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Compressive Cryotherapy Tops Solo Cryotherapy After ACL Reconstruction

February 15, 2011 (San Diego, California) — Patients who are treated with compressive cryotherapy after anterior crucial ligament (ACL) reconstruction can expect better pain relief and less dependence on narcotic use than patients treated with cryotherapy alone, according to results presented here at the American Academy of Orthopaedic Surgeons (AAOS) 2011 Annual Meeting.

"Ice treatment is an extremely useful adjunct in the postoperative care of orthopaedic patients that has long been used for patients undergoing ACL reconstruction both to improve edema and facilitate early range of motion, and it is currently the standard of care at our center," Brian Waterman, MD, orthopaedic surgery resident at the Orthopaedics and Rehabilitation Service at William Beaumont Army Medical Center/Texas Tech University Health Sciences Center in El Paso, Texas, told *Medscape Medical News*. "However, based on our findings, orthopaedic providers may now also consider the use of compressive cryotherapy after arthroscopic knee surgery to optimize short-term clinical outcomes in young, active patients"

Prospective Randomized Trial Confirms Hypothesis

For the study, 36 patients first underwent arthroscopic ACL reconstruction and were then randomly assigned to 6 weeks of treatment with a dual compressive cryotherapy device or a standard ice pack.

The use of cryotherapy for acute musculoskeletal injuries and the postoperative treatments of orthopaedic patients has been widely documented. The treatment has been shown to significantly reduce cellular metabolism, tissue hypoxia, edema onset, nerve conduction, and secondary pain. Simultaneous pneumatic compression has also been reported to improve short-term clinical outcomes. However, there are limited data on the use of cryotherapy combined with pneumatic compression compared with standard cryotherapy alone.

Both treatment groups were instructed to use ice or the cryotherapy/compression device 3 times daily for at least 30 minutes per session. All patients were given the same standard postoperative rehabilitation protocol.

Patients returned to the clinic 1, 2, and 6 weeks after their procedure for routine care and to complete several questionnaires that assessed their functional outcomes.

Significant Pain Reduction Seen With Compressive Cryotherapy

The primary outcome measure was the score on the visual analogue scale (VAS).

The study found that the VAS score in the compressive cryotherapy group decreased significantly from 54.9 at baseline to 28.1 by 6 weeks ($P = .0001$). The baseline and 6-week VAS scores in the group receiving cryotherapy alone were 35.6 and 40.3, respectively ($P = .34$).

"Our results show a 27-point improvement in the average, patient-reported VAS by 6 weeks with compressive cryotherapy, while patients with cryotherapy alone failed to return to baseline levels of pain," Dr. Waterman said.

Groups did not significantly differ for secondary endpoint measures, which included the Lysholm knee score, the Short-Form (36-item) Health Survey, or Single Assessment Numerical Evaluation scores.

In addition, circumferential measurements of the knee that were obtained to measure postoperative edema showed no significant differences between groups or time points.

Overall, 15 (83%) of 18 patients assigned to compressive cryotherapy reported that they had withdrawn from narcotic use by the 6th week vs only 5 (28%) of 18 patients who received cryotherapy alone ($P = .0008$).

No cold-related wound complications, such as frostbite or transient nerve palsy, occurred in either group.

Dr. Waterman said that study strengths include its stringent design as a prospective, randomized, controlled trial and the use of a relatively homogenous study population with minimal additional comorbid conditions and centralized physical therapy.

He was quick to emphasize that the study enrolled patients from multiple operating providers, which may be a potential limitation. In addition, because patients could not be blinded to treatment, both responder and treatment bias are possible.

Finally, he said that future studies are needed to compare commercially available systems and to examine the potential for compressive cryotherapy for other applications besides the knee.

His group is evaluating the utility of similar interventions in patients undergoing hip arthroscopy and shoulder instability procedures.

Study Strengths

"While prior studies on the use of cryotherapy have focused primarily on pain, this study also examined the time point at which patients withdrew from narcotic use," Jim Barber, MD, a general orthopaedic surgeon in Douglas, Georgia, and a member of the AAOS Communications Cabinet, told *Medscape Medical News*. "I think that the use of such an end point is important because it's a pretty effective measure of when patients are hurting and when they're not. This study clearly showed that using this type of compressive device did stop narcotic usage faster than using ice therapy alone."

He also noted that the military population used is a study strength. "Military studies include a very controlled patient population; for example, if patients are instructed to wear an ice pack with or without a compression device, they are likely to comply. The benefit of that particularly high level of control is that it makes it a lot easier for investigators to evaluate quickly and effectively a particular treatment without a lot of background noise."

Dr. Waterman reported that there was no outside funding for the study, and he disclosed no relevant financial relationships. He also cited the following standard disclaimer: "The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or reflecting the views of the Department of Defense or the US government. The authors are employees of the US government."

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