



Suction drainage influence on knee effusion following partial meniscectomy with partial fat pad or synovium resection

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Objective: The aim of our study was to examine the effect of suction drains on knee after arthroscopic partial meniscectomy with partial fat pad removal or synovectomy.

Methods: We performed arthroscopic partial meniscectomy for posterior tears of the medial meniscus and partial fat pad or synovium shaving in 72 patients. Following surgery, a suction drain was not used in 40 patients (Group A) and used in 32 (Group B). Both groups were similar in terms of age, gender, and total operation time. The patients were evaluated at 1, 2, and 4 weeks postoperatively for the presence of a knee effusion.

Results: No significant difference was observed in the grade of effusion and the average percent change in the effusion grade between Groups A and B at 1, 2, and 4 weeks postoperatively.

Conclusion: Use of a suction drain did not influence the postoperative effusion or the clinical course of the effusion after arthroscopic partial meniscectomy with partial fat pad removal or synovectomy.

Key words: Arthroscopy; fat pad; knee effusion; suction drain; synovium.

The use of a suction drain following arthroscopic knee surgery is controversial. Some studies have implied that suction drains prevent effusions and painful irritation of the knee by reducing synovial irritation while others claim that they do not contribute to patient recovery.^[1,2] Intra-articular bleeding has been advocated as the main cause of effusion after knee arthroscopy.^[1,2] The hematoma that can occur following deflation of the tourniquet postoperatively attaches to all of the surgically incised or excised surfaces.^[3] During arthroscopic meniscectomy, the synovium and fat pad may be partially removed to visualize the anterior part of the meniscus.^[4-7] The bleeding after partial removal of the synovium results in knee effusion and may compromise

rehabilitation.^[4,5] Studies that have examined suction drainage following arthroscopic knee surgery have generally considered anterior cruciate ligament reconstruction or combined procedures, such as partial or subtotal meniscectomy, chondral drilling, chondral debridement, and synovial shaving.

The current study evaluated the influence of suction drains on knee effusion after arthroscopic partial meniscectomy with partial fat pad removal or synovectomy.

Patients and methods

To evaluate the effect of suction drain on knee effusion, patients undergoing arthroscopic meniscectomy and partial synovectomy or fat pad removal were

assigned in two groups. The patients with a history of major knee trauma, knee surgery, use of steroids or non-steroidal drugs, synovial disorder, rupture of a cruciate ligament or a bleeding diathesis were not included in the study. Patients who were lost to follow-up were also excluded. Group A consisted of 40 (21 men, 19 women; mean age: 42.3 years; range: 24-62 years) consecutive patients who had no suction drain after surgery, while Group B consisted of 32 patients (16 men, 16 women; mean age: 41.8 years; range: 24-61 years) who had a suction drain for 24 hours after surgery.

All patients were operated under normotensive epidural anesthesia, using a standard pneumatic tourniquet inflated to 300 mmHg. Standard antibiotic prophylaxis was given preoperatively. No arthroscopic pump was used. Pressure was supplied by hanging a 3 L solution of 0.9% NaCl at a height of 220 cm. Standard anterolateral and anteromedial portals were opened in all patients. In Group B, the drain (400 ml) was inserted through the anterolateral portal and was removed at 24 hours after surgery. The exterior and interior diameters of the drains were 4 and 2 mm, respectively. The portion with suction holes was 14.5 cm long and contained 56 1-mm diameter holes. A 15-cm-wide bandage dressing was wrapped around the entire limb postoperatively for 24 hours. In all patients, ice application was begun immediately postoperatively and its continuation for 1 week was advised. For Group B patients, the suction drains were removed 24 hours postoperatively and the amount of material collected was noted. On the first postoperative day, all patients were given 75 mg of intramuscular diclofenac sodium twice a day.

All patients were discharged 24 hours after surgery and active quadriceps and knee range of motion exercises were initiated. The patients were allowed full weight-bearing as tolerated and given 500 mg of

paracetamol three times a day for analgesia. All patients were examined at 1, 2, and 4 weeks postoperatively for effusions in the knee. The size of the effusion on compression of the suprapatellar pouch was graded on a scale of 1 to 4: Grade 1, some fluid noted; Grade 2, slight lifting of the patella; Grade 3, a ballotable patella; Grade 4, a tense effusion making it impossible to compress the patella against the femoral sulcus.^[3]

Statistical analysis was performed using NCSS 2007 (NCSS Statistical Software, Kaysville, UT, USA) statistical software. Descriptive statistical methods (mean value, standard deviation) were used. The unpaired t-test was used to compare age and operating time, while the χ^2 test was applied to evaluate gender and effusion grade. Within Group A and B, McNemar's test was used to compare repeated effusion grades. Due to the abnormal distribution of the percent change in mean values, the Mann-Whitney U test was used to compare the percent change in the mean values of the effusion evaluations. The results were evaluated with a significance level of $p < 0.05$.

Results

No significant difference was observed between Group A and B, in terms of mean age, gender or operating time ($p=0.849$, $p=0.833$, and $p=0.449$, respectively; Table 1). Moreover, no significant difference was seen in the distributions of the effusion grades between groups in the first, second, and fourth weeks ($p=0.912$, $p=0.992$, and $p=0.664$, respectively; Table 2). In both groups, statistically significant improvements were observed for the distribution of the effusion grades between the first and second, first and fourth, and second and fourth weeks (all $p=0.0001$). In both groups, no significant differences were detected between the percent change in the mean effusion values obtained in the first and second, first and fourth, and second and fourth postoperative weeks

Table 1. Comparison of age, gender, and operating time in Group A and B.

		Group A	Group B		p
Age		42.28±11.05	41.78±10.74	t: 0.191	0.849
Gender	Male	21 (52.5%)	16 (50%)	χ^2 : 0.04	0.833
	Female	19 (47.5%)	16 (50%)		
Operating time (min.)		37.88±8.31	39.38±8.3	t: -0.761	0.449

Table 2. The distribution of effusion grades in the first, second, and fourth weeks in Group A and B.

		Group A		Group B		
Effusion grades in the first week	No effusion	3	7.5%	2	6.3%	χ^2 : 0.519 p=0.912
	Grade 1	8	20.0%	7	21.9%	
	Grade 2	13	32.5%	12	37.5%	
	Grade 3	12	30.0%	9	28.1%	
	Grade 4	4	10.0%	2	6.3%	
Effusion grades in the second week	No effusion	6	15.0%	5	15.6%	χ^2 : 0.09 p=0.992
	Grade 1	17	42.5%	13	40.6%	
	Grade 2	14	35.0%	11	34.4%	
	Grade 3	3	7.5%	3	9.4%	
Effusion grades in the fourth week	No effusion	19	48.7%	15	46.9%	χ^2 : 0.819 p=0.664
	Grade 1	17	43.6%	16	50.0%	
	Grade 2	3	7.7%	1	3.1%	

(p=0.519, p=0.800, and p=0.787, respectively; Table 3). In the group in which suction drains were used, the mean amount of fluid collected in the drain was 37.4 ml (range: 0-350 ml).

Discussion

This study investigated whether the use of a suction drain to evacuate the intra-articular hematoma prevents the postoperative occurrence of a knee effusion in patients who underwent partial fat pad removal or synovectomy during arthroscopic meniscectomy. We formed two groups that were similar in terms of age, gender, and operation time. We found that the use of a suction drain on the first postoperative day does not influence the formation of knee effusion.

Using suction drains following arthroscopic procedures of the knee is controversial. Some studies have reported that using suction drains reduce synovial irritation, preventing the occurrence of an effusion and improving postoperative rehabilitation.^[1,2] However, we found no significant difference in the distribution effusion grade in the first, second, and fourth postoperative weeks between the groups with and without

suction drains. The mean amount of fluid collected inside the drain following arthroscopic meniscectomy has been reported as between 59 and 152 ml.^[2,8,9] In our study, the mean amount of collected fluid was 37.4 ml (range: 0-350 ml), which was less than the reported values. Most studies of this subject evaluated anterior cruciate ligament reconstruction or all arthroscopic procedures of the knee. However, we evaluated only patients in whom a partial resection of the posterior medial meniscus and partial fat pad removal or synovectomy was performed.

One factor affecting the amount of drainage is the operating time. Procedures that take more than 60 minutes cause more bleeding.^[9] Our mean operating time for the group with suction drains was 39.4 minutes. In studies of arthroscopic anterior cruciate ligament reconstruction, the rate and scale of effusion is reportedly smaller in the first week in patients in whom suction drains are used, but the same in the fourth and eighth weeks.^[10] In our study, we observed a significant decline in the grade of the effusion and mean percent change as time passed, and no significant difference was seen among the

Table 3. Changes in effusion grade values in the first, second, and fourth weeks for Groups A and B.

Change in %	Group A	Group B	MW	p
Effusion grades in the first week / Effusion grades in the second week	16±17.07	13.12±18.74	586.5	0.519
Effusion grades in the first week / Effusion grades in the fourth week	30.77±25.06	29.38±20.31	603	0.800
Effusion grades in the second week / Effusion grades in the fourth week	15.39±18.61	16.25±18.62	602	0.787

weeks in either group. In addition, no significant difference was observed in the rate of effusion resolution in both groups in all postoperative weeks. Therefore, the use of a suction drain does not affect the clinical course of a knee effusion during the first postoperative month.

We studied a homogenous group of patients who underwent arthroscopic meniscectomy and partial synovectomy or fat pad removal. This design enabled us to assess the effect of a suction drain in a widely used procedure after which intra-articular bleeding can occur.^[8-10]

Our study had some limitations. Our series was not large because of our inclusion criteria to obtain a homogenous group of patients. Patients receiving steroid or non-steroidal therapy preoperatively were excluded. However, all patients were given a non-steroidal anti-inflammatory drug within the first 24 hours postoperatively. Medication with such drugs may negatively affect coagulation factors. Since the same drugs were used in both groups, comparison should not be negatively affected. In addition, denying the patients pain relief in the early postoperative period would have been unethical.

Our investigation demonstrated that using a suction drain has no effect on knee effusion in the first postoperative month after partial meniscectomy and partial fat pad removal or synovectomy. We believe that using a suction drain does not affect the effusion or the course of the effusion in these patients.

Conflicts of Interest: No conflicts declared.

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