

Computer Tomography (CT) determined sarcopenia and physical functioning in lung cancer patients

Suzanne ten Dam; Marijke de Leeuw; Hinke Kruijzen; Chris Dickhoff; Marika van der Schaaf; Marika van der Leeden; Ben Zwezerijnen; Nicolette Wierdsma.

Contact: N.Wierdsma@amsterdamumc.nl, Amsterdam University Medical Centers, The Netherlands



Description of the initiative

Sarcopenia is common in lung cancer patients, and its presence is associated with post operative complications and poor survival. Adequate physical activity and nutrition are important factors that influence recovery in physical functioning and modulate physiological decline/sarcopenia. However, the impact of sarcopenia on physical functioning in operable lung cancer patients remains unclear. There is a lack of knowledge about the evolution of muscle loss and/or fat gain (sarcopenic obesitas) in the months or weeks following lung surgery. Periodic CT-determined sarcopenia assessments are expected to facilitate early and timely intervention with nutrition and exercise treatments that can help prevent or delay sarcopenia progression and poor outcomes. To confirm sarcopenia, computed tomography (CT) is considered to be a gold standard for non-invasive assessment of muscle mass.

Objective: To investigate the longitudinal association between CT-determined muscle mass and recovery in physical functioning in patients after lung cancer surgery. The second aim is to investigate the effectiveness of a blended nutrition and exercise program on CT-determined muscle mass in patients after lung cancer surgery.

Planned activities & deliverables

Study design: This project will be complementary to an existing trial (OPRAH Trial NL9793) at Amsterdam UMC and Antonius Hospital Nieuwegein, (the Netherlands) which is a multicenter, assessor-blinded, randomized controlled in 60 lung cancer patients. Three CT images routinely obtained in the perioperative workup, one preoperative and two postoperative, will be used. CT images are analyzed by a validated computer program AMUSE (acronym for Automatic MUScle and visceral/subcutaneous fat SEGmentor) for muscle mass necessary to diagnose sarcopenia.

Deliverables: Evidence on the longitudinal association between recovery in cancer patient reported physical functioning and the CT-determined muscle mass, and secondly the between-group difference in muscle mass measured by repeated CT imaging. Afterwards the results will be published.

Achievements: Improved interdisciplinary collaboration to identify cancer patients at risk for functional decline, contribution to the optimization and personalization of patient care in rehabilitation after lung cancer surgery and publication of a scientific article and (poster) presentation at (inter)national congress.

Resources & enablers

Personnel, financial needs: €30.000 euro will be spent on 2 years dietitian-researcher time to coordinate the project, determine muscle mass by CT-scans with AMUSE and perform statistical analysis.

Success factors: This project will be part of an ongoing randomized controlled trial. The project is a collaboration of multidisciplinary team consisting of dietitians, physiotherapists, surgeons, radiologists, and researchers. Working closely with professionals who have an extensive experience in diagnosing sarcopenia and the implementation and interpretation of measuring muscle mass with CT scans, would enable this project to be successful.

Results/outcomes & expected impact

Implementation: the findings will be used to implement CT-determined muscle mass in daily perioperative care to diagnose, prevent or delay sarcopenia progression. The results will be published in an international open access journal.

Innovative: CT analysis is a novel and growing field in healthcare. Knowledge about the impact of muscle mass loss on the recovery in physical functioning is needed to improve perioperative care.

Influence national nutrition policy: Increased awareness on prevalence of muscle mass loss and sarcopenia in this patient group and call for action to improve nutritional and physical care organization (pre- and postoperative).

Transferable: Transferable to all patients with CT images in their workup and follow-up. If this method of CT diagnosis ensures that we are effective in early recognition of sarcopenia and the OPRAH nutrition and exercise intervention can improve outcomes it can be widely implemented. The AMUSE CT coloring program will be available to all healthcare facilities within 2 years.