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Short Communication Open Access

Intraforaminal Ozone Therapy and Particular Side Effects: All that Glitters aren't Gold

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Short Communication

Low back pain syndrome is often due to postural disorders, nerve root syndrome, osteoporosis, myofascial pain syndrome, fibromyalgia, vertebral fractures, osteomyelitis, sacroiliitis, cauda equina syndrome and tumors. In some cases the reason for the pain remains unknown, and consequently the therapy cannot be specific, so the therapeutic approach is often only symptomatic and not etiologic.

There are pharmacological and non-pharmacological therapies such as spinal manipulation, exercise therapy, cognitive-behavioral therapy, massage and acupuncture. In case of treatment failure the patients resort to surgical treatment, but many interventional techniques, not included in the previous APS/ACP guideline, are also available for LBP treatment. Unfortunately, these therapies can be applied incorrectly, with a consequent therapeutic inefficacy or even serious side effects.

In the study "Intraforaminal ozone therapy and particular side effects: preliminary results and early warning" the side effects of the ozone therapy by the intraforaminal approach and the intraforaminal steroid injections (16 applications in an 8-week period: standard therapy) were compared. In this case, such a number of infiltrations represent an indication outside of the correct protocol.

The use of ozone in medicine derives from its intrinsic properties as an unstable allotropic form of oxygen. It is used in the treatment of osteo-articular pain and nociceptive-neuropathic pain, osteoarthritis, facet joint syndrome, spinal canal stenosis, spinal instability, myofascial syndrome, fibromyalgia syndrome, and especially degenerative disc disease and disc herniations. Specifically, in cases of disc herniations, ozone is able to react with proteoglycans, glycosaminoglycans and other macromolecular complexes, inducing the oxidation of glucuronic acid, glycine and 4-hydroxyproline. In this way, the intra- and intermolecular chemical bonds are broken, releasing entrapped water. Subsequently, after the water reabsorption, the intradiscal and periradicular pressure decreases, and as a consequence the pain and symptoms improve. For the treatment of disc herniations, oxygen-ozone therapy can be given through three techniques: intramuscular, intradiscal or intraforaminal. Although in some diseases ozone therapy produces excellent and long-lasting therapeutic effects, nowadays ozone therapy is increasingly used to treat the disc hernias not responsive to conservative management. In most cases this therapy is even proposed as an alternative to surgery, although its effects are often only partial and temporary.

Above all, very serious side effects can occur, like seen in patients previously treated with intraforaminal ozone therapy and then undergone to microsurgery for lumbar disc hernia or lumbar segmental stenosis.

Before surgery the patients in the study were subjected to an MRI evaluation accomplished in order to perform a micro-discectomy or micro-decompression and several hard adhesions between the soft tissues and bony structures were unexpectedly discovered. They occurred only in the patients previously treated by ozone injections. In particular, it was noted that the root contracted and had firm and adhesive adhesions with the dural sac and/or with the fragmented disc, which were difficult to resolve. In three cases some irreversible finger glove invaginations among the herniated fragment, root and dural sac were found. In four cases of the study it was also not possible to finish the surgery by the microsurgical approach and it was necessary to convert to an open approach to perform a decompressive laminectomy. In one case, an iatrogenic spinal meningeal cyst with invagination of the roots was noticed. This lesion was also detected during the preoperative MRI, but it appeared only after the ozone therapy treatment, about 9 months after the last cycle of infiltrations. Therefore, we discovered a complete subverting of the anatomy, especially of the anatomical relationship between the various structures placed inside the spinal canal. It is noteworthy that none of these patients had previously been subjected to spine surgery.

These findings were not present in the patients who did not receive any injections or who received intraforaminal steroid injections. That could exclude that the tissue damage was due to the mechanical action of the needle during the injection.

In the literature there are only a few reports about the possible side effects resulting from treatments with oxygen-ozone. Side effects reported are: insomnia, itching, papules around the point of infiltration, gastritis, dizziness, tachycardia and hot flushes, bilateral vitreo-retinal hemorrhages, headache after oxygen-ozone therapy related to pneumoencephalus as a consequence of inadvertent intrathecal puncture, paresthesias and hypoesthesia due to a spinal nerve injury subsequent to the percutaneous intradiscal infiltration of ozone, vertebrobasilar stroke during ozone therapy, subcutaneous hematoma at the puncture site, pyogenic spondylodiscitis associated to a epidural abscess, discitis due to Achromobacter xylosoxidans, fulminating septicemia. All these adverse effects must be considered as side effects correlated with the ozone administration procedure and not side effects closely related to the ozone itself.

Although these data are preliminary and it is important not to raise unnecessary alarms, it is important to assert that the ozone therapy procedures can be associated with several major complications. In fact in this series, such a number of infiltrations represents an indication outside of the correct protocol. This demonstrates that the inappropriate use of ozone can cause serious side effects. Therefore it is mandatory to follow precise and specific indications, strictly according to the protocols. Therefore, it is necessary to perform a revision of the guidelines and protocols related to ozone therapy application.

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