Temporo-mandibular dysfunctions and injections

Temporo-mandibular joint (TMJ) dysfunction is a recurrent pathology and classical treatment only relieves some patients. Botulinum Toxin type A (BoNTA) injections, both intra-muscular and intra-articular, and intra-articular injections of sodium hyaluronate or hyaluronic acid (HA) are precious tools in the treatment of this pathology. Intra-muscular injections of BoNTA are very effective in curing bruxism. Intra-articular injections of HA sedate average intensity joint pain and injections of BoNTA sedate more acute pain. Furthermore, intra-articular HA injections improve articular noise and mouth opening.

Fig. 1. Intra-articular injection of BoNTA in the masseter muscle.

Muscular relaxation is a well-known effect of BoNTA, but the nociceptive effect has been more recently discovered. HA, contrary to BoNTA is not a medication but a viscoelastic implantable medical device. Intra-muscular injection of BoNTA has been performed in our department since 2002. The masseter and temporal muscles are injected. Intramuscular injections of BoNTA can release tension from the masticatory and cervical muscles.

After 2004, we began to carry out intra-articular injections, firstly, with HA, then with BoNTA. HA had already been used in injection in other joints for some time, and we successfully tried it in the TMJ. At that time, Mahowald's team had published their results using BoNTA in knees and

shoulders. We tried in the TMJ with different dosages and concluded that the minimal effective dose was 30 U.

Intra-articular HA relieves pain and sometimes diminishes joint clicking and locking that occurs during mouth opening. BoNTA, on the other hand, has a purely analgesic action, but acts even in cases of severe pain.

We reserve this technique for patients with pain higher than 5/10 on a Visual Analogue Scale (VAS). The BoNTA used in our department is Botox* (Allergan Pharmaceuticals, Westport, Ireland). The dosage for these indications is from 30 to 150 units for the masseter muscle and from 10 to 50 for the temporal muscle. We injected 30 U in the joint as shown above. For the HA injections, we used 1 ml per joint of Arthrum* (Arthrum H 2% - 2 ml – LCA Pharmaceutical, Chartres, France).

Fig. 2. Intra-articular injection of BoNTA in theTMJ.

BoNTA is produced by a bacterium, Clostridium Botulinum. It produces paralyzing toxins of the flaccid type. We already knew that this toxin blocked the release of acetyl-choline (Ach) in the synapse. This muscle-relaxing effect of BoNTA has been well-documented for some time. More recently, it has been proven, that other neurotransmitters are also blocked. It has been shown that BoNTA interferes with the synthesis of neuro-transmitting and neuro-modulating polypeptides such as Substance P and CGRP, which are key mediators of neurogenic inflammation. That is the reason for the efficiency of the toxin in pain and inflammation.

All the intra-articular injections require the use of a standard aseptic technique under local anesthesia. To be carried out, these injections need only anatomical reference points (the posterior border of the ramus to the condyle and the inferior border of the zygomatic arch).

The expected result for the intra-muscular injections is to have no more pathological contractions and no more pain. For the intra-articular injections, the expected result is different depending on what product is used:

> For the BoNTA, the action is only on pain and we use it on severe, refractory TMJ pain, expecting to have a reduction of 2 points or more on the VAS, in order to be qualified as effective.There is no action (or a very transitory one) on mouth opening and no action at all on articular noise.
> For the HA, there is a mechanical action on average pain, on articular noise and on mouth opening.

However, all these techniques decrease pain and improve quality of life.

Eighty-five percent of the patients treated with intra-muscular BoNTA injection improved. Total or partial pain relief was obtained in 95 % of the patients after intra-articular sodium hyaluronate injections. Seventy-six percent of the 56 patients treated by intra-articular BoNTA injections improved, sometimes with complete pain relief.

These different techniques allow for good results, even if they do not revolutionize the treatment of temporo-mandibular disorders. In the hands of experienced practitioners, they are efficient, have a low morbidity rate, are cost-effective are now well-known and accepted by patients.

Dominique Batifol
Department of Maxillofacial surgery, Montpellier University Hospital, France

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