Chondrolysis Linked to Intra-articular Infusions

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AFTER LEFT SHOULDER arthroscopy, an elastomeric infusion device was used to deliver a continuous infusion (over about 48 hours) of the local anesthetic bupivacaine directly into the patient's intra-articular space for postoperative pain control. Approximately 5 months following the infusion, the patient developed pain, stiffness, and loss of motion in the left glenohumeral (shoulder) joint.

Postarthroscopic glenohumeral chondrolysis (PAGCL), which is necrosis and destruction of articular cartilage, was subsequently diagnosed. The patient required a total shoulder arthroplasty, according to a report sent to the FDA.

The FDA has received approximately 35 reports of chondrolysis in patients who received continuous intra-articular infusions of local anesthetics with elastomeric infusion devices (often called pain pumps) for postoperative pain management. (See A closer look at elastomeric infusion devices.) The local anesthetics involved include bupivacaine, chloroprocaine, lidocaine, mepivacaine, procaine, and ropivacaine with and without epinephrine. Chondrolysis, a severe, life-altering complication, is usually irreversible. (For more details, see What's chondrolysis?)

What went wrong?

It isn't known what factor or combination of factors contributed to the development of chondrolysis in these cases. The infused local anesthetic drug, the device materials, or other sources may have contributed.

Before 2000, the reported incidence of chondrolysis was low. Reports of PAGCL began to appear more frequently as surgeons began to use newer devices, such as lasers and thermal devices, and newer techniques, including intra-articular injection of dye and continuous postoperative infusion of anesthetics into the glenohumeral joint.¹³

What precautions can you take?

In general, elastomeric infusion devices are safe when used properly. The FDA has approved them for the perioperative and postoperative infusion of local anesthetics and opioids for pain management and regional anesthesia via the I.V., I.M., subcutaneous, perineural, and epidural routes. However, these devices haven't been approved by the FDA for intra-articular administration.

Because chondrolysis can affect patients of any age and the effects aren't reversible, healthcare professionals must be informed of the risks associated with intra-articular infusion of local anesthetics with these devices.⁴ The FDA now requires pain pump manufacturers to warn healthcare providers and patients about the potential for severe joint damage when these devices are used for intraarticular anesthetic administration.

Here's what you need to know about local anesthetics:
Local anesthetics are indicated for local or regional anesthesia or analgesia. Approved drug labels for local anesthetics don’t include an indication for continuous intra-articular postoperative infusions or for use with infusion devices such as elastomeric infusion devices. Single intra-articular injections of local anesthetics have been used for many years in orthopedic procedures without any reported occurrence of chondrolysis; however, the same isn’t true for continuous infusions. The FDA hasn’t approved any infusion devices for the continuous infusion of local anesthetics into intraarticular spaces.

Nursing considerations

If an elastomeric infusion device is used to deliver a continuous infusion of a local anesthetic directly into a patient's intra-articular space:

- Make sure the patient has given informed consent and understands the potential risks and benefits.
- Teach your patient to immediately report signs and symptoms of chondrolysis, including chronic severe joint pain; stiffness or loss of motion; weakness in the shoulder; or popping, grinding, or clicking of the shoulder joint.
- Prepare patients who have signs and symptoms of chondrolysis for additional diagnostic studies, such as X-rays or magnetic resonance imaging, as ordered.

Be vigilant to help patients avoid complications or get further treatment when needed.

A closer look at elastomeric infusion devices

Elastomeric infusion devices are small, disposable, nonpowered pumps consisting of an elastomeric reservoir inside a protective shell and an administration set that contains a flow restrictor system. The reservoir containing the drug operates with a sustained internal pressure. These devices are used after surgery to control pain by delivering an anesthetic directly to the surgically repaired area or in close proximity to the nerves associated with the surgical area. This medication administration method allows earlier patient discharge from the hospital and decreases the need for opioids.

Pain pumps infuse a drug at an hourly flow rate over a period of 2 to 4 days. The pressure in the filled reservoir, the flow control tubing, and the flow restrictor determine the flow rate. Most pumps have a maximum capacity of 120 mL.


What's chondrolysis?

Chondrolysis is characterized by the complete loss of articular (or hyaline) cartilage. Articular cartilage covers bones where they contact other bones and acts as a lubricant, smoothing movement, reducing friction, and protecting bones from wear. Articular cartilage has difficulty repairing itself because it grows very slowly and has no blood supply.

References


