

Factsheet



FULL TITLE METASTRA – Computer-Aided Effective Fracture Risk Stratification of Patients with Vertebral Metastases for Personalised Treatment through Robust Computational Models Validated in Clinical Settings

PROGRAMME HORIZON-HLTH-2022-TOOL-12-01-two-stage

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ABSTRACT Cancer patients (2.7M in Europe) with a positive prognosis are exposed to a high incidence of secondary tumours (≈ 1 M). Bone metastases spread to the spine in 30-70% cases, reducing the load bearing capacity of the vertebrae and triggering fracture in 30% cases. Clinicians have only two options: either operate to stabilise the spine, or leave the patient exposed to a high fracture risk. The decision is highly subjective and can either lead to unnecessary surgery, or a fracture significantly affecting the quality of life and cancer treatment. The standard-of-care to classify patients with vertebral metastasis are scoring systems based on radiographic images, with little consideration of the local biomechanics. Current scoring systems are unable to establish an indication for surgery in around 60% of cases. Thus, there is an unmet need to accurately and timely quantify the risk of fracture to improve patient stratification and identify the best personalised treatment. This interdisciplinary project will develop Artificial Intelligence (AI)- and Physiology-based (VPH) biomechanical computational models to stratify patients with spine metastasis who are at high risk of fracture and to identify the best personalised surgical treatment. After rigorous model training with clinical (2000 retrospective cases) and biomechanical (120 ex vivo specimens) data, the new approach will be tested in a multicentric prospective observational study (200 patients). The models will be combined in a decision support system (DSS) enabling clinicians to successfully stratify metastatic patients. The models and the DSS will be designed so as to be suitable for regulatory requirements and future exploitation. METASTRA will propose new guidelines for the stratification and management of metastatic patients. METASTRA approach is expected to cut the uncertain diagnoses from the current 60% down to 20% of cases. This will reduce patient suffering, and allow cutting expenditure by 2.4B€/year.

DURATION 60 months (01/07/2023 – 30/06/2028)

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