

Monitoring bone metastases of cancer

UniQ ICTP

UniQ ICTP – a proven and reliable tool

Breast, lung and prostate cancers often metastasize to bone. In the follow-up of cancer patients early detection of metastases is critically important. ICTP is an early marker of skeletal metastases providing valuable information of the progression of the disease.

Collagen in bone

Type I collagen is the only collagen type found in mineralized bone, where it accounts for more than 90 % of the organic matrix. ICTP is a degradation product of type I collagen. It is liberated to the blood circulation during pathological breakdown of bone, e.g. due to bone metastases of cancer.

Cancer metastases

Breast, lung and prostate cancer are among the leading cancer types in the world. These cancer types can metastasize, bone being the most common site of metastasis. Skeletal metastases can appear years after resection of the primary tumour and greatly affect the prognosis and quality of life of cancer patients. Patients with metastatic carcinoma can suffer from significant pain and skeletal related events (SRE) such as pathological fractures, hypercalcemia, and spinal cord compression, all of which diminishing their quality of life.

Detection of bone metastases

In the follow-up of patients treated for cancer the early detection of bone metastases is critically important for their clinical management.

Bone scan

Imaging based on radiological bone scan or scintigraphy is the routinely used method for diagnosing bone metastases. They are considered sensitive for the initial diagnosis, but their use in monitoring is limited. Radiography only gives a definite diagnosis when the bone is already substantially damaged by the tumour and scintigraphy is time-consuming, invasive and expensive.

Moreover, bone scans are not suitable for monitoring the short-term treatment response of bone metastasis.

Bone markers

Biochemical bone resorption markers have the highest independent diagnostic value for detecting and potentially predicting bone metastasis. Monitoring of cancer patients with serial measurements of bone markers helps in the diagnosis of skeletal metastases. ICTP has been shown to be indicative of the

early stages of skeletal involvement (one to five metastases) in breast, prostate, and lung cancer patients and thus facilitates the timely diagnosis of skeletal metastases. ICTP has a high independent diagnostic value for detecting and potentially predicting bone metastasis in breast cancer patients.

Monitoring therapy

Bisphosphonate treatment is an established standard of care for patients with bone metastases. Bisphosphonates prevent and delay SREs, reduce bone pain, and improve quality of life. Bisphosphonate treatment is however expensive and does not benefit all patients. ICTP provides valuable information regarding progression of bone metastasis in men with metastatic prostate cancer undergoing bisphosphonate therapy.

Routine use of ICTP

ICTP has successfully been in routine use since the 1990's in Japan. It is used at an interval of 6 to 12 months for monitoring prostate, breast and lung cancer patients for bone metastases. In the Czech Republic the guideline on the use of tumour markers in clinical practice recommends the use of ICTP for osteolytic metastases with a monitoring interval of 6 months.

Benefits of using ICTP

- Early marker of bone metastases, becomes elevated months before lesions become radiologically detectable serial measurements help in timely diagnosis of bone metastases
- Convenient for the patient, only a simple blood test is needed
- No need for hospitalization contrary to bone scan
- Inexpensive compared to bone scan

References

1. Voorzanger-Rousselot N et al. Association of 12 serum biochemical markers of angiogenesis, tumour invasion and bone turnover with bone metastases from breast cancer: a cross-sectional and longitudinal evaluation. *Br J Cancer*. 2006;95(4):506-14
2. Petrut B et al. A primer of bone metastases management in breast cancer patients. *Curr Oncol*. 2008;15(Supplement 1):S50-7
3. Koizumi M et al. Bone metabolic markers in bone metastases: *J Cancer Res Clin Oncol* 1995;121:542-548
4. Leeming DJ et al. The relative use of eight collagenous and noncollagenous markers for diagnosis of skeletal metastases in breast, prostate, or lung cancer patients. *Cancer Epidemiol Biomarkers Prev* 2006;15:32-38
5. Lein M et al. Serial markers of bone turnover in men with metastatic prostate cancer treated with zoledronic acid for detection of bone metastases progression. *Eur Urol* 2007;52:1381-1387