Should we reconsider the use of intra-articular local anaesthetics?

The use of intra-articular local anaesthetics is widespread and longstanding, but concerns have been expressed about their potential harm.

Evidence supporting the use of intra-articular local anaesthetics

Single intra-articular injections are well established in clinical practice, in both outpatient and inpatient settings. They are simple to administer, have good therapeutic effect and have low levels of systemic side effects. Single intra-articular injections also have an important role in diagnosing chronic joint pathology (Crawford et al, 1998).

An increasing number of procedures are being performed as day cases or as part of an enhanced recovery pathway, requiring adjustment of traditional pain management protocols. Intra-articular local anaesthetic has been used in combination with a multimodal analgesic approach to maximize pain control while minimizing opiate use. Multiple published studies have shown the benefit of using both single and continuous intra-articular local anaesthetics in arthroscopic joint surgery of the knee and shoulder in reducing opiate consumption and improving pain scores (Sun et al, 2015).

Evidence against the use of intra-articular local anaesthetics

Despite their widespread use, the effects of intra-articular local anaesthetic agents on joint structures have not been fully elucidated. Local anaesthetics including lidocaine and bupivacaine have direct cytotoxic effects on both neurons and myocytes. There is also a growing evidence base about the direct effects of local anaesthetics upon tissues within the joint capsule, especially articular cartilage.

Bupivacaine has been shown to be toxic to bovine articular chondrocyte cultures and articular osteochondral tissue. Bupivacaine 0.5% and 0.25% displayed both dose- and time-dependent toxicity, with 0.5% bupivacaine more toxic than 0.25% bupivacaine. However, the effects of 0.125% bupivacaine on bovine and human articular chondrocytes were similar to those of 0.9% saline. Lidocaine's effects were less profound but still exhibited dose- and time-dependent toxic effects. Ropivacaine, although still toxic to chondrocytes, is significantly less so than bupivacaine (Webb and Ghosh, 2009).

Long-term in-vivo animal studies have suggested that the effects of bupivacaine on chondrocytes may be long-lasting, but whether bupivacaine chondrotoxicity results in permanent damage remains inconclusive. Chu et al (2010) performed a single injection of 0.5% bupivacaine into rat stifle joints. The joints were evaluated at 1 week, 4 weeks, 12 weeks and 6 months. There was increased joint hypercellularity up to 4 weeks and then hypocellularity thereafter. Chu et al (2010) concluded that the early hypercellularity was a response to injury, while later hypocellularity reflected the inability to recover from bupivacaine-induced chondrotoxicity.

Post-arthroscopic glenohumeral chrondrolysis is a rare condition which occurs over a relatively short period of time after shoulder arthroscopy. There is extensive loss of the articular cartilage which tends to progress to severe osteoarthritis; this may eventually require joint arthroplasty. In the largest case series of post-arthroscopic glenohumeral chrondrolysis, the common factor in all cases was the postoperative administration of an intra-articular infusion of bupivacaine with adrenaline (Matsen and Papadonikolaki, 2013).

Conclusions

Intra-articular injections of local anaesthetics have effective analgesic properties and diagnostic uses. However, they may also have potentially unwanted toxic effects. The evidence identifies an important dose–time relationship between the use of intra-articular local anaesthetics and chondrocyte toxicity, the implication being that there is a greater risk of chrondrolysis with a longer exposure to higher concentrations of local anaesthetics, such as with continuous intra-articular infusion. The Food and Drug Administration has issued multiple safety alerts since 2009 warning against the danger of continuous intra-articular local anaesthetic infusions. An alternative analgesic regimen to a continuous intra-articular local anaesthetic needs to be considered, perhaps involving the use of a regional anaesthesia technique. **BJHM**

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