

## **International Myeloma Working Group (IMWG) consensus statement on the role of vertebral augmentation in multiple myeloma<sup>1</sup>**

Following are the recommendations of the IMWG on role of minimally invasive percutaneous injection of polymethyl methacrylate (PMMA), first developed as “vertebroplasty” in France in the late 1980s, as treatment for painful vertebral compression fractures (VCFs).

### **Consequences of VCF-related kyphosis**

- Compression of abdominal contents
  - Anorexia, weight loss
  - Decreased lung capacity
- Limited exercise tolerance/physical activity
- Anterior loading of spine
  - Subsequent fractures
  - Increasing kyphosis and deformity

### **Types of vertebral augmentation**

- Vertebroplasty: fractured bone fragments are stabilized and strengthened by percutaneous injection of PMMA.
- Kyphoplasty: inflation of a balloon in the vertebral body prior to PMMA injection can restore vertebral height and reduce kyphotic deformity in addition to stabilizing the fractured vertebral body.

### **Indications for vertebral augmentation**

- Primary: severe pain present (pain >7/10 on Visual Analogue Scale)
  - Collapse of one or more vertebra (VCF)
  - Bone destruction (osteolytic/osteopenic) with high risk of collapse of one or more vertebra
- Secondary: severe pain absent (pain ≤ 7/10 on VAS)
  - Significant loss of height and/or structural integrity or stability

### **Contraindications to vertebral augmentation**

- Absolute
  - Contraindications to general or local anesthesia
  - Pregnancy
  - Bleeding disorder
  - Infection at the site
  - Pain unrelated to vertebral collapse
  - Cord compression
  - Presence of overt instability

- Severe cardiopulmonary insufficiency
- Allergy to procedure-related drugs/contrast
- Relative
  - Lesions above T3
  - Osteoblastic metastases
  - Patient < 40 years of age
  - Technically not feasible (vertebra plana)
  - Fractures with obstructing plasmacytoma
  - Retropulsed bone

### **Identification of patients suitable for vertebral augmentation**

- Careful assessment to determine source/severity of pain
- MRI is essential to document the anatomy and assess spinal cord edema/compression.
- Assessment of myeloma disease status and potential anti-myeloma treatment needs
- Assessment of other pain therapy options

### **Number and location of levels to be considered for treatment**

- 3 or 4 vertebrae per intervention is considered reasonable and feasible during a single procedure, if required.
- Vertebral augmentation for adjacent or suspect vertebrae may be necessary when there is a fracture with kyphosis in the thoracolumbar region.
- For practical purposes, T3-L5 is the range that can be performed safely by percutaneous route.

### **Method of vertebral augmentation**

- Risk of complications, particularly PMMA leakage, is greater with vertebroplasty.
- The likelihood of clinically significant complications is dependent upon the experience of the operator.
- The choice of balloon kyphoplasty versus vertebroplasty should be left to the discretion of the operator and based upon the goals of the procedure.

### **Potential complications of vertebral augmentation**

- Extravasation of PMMA cement
  - Local effects
  - Systemic effects including pulmonary
- Cord compression (spinal cord)
- Radiculopathy (foramina)
- Pneumothorax
- Retroperitoneal hematoma
- Infection: local/systemic

## **Use of vertebral augmentation versus radiation therapy, systemic therapy, or medical pain therapy**

- Vertebral augmentation is the procedure of choice to improve quality of life for painful VCFx.
- Up-front external beam radiation therapy (EBR) should be considered for patients with plasmacytomata, extramedullary masses, and cord compression.
- EBR can be performed in one session without risks of anesthesia, bleeding, infections, or compromise of vital structures.
- Systemic anti-myeloma therapy is an alternative for rapid reduction in myeloma tumor burden.
- Medical pain therapy can provide helpful relief as necessary.

### **Physical rehabilitation from vertebral augmentation**

- A physical rehabilitation program is recommended to maximize recovery from augmentation.
- Ideally, this should be in the form of water aerobics and thoracolumbar stabilization with an extension directional focus, under the auspices of a physical therapist.

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<sup>1</sup>MA Hussein *et al.* The role of vertebral augmentation in multiple myeloma: International Myeloma Working Group Consensus Statement. *Leukemia* (2008), 1-6.