

Debulking Tumors Prior to Insertion of Balloon or Cement

In “Balloon Kyphoplasty for Multilevel Spinal Metastases from Breast Cancer” (*J Support Oncol* 2007;5:243–246), Dr. Alberico examines the use of a new technique—the “eggshell technique”—as part of balloon kyphoplasty to address severe and uncontrolled pain in patients with vertebral metastases, in this case originating from the breast.

I find it interesting that although the eggshell technique is designed to contain extravasation that takes place during cement injection for kyphoplasty, it appears that the technique is only implemented after a balloon is inserted and expanded. More importantly, the risk of tumor embolization or retropulsion during the initial balloon inflation is not addressed. The complication rates for kyphoplasty and vertebroplasty are many times greater in the face of an existing bone tumor. There is no discussion of the value in removing tumor prior to insertion of any material, either a balloon or cement, in the vertebral body.

When I treat a patient with a vertebral compression fracture secondary to spinal metastases, I use a device (Cavity SpineWand; Arthrocare, Sunnyvale, Calif.) to debulk the tumor prior to cement injection. It uses low-temperature plasma to dissolve the tumor into elemental gas, which escapes from the cannula. This tumor removal creates a space, which decreases or eliminates the risk of embolization or tumor retropulsion.

Using this procedure, I have treated more than 50 patients, all of whom experienced immediate pain relief and excellent outcomes. In addition, the procedure takes only about an hour, and most patients do not require an overnight stay in the hospital.

In my opinion, the ability to remove tumor tissue prior to inserting a balloon or cement is a vital part of the treatment of patients with metastatic spinal tumors.

It is simply not acceptable to embolize tumor tissue when this option exists.

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Author Response

Dr. Georgy discusses concerns with the eggshell technique, asserting that it is safer to first debulk the tumor using a Coblation device. The technique described by Dr. Georgy could be associated with an unacceptable risk of potential complications while not providing any true improvement to patient safety or outcome.

Manipulating tumor tissue and injecting bone cement into the resulting cavity could be associated with extravasation of cement into the epidural space if measures are not taken to protect the posterior vertebral wall. A further concern is maneuvering the heated tip of a Coblation device in close proximity to an unprotected posterior vertebral wall. Use of the eggshell technique creates a mechanical barrier to epidural extravasation of polymethyl methacrylate (PMMA) during the injection, minimizing the potential for extravasation and serious associated complications.

Due to the lytic nature of metastatic spinal tumors, the initial inflation of the balloon in balloon kyphoplasty appears to compress the tumor inside the vertebral cavity. Admittedly, it is unclear whether this step results in any displacement of cells into the vascular system or surrounding tissues. However, the same can be said of any percutaneous manipulation of the tumor, including Coblation. We routinely obtain

postprocedural computed tomography (CT) in all cases and have not observed any evidence of tumor shifting to the epidural space or paravertebral space. Follow-up magnetic resonance imaging in many cases, including the one in my article, also shows no evidence of tumor displacement after balloon kyphoplasty, and frequently the tumor in the treated level remains stable over time. We perform balloon kyphoplasty with the patient in a prone position, which distends and increases the cavity within the vertebral body, thereby reducing the possibility of displacement of malignant tissue outside the vertebral body.

My concern with Coblation is in the edges of the cavity created from the tissue removal process. The cavity edge is in free communication with the surrounding structures, and the post-Coblation vertebroplasty is as likely to have PMMA extravasation as often as vertebroplasty. The eggshell technique provides yet another level of protection against cement extravasation through the posterior vertebral wall. The balloon inflation itself compresses tissues to the edge of the cavity, providing an additional layer of mechanical obstruction between the center of PMMA injection and the adjacent structures.

I have seen no evidence in the literature of tumor retropulsion or embolization with balloon kyphoplasty using the eggshell technique. In practice, I have not seen it occur in the approximately 400 patients I have treated with this technique and for whom I have obtained postoperative CT scans. These CT scans have shown absolutely no evidence of embolization or tumor retropulsion.

In my opinion, balloon kyphoplasty using the eggshell technique is currently the safest and most effective treatment for these patients.

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