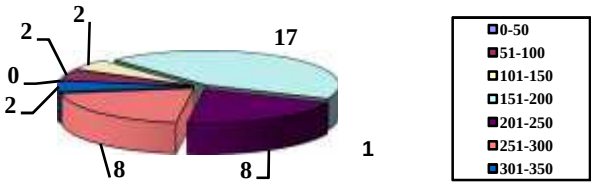

Figure 1 Patients with Notchplasty

Total patients=39 Drain volume in ml

Patients without notchplasty

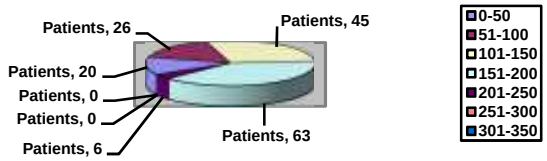

Figure 2

Total Patients =171 Drain Volume in ml

DISCUSSION

The significant amount of blood loss associated with arthroplasties induces surgeons to use drains although no clear benefit has been shown in literature (Beer KJ *et al* ,1991; Holt BT *et al*, 1997; Niskanen RO *et al*,2000) Similarly in arthroscopic ACL reconstructive procedure literature shows no clear cut consensus about the use of post operative drains(Dhawan A *et al* ,2003; Straw R *et al*, 2003; O' Driscoll SW *et al*, 1983; Clifton R *et al*,2003). A significant proportion of surgeons use intra-articular drains after arthroscopic anterior cruciate ligament (ACL) reconstruction. The usual reason given to justify the use of a drain is to minimize articular heamarthrosis, pain and stiffness of the knee (Clifton R *et al*, 2003**)**. Anther study found no significant difference in the occurrence of wound healing complications, infections, post-operative range of movement, functional score or incidence of limb swelling between the drain v/s non drain groups **(**Pape D *et al*, 2001**)**. There is still debate over the use of drains following anterior cruciate ligament reconstruction surgery. It is taken for guaranteed by the majority of the surgeons that arthroscopic knee surgeries are minimally invasive procedure with little postoperative blood loss but literature revealed ACL reconstruction when combined with notchplasty may have significant post operative drainage(15 In a study on 190 arthroscopic cases, the average drainage observed was 117 ml and post operative drainage was recommended following subtotal meniscal resection and after drilling of osteochondral defects (Tatari H *et al* ,2005). ACL reconstruction was not included in this study group. In another study, notchplasty during ACL reconstruction was shown to increase the blood loss by 30% with total drainage amounting up to 448 ml (150 – 550 ml) (Pape D *et al* ,2001) . This study was done on bone patellar bone graft in comparison to present study assessing drainage after quadrupled hamstring graft However; there is no significant data present which shows the average blood loss in 24 hour in arthroscopic ACl reconstruction with hamstring graft. This is the first pilot study enrolling large no of patients to evaluate the amount of postoperative blood loss following arthroscopic ACL reconstructive procedure with quadrupled hamstring graft.

In present study on 210 patients, the mean drain output at the end of 24 hours was found to be 157.7mL (range 50-350mL). Out of 210 patients, notchplasty was performed in 39 patients with average blood loss of 222.6 ml as compared to 142.9 ml in patients without notchplasty. This difference in blood loss was found to be higher in the notchplasty group and was statistically significant (p value <0.001). so, this is our impression that drilling of femoral and tibial tunnels lead to increase in post operative drainage when compared to routine arthroscopic meniscal procedures and in ACL reconstruction with notchplasty, postoperative blood loss volume in drains is significantly increased which is reaching nearer to the volume of postoperative drainage following knee arthroplasty (Narayana Prasad *et al*, 2007; Padala PR *et al*,2004) The c ohort of patients undergoing these surgeries is young and has high functional demands which may be compromised with even slight loss of function. This is our opinion that drainage of joint can be used in patients following ACL reconstruction especially those undergoing notchplasty to reduce pain and improves the range of movement of the knee in the early postoperative period.

The study was limited by restricting it to the amount of post operative drainage only, with no correlation to functional outcome. Further studies are to be conducted by comparing drain versus non drain patients to evaluate the effect of postoperative drainage on functional outcome. However, being a prospective study with single surgeon following up a large number of patients are the potential strengths of our study. Furthermore, all the patients included underwent quadrupled hamstring graft.

CONCLUSION

1. The average rate of post-operative drainage following ACL reconstruction is 157.7ml/24hr which increases significantly following notchplasty. Though significant, this drainage is less as following arthroplasty.
2. Drainage of knee joint can be beneficial in patients following ACL reconstruction especially those undergoing notchplasty

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