

Knees and Pain Pumps: New Evidence Linking Cartilage Loss in Knee Joint to Pain Pumps

For the past year there have been a number of studies and journal articles that link the use of pain pumps to destruction of the shoulder cartilage. Now, a new study implicates pain pumps in the destruction of cartilage in the human knee.

After years of using pain pumps to control joint pain after surgery, surgeons are getting an inkling that the drug used (bupivacaine) may be the cause of cartilage damage called *chondrolysis*. Chondrolysis refers to the loss of articular cartilage, the smooth cartilage that allows the two joint surfaces to slide and glide against each other easily. Thinning of the cartilage narrows the joint space, putting more pressure on the joint and causing painful symptoms that eventually lead to joint arthritis.

Chondrolysis doesn't develop until many months to years after the use of the pain pump, so the connection hasn't been made until just recently. By the time the patients develop joint pain and swelling, it is so far after the operation that no one has ever linked the two events together. Now, as a result of several case reports, there has been a published recommendation against the use of intraarticular pain pumps until this problem can be studied further.

How do we know for sure it's the pain pump that's causing the problem? How do we know it isn't the screws used in repairing ligament damage? Or maybe the patients who develop chondrolysis had some cartilage damage before the operation that just got worse over time. Well, some animal studies done way back in 1985 were the first to point out that bupivacaine kills *chondrocytes* (cartilage cells). And more recent studies on human joints removed during total joint replacements showed cartilage damage after only 30 minutes exposure to bupivacaine.

And now, a series of three patient cases reported in this article seem to support the idea that chemical trauma can occur when joint cartilage is exposed to this drug. Not only does bupivacaine kill cartilage cells, but it also seems to inhibit (prevent) new chondrocytes from forming. In all three patients, there was a continuous infusion of bupivacaine for 48-hours after knee surgery. Surgery was done to repair a torn *anterior cruciate ligament*. In two cases, young female athletes had a pivoting injury while playing basketball. The third case was an older adult woman (41-years-old) who had a skiing accident.

Preoperative X-rays, MRIs, and arthroscopic exam were used to make the diagnosis and determine the best plan-of-care. Only the 41-year-old showed any signs of mild articular cartilage thinning and joint narrowing before surgery. The two young athletes had completely normal, healthy cartilage before the procedure was done. In all three cases, it was months after the surgery before the patients returned to their surgeons with reports of knee pain and swelling. And even more time before the first obvious signs of cartilage damage could be seen on imaging studies.

At first, there was no change in pain and swelling despite the use of antiinflammatory medications. After months of conservative care, changes in the cartilage could be seen on MRIs or during arthroscopic exam. The cartilage was fragmented in all three compartments of the knee. That includes the top and bottom and both sides (medial and lateral) of the *femur* (thigh bone), *tibia* (lower leg bone), and *patella* (kneecap). And the cartilage was worn down to the bone in all three areas. The

most severe case was in the older woman with the skiing injury who already had some early signs of joint degeneration.

Taking a closer look at these three cases, the surgeons surmise that perhaps the pain pump caused problems in the knees because it is a small area with less capacity compared with the shoulder or hip where pain pumps have been used with fewer problems. The articular cartilage tends to be thinner in the knee compared to other joints as well. So, that might have been an additional factor. Where does this leave these three patients?

Treatment has not been successful in stopping the degenerative process. Rest, steroid injections, microfracture, activity modification, and the use of antiinflammatories have not helped. The 41-year-old was told that further surgery won't help. She will have to manage her symptoms for as long as possible and expect to have a total knee replacement at some time in the future. Efforts to use *viscosupplementation* (injection of a slippery fluid into the joint) have also proven unsuccessful. Successful treatment options are limited at the present time, once again pointing to the need for further research in this area.

The authors of this article advise watchful awareness of any joint symptoms after post-operative pain pump use. They advise against the intra-articular use of these pumps until further notice.