**Results:** Lesion size ranged from 12 mm to 70 mm. Technical success was 100%. Mean ablation time was 4.75 minutes (1-13) with an average of 4.2 cycles per ablation lasting from 30 seconds to 3 minutes with a ablation power ranging from 30 to 160 W. Mean VAS before procedure was 7.11/10. Immediate pain relief was greater than or equal to 50% in 9/10 cases and lasted for an average of 4.85 months (range 0.5-15months). No adverse events occurred during or after procedure

**Conclusion:** Percutaneous MWA appears to be a feasible, safe, effective and fast technique for the management of refractory pain in spinal and parspinal tumors. Ablation time appears to be highly reduced compared to radiofrequency ablation.

## 4:10 PM Abstract No. 57

### Development and evaluation of an inherently radiopaque, adhesive bone cement for vertebroplasty

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**Purpose:** To develop and identify the optimal composition (based on injectability ($t_i$), compression strength ($\sigma_c$)) of a new load bearing adhesive cement and to evaluate the in vitro cytocompatibility and clinical radiopacity of the optimal composition against a conventional PMMA based vertbroplasty (VP) cement.

**Materials and Methods:** The cement consists of a glass powder (0.48$GeO_2$, 0.36ZnO, 0.05$ZrO_2$, 0.05$Na_2O$, 0.04SrO, 0.02CaO) mixed with an aqueous solution of polyacrylic acid. This study examined 15 cement compositions with glass to acid ratios (G:A) of 1:1 to 2:1, and the acid concentration ranging between 40-60wt%. $\sigma_c$ was evaluated in line with ISO9917 using a 2kN load cell (1mm/min after 24h incubation at 37°C, n=5). Cement injectability was measured using 1cc syringes and expelling cement through a 12G cannula under a compressive force applied by the Instron, n=3. $t_i$ was recorded as the length of time from cement mixing until the applied syringe plunger load reached 200N. Cytocompatibility of cement extracts was assessed quantitatively via 24h MTT assay using an NIH 3T3 cell line. Extracts were tested against a tissue culture water (TCW) control, n=3. CT scans were used to evaluate the radiopacity of the novel cement and Spineplex (Stryker International, Hamilton, Canada). Furthermore, both cements were injected into synthetic vertebral models under clinical fluoroscopic settings and qualitatively compared.

**Results:** The new cement compositions demonstrated $\sigma_c$ between 12-62MPa and $t_i$ between 5-17min. Optimal compositions 1, 2, and 3 were derived and demonstrated $\sigma_c$ and $t_i$ values of: 43MPa, 46MPa, and 54MPa, and $t_i$ up to 19m59s, 15m30s and 15m32s, respectively. Cell viability of extracts from optimal compositions 1, 2, and 3 were statistically similar to the TCW control (94, 100, 98 vs. 100%, respectively). The novel cement exceeded the fluoroscopic traceability of Spineplex; CT scans found the novel cement to have a radiopacity of 6052HU compared that of Spineplex at 4244HU.

**Conclusion:** This work identified a novel bone cement which is more radiopaque than Spineplex, blends both $t_i$ and $\sigma_c$ in appropriate levels for the VP procedure and exhibits high in vitro cell viability.

## 4:18 PM Abstract No. 58

### Percutaneous treatment of lumbar and cervical intervertebral disc herniations with radiopaque gelified ethanol (RGE): clinical and morphostructural changes in our experience

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**Purpose:** To demonstrate the safety and efficacy of injection of RGE in the percutaneuos treatment of lumbar and cervical disc herniations. Furthermore, intervertebral disc morfostructural changes has been evaluated by three dimensional compute tomography (3D-CT).

**Materials and Methods:** Between September 2010 and April 2012, 47 symptomatic patients (21 females, 26 males, age range at treatment: 33-75 years) have been treated for 54 lumbar intervertebral disc herniations in L2-L3 (n: 3), L4-L5 (n: 25), and L5-S1 (n: 26) levels, and 7 cervical intervertebral discs in C4-C5 (n: 2), C5-C6 (n: 3), C6-C7 (n: 1), and C7-D1 (n: 1) levels by percutaneous intradiscal injection of RGE (DISOGEL by Gelscom SAS Caen France). All treatments were performed under fluoroscopic guidance with biplanar 3D rotational angiographic system using 18 G needle for lumbar and 21 G for cervical. All patients received local anesthesia and a "short term" antibiotic therapy. In 14 patients, the treatment was performed in 2 levels in the same session. In 5 cases large extruded and migrated herniations have been treated. All patients underwent clinical evaluation, including VAS scale before treatment, soon after treatment, 3 and 6 months later. Low dose three-dimensional computed tomography (3D-CT) was obtained after treatment and 3 months later.

**Results:** All the procedures have been well tolerated. There were no allergic complications. 34 patients (85%) with lumbar disc herniations and 4 of 5 patients with cervical herniations obtained improvement in symptoms. In these patients, VAS scale showed a significant score reduction ($p < 0,001$). This was confirmed in the 5 extruded and migrated herniations, which underwent significant clinical improvement. In the other patients, clinical symptoms were substantially unchaged. 3-month 3D-CT follow-up showed little or no changes in volume and shape of intervertebral disc, but there was discordance with clinical signs.

**Conclusion:** These results show the efficacy and innocuity RGE. RGE does not produce any intervertebral disc morphostructural change.