

Musculoskeletal Tumours

Musculoskeletal applications were addressed in a number of sessions, including a Hands-on Workshop, Interactive Sessions and even a Video-Learning Session. Evidence for their use was presented alongside radiotherapeutic and surgical options at the Clinical Focus Session, equipping those practicing MKS interventions with the skills needed to be clinically involved in their hospital's tumour boards.

Evidence for local control with ablation

Dr. Matt Callstrom (Rochester, MN/US) discussed the evidence for using ablation to achieve local tumour control in bone and soft tissue. Early results indicate that a number of modalities can be successfully used to target such tumours, and may be particularly useful for tumours that don't respond well to chemotherapy, such as chondrosarcoma.

Existing data covers a mixed range of histologies (melanoma, renal and others), but the Mayo Clinic experience has achieved 87% overall local control (CI 75-93%). While the disease-free interval is generally short (average 6 months), ablation seems to offer an extended survival of approximately 4 years, shifting the clinical focus to a quality of life issue.

Disease-specific outcomes for three tumour types were addressed in more detail. Oligometastatic prostate cancer responds well to ablation. Cryo-ablation produces a good biochemical response: local control is in the 80% range, with PSA reduction from approximately 1.5 ng/ml to 0.3 ng/ml.

Approximately 65% of RCC patients present with a single site of metastasis, often in lung or bone, which respond well to focal therapy. While cryotherapy is not cheap, it compares well with systemic therapies, and has been recorded as achieving local control of 87%.

Desmoid tumours have a high surgical recurrence (77%) and wide margins are necessary, entailing significant morbidity. Ablation can offer good functional preservation, and is a potential front-line therapy.

Evidence for radiation therapy in local control

Radiation therapy (RT) is widely used in MSK treatment, with 50% of all cancer patients receiving it. Dr. Barbara Jereczek-Fossa (Milan/IT) discussed the advances being made in the field, and how improved survival rates have led to a new aim: "cure without complications".

As primary MSK tumours are rare, there is no Level 1 evidence available. For primary bone lesions, local control of ~90% has been demonstrated in extremity tumours, while spine and pelvis lesions do not respond well to conventional RT. Advances in carbon ions and proton-beam treatments may improve response in radioresistant tumours such as chondrosarcoma and chordoma. Soft tissue tumours predominantly appear in extremities (50%) and trunk (33%). RT is an intrinsic part of limb preservation, and in combination with wide-excision, has largely replaced amputation, with grade A recommendation (5-year local control >80%, 5-year OS 50-60%).

Bone and soft tissue metastases are a common cause of severe cancer pain. RT is given routinely, as it confers pain relief in 60-90% of patients.

RT offers many advantages: it is a pain-free, non-invasive outpatient procedure that is easily combined with other modalities. However, it does have its limitations, and IR options may help bridge this gap. Advances in oncology are moving us towards chronic or even chronic curable cancer, and the better-tolerated local treatments will play a strong role here.

When does HIFU fit in?

Delivered under US or MR guidance, high-intensity focused ultrasound is totally non-invasive, does not involve ionising radiation, and has low complication rates. Dr. Alessandro Napoli (Rome/IT) discussed the evidence for its use in MSK settings.

RT is the gold standard for bone metastases, but up to 30% of patients may remain with painful lesions at the end of treatment. As a result, two centres in Rome and Bologna have designed a prospective, single-arm, multi-centre study. So far, 72 patients with 87 non-spinal lesions and VAS



≥4 have been enrolled. While not complete, individual cases show great promise, and Dr. Napoli gave some impressive examples that delivered immediate and dramatic pain relief. Clinical experience thus far indicates that not only can MRgFUS be used as primary technique in pain palliation; it has a potential role in achieving local tumour control.

Osteoid osteoma is another interesting application: a small number of cases achieved good results when the nidus was targeted. Dramatic pain relief was conferred with 24 hours, and patients remained stable at 18- or 24-month follow-up. The safe, non-invasive and repeatable nature of HIFU means this should be considered as a primary technique in treating osteoid osteoma.



Bone consolidation: cementoplasty vs. osteosynthesis

Dr. Frédéric Deschamps (Villejuif/FR) described the role of cementoplasty and percutaneous osteosynthesis, focusing on the consolidation applications of both. Cementoplasty is particularly suited for compression fractures of the vertebrae, but cement leakage from high-pressure areas is a constant concern, and to protect against this, filling should be stopped before optimal consolidation is achieved.

Consolidation of the pelvis or proximal femur raises other challenges. Bone cement is not appropriate for tension or shear stress, and fractures frequently occur despite consolidation in e.g. the femoral head, pubis, iliac crest and acetabular roof. Leakage through fracture lines is again a consideration. To overcome both, percutaneous screw fixation can be employed. The procedure is similar to a biopsy, and requires an 8 G needle, a Kirschner wire and cannulated screws. It can be performed under fluoroscopy, but 3D acquisition is needed to assess placement. One drawback of screw fixation is that metastasis growth can displace the screw. In such cases, combined use of screws and cement is a good option.

Bone palliation and consolidation are major issues in cancer patients. Cementoplasty is well-established, but has limitations. Screw fixation is a straightforward procedure that achieves both consolidation and pain relief, and must be considered as an additional tool in the therapeutic arsenal of all IRs.

When to use embolisation in combination with ablation

Little evidence exists to support combined use of embolisation and ablation, but the topic was tackled with gusto by Dr. Anthony Ryan (Waterford/IE), who also addressed various technical considerations.

Use of pre-operative embolisation predates ablative technologies. Initial studies demonstrated safety and efficacy. One of the few RCTs in the field (Clausen et al) demonstrated a significant reduction in operating time, and reduced blood loss in hypervascular tumours. The sooner surgery follows embolisation, the greater the reduction in blood loss, as with time, recanalisation and collateral establishment occurs. It can be presumed that similar mechanisms apply to ablation, although this remains to be proven. Palliative embolisation works primarily by virtue of decreasing tumour volume and turgor, and has a knock-on effect of decreasing compression of adjacent structures. It has not yet been established if there is a synergistic effect with ablative techniques.

Dr. Ryan detailed the outcomes of various small series. While none can give us a definitive answer, there is weak evidence to show benefit when combined with other therapies. Based on this, he believes that embolisation is generally underutilised, and that it complements ablative outcomes. It is a safe procedure, and can be a powerful tool for palliation, but more data is needed.

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