



Is cold therapy really efficient after knee arthroplasty?



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HIGHLIGHTS

- Cold therapy is effective in terms of the pain control and knee scores.
- Cold therapy does not lead to significant changes in intraoperative and postoperative bleeding.
- Cold therapy does not affect the hemoglobin values.

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ABSTRACT

Introduction: Knee arthroplasty is a frequently used surgery. The purpose of this study is to evaluate the effects of cold therapy after knee arthroplasty.

Methods: 60 patients who were operated in our clinic between the years 2013 and 2014 were evaluated prospectively, and the patients were randomized into two groups. The cold therapy by Cryo/Cuff application was started 2 h before the surgery in Group-2 patients; it was repeated in a postoperative 6th hour and continued for postoperative four days. We analyzed the visual analog scales (VAS) for pain, Knee Society Scores (KSS), hemoglobin, and bleeding parameters.

Results: The data of the group that did not receive the Cryo/Cuff application (Group-1) are as follows; the number of the patients was 33; the mean age value was 68.4 (53–78). Group-2 data was as follows; the number of the patients was 27; the mean age value was 67.2 years (range 57–78). The mean KSS scores of the patients increased from 79.6 (75–83) and to 90.5 (88–92) postoperatively ($p < 0.05$).

Discussion: In our study, the pain and functional knee scores of the patients who received Cryo/Cuff application were significantly different and as expected, the use of analgesics was much lower. Cryotherapy did not affect the amount of bleeding during the surgery ($p > 0.05$), which was not reported previously in the literature.

Conclusion: After knee arthroplasty, the preoperative and postoperative use of cryotherapy is effective in terms of the pain control and functional knee scores without a significant change in surgical blood loss.

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Knee arthroplasty is a routinely performed orthopedic procedure to improve mobility and obtain pain relief in the affected lower limb [1]. The pain together with the edema and blood loss are the early postoperative problems after knee arthroplasty [2]. The prevention of pain and reduction of surgical blood loss will provide a better orientation of the patient to the rehabilitation period. The patients will be able to use the extremity in a faster way, and the hospitalization time will be reduced. The analgesic drugs, morphine and epidural analgesia and cold therapy are the preferred alternatives for the pain control.

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Cold therapy has clinical applications in pain control since the 1960s [3]. This therapy passes the cold soft tissues and decreases the intra-articular temperature; slows down the nerve conduction velocity, also slows down the blood flow with vasoconstriction and makes the pain and edema become smaller [4,5]. In the literature, there are plenty of papers that they mentioned about the effectiveness of the cold therapy after soft tissue and sports injuries [4,6]. However, the literature is scarce regarding the effects of perioperative cold therapy.

The objective of this study is to evaluate the effects of cold therapy on the pain, bleeding amount from the drainage tube, hemoglobin levels, blood transfusion needs and the postoperative rehabilitation period in patients with knee arthroplasty.

1. Methods

60 patients who were operated in our clinic between the years 2013 and 2014 were evaluated prospectively. The inclusion criteria of the study was indication for knee arthroplasty due to the presence of advanced primary knee osteoarthritis. Presence of comorbidities that are contraindications for cold therapy (diabetes mellitus, bleeding diathesis and vascular occlusion) was accepted as exclusion criteria. The patients were grouped into 2 groups in random order, and the patients were allocated to the study or control group according to a computer-generated list; the 1st Group did not receive the cryo/cuff therapy in the postoperative period. The cryo/cuff (*Waegener cryocephical treatment server*) (Fig. 1) was applied to the 2nd Group in the postoperative period. All patients had primary osteoarthritis and unicondylar or total knee arthroplasty applied to them according to their knee osteoarthritis status. Fifteen patients were operated with unicondylar knee arthroplasty (Group-1: 9 patients, Group-2: 6 patients); and 45 patients were operated with total knee arthroplasty (Group-1: 24 patients, Group-2: 21 patients). The same surgeon who was experienced in arthroplasty operated all the patients arthroplasty with the same surgical technique. The patients were administered 1 gr/iv Cefazolin 1 h before the surgery. All patients were operated under general anesthesia.

The Cryo/Cuff application was started 2 h before the surgery in Group-2 patients; it was repeated in postoperative 6th hour, and it was applied to the patients for 2 h every day, during postoperative 4 days (Fig. 2). The Continuous Passive Motion (CPM) device was started for all groups on the postoperative first day, and it was ensured that the time and level were the same. CPM is one of the postoperative rehabilitation devices that we routinely use to gain the flexion and extension of the knee postoperatively. The drainage tube was used intraoperatively to remove the unnecessary blood from the knee joint, and it was taken out on the postoperative first day. The Knee Society Scoring System (KSS) was used to evaluate knee function after knee arthroplasty. KSS evaluates the patient's pain, total range of flexion (flexion contracture and extension lag-if present) and stability [7] and is graded scores as; below the 60 points-poor and above the 80-excellent. The hemoglobin values and VAS scores were assessed preoperatively and on first, third and



Fig. 2. 64 years old male patient Cryo therapy application after total knee arthroplasty.

fifth postoperative days. The patients were discharged on the postoperative fifth day. None of the patients had reactive skin damage or problems in the healing of the wounds.

All patients were followed up at least 12 months however we analyzed the early effects of the cold therapy for this reason in this report we mentioned preoperatively and early postoperative results. KSS scores assessed the impact of the cryotherapy on the knee functions. VAS assessed the perceived pain and relatively the analgesic need. Hemoglobin values and the amount of bleeding from the drainage tube were used to evaluate the vasoconstrictive effect of cryotherapy.

1.1. Statistical analysis

For the analysis of the parametric variables were used one-way analysis of variance, whereas the values within the groups were compared using the parametric paired t-test and the Wilcoxon test was used. The ($p < 0,05$) value was accepted statistically significant for all statistical analyzes. The groups were randomized



Fig. 1. Waegener cryo/cuff treatment server.

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