Chondrotoxic effect of intraarticular bupivacaine administration

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Letter to the Editor:

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We read the article "The comparison of intraarticular morphine-bupivacaine and tramadol-bupivacaine in postoperative analgesia after arthroscopic anterior cruciate ligament reconstruction" by Hosseini et al. [5] recently published in this journal with great interest. The article describes a randomized, double blind, controlled trial study of ASA I–II patients undergoing arthroscopic ACL reconstruction performed under general anaesthesia who were given a combination of drugs intraarticularly for postoperative analgesia and pain control. Study was approved by the research ethics committees in Shahid Sadoughi University of Medical Sciences and written informed consents were obtained from 60 male patients. Patients were randomly allocated into three groups. The MB group (n = 20) received 10 mg morphine and 0.5% bupivacaine, the TB group (n = 20) received 100 mg tramadol and 0.5% bupivacaine and the control group (n = 20) received 2 0ml of isotonic saline intraarticularly at the end of the operation. The authors concluded that intraarticular morphine–bupivacaine combination provides more effective pain relief, longer analgesic duration, less supplemental analgesic postoperative requirement, shorter unassisted ambulation and discharge time when compared with intraarticular tramadol–bupivacaine injection and isotonic saline after ACL reconstruction arthroscopy. In assessing the side effects, none of the patients had respiratory depression and there was no significant difference between the groups in terms of nausea and vomiting.

It is interesting that there was no mention or even concern of chondrotoxic effect of bupivacaine in this article. Chu et al. [4] have shown in 2006 that 0.5% bupivacaine solution is cytotoxic to bovine articular chondrocytes and articular cartilage in vitro after only 15 to 30 minutes exposure. The authors suggested caution in the intraarticular use of 0.5% bupivacaine. Toxicity of bupivacaine was demonstrated on human articular chondrocytes too [6]. Piper et al. compared the in vitro viability after exposure of full-thickness knee cartilage explants and cultured chondrocytes to 0.9% normal saline solution, 0.5% ropivacaine and 0.5% bupivacaine respectively, after thirty minutes. Chondrocyte viability in cartilage explants and the viability of cultured chondrocytes were significantly lower after treatment with bupivacaine as compared to ropivacaine. A few years later, in vivo animal study was conducted to determine whether a single intra-articular injection of 0.5% bupivacaine results in chondrocyte

morbidity and rapid chondrolysis [3]. Reduced chondrocyte density without cartilage tissue loss six months after a single intra-articular injection of 0.5% bupivacaine suggested bupivacaine toxicity. The effects of bupivacaine were milder than those of an injection of 0.6% monoiodoacetate (positive control), which resulted in chondrolysis over the same time period.

As the risk of chondrotoxic effect of bupivacaine clearly exists, we would like to know why the adverse effect of bupivacaine was completely ignored in the article. Unfortunately, period of time when the study has been conducted was not specified in the Hosseini et al. [5] article. We are curious if the authors were aware of the adverse chondrotoxic effect of bupivacaine and if it was mentioned in the application to the ethics committees in Shahid Sadoughi University of Medical Sciences. If so, was the adverse effect explained in the informed consents signed by the participants of the study? Were the patients aware that intra-articular administration of bupivacaine is not approved and licenced usage of the anaesthetic, although such a usage has become a common practice in some clinics even today [1]? The question remains if it is justified to expose patients between 16 and 37 years old without degenerative changes in their knees to such probable devastating complication as chondrolysis just in order to decrease analgesic consumption and to shorten discharge time after the arthroscopic procedure? Campo et al. [2] performed randomised clinical trial comparing the analgesic effects of low doses of intra-articular 0.5% bupivacaine and 0.75% ropivacaine against placebo after knee arthroscopy performed under general anaesthesia in 282 patients. The authors of the trial concluded, considering the improvement in patient comfort on one side, but the short duration and small amount of this improvement and the risk of chondrotoxicity on the other side, that the administration of intra-articular analgesia with bupivacaine or ropivacaine cannot be recommended.

Knowing all this data it is our opinion that the reduction in the amount of total analgesics used postoperatively together with preferably shorter hospital stay and sooner ambulation should not be attempted with intraarticular application of bupivacaine.

Conflict of interest - The authors declare that they have no conflict of interest.

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