

Project Title: Pre-Operative Nodal Staging of Thyroid Cancer Using Ferumoxytol

Abstract: Papillary thyroid cancer (PTC) is the most common type of thyroid cancer. Metastases to the central and lateral neck compartments occur in 20-50% of patients with PTC. Nodal metastases predict disease recurrence and possibly decreased survival in PTC. Unfortunately central nodes cannot be reliably assessed using preoperative ultrasound or intra operative examination. Therefore, central compartment lymph nodal dissection (CLND) is the current gold standard for nodal staging. However, the role of prophylactic CLND is controversial because of the significantly increased morbidity of CLND plus total thyroidectomy, compared to total thyroidectomy alone.

Lymphotropic nanoparticle enhanced magnetic resonance imaging (LNMRI) was developed at the MGH to detect metastatic nodal disease in prostate cancer, independent of size and morphology of the lymph nodes, after intravenous administration of ultrasmall superparamagnetic iron oxide nanoparticle (ferumoxytol). We propose a pilot trial of LNMRI to detect metastatic lymph nodes in patients who are scheduled for resection of a primary thyroid cancer or resection of lymph node metastases from thyroid cancer. Our goal is determine the sensitivity and specificity of high resolution LNMRI to identify small and otherwise undetectable lymph node metastases in patients who are scheduled for surgical resection of papillary thyroid carcinoma, and to determine whether LNMRI will identify metastatic lymph nodes that would not have been noted during surgery.

The hypothesis is that LNMRI will provide enhanced accuracy of nodal staging in patients with thyroid cancer. The technique will identify small and otherwise undetectable lymph node metastases in patients with papillary thyroid carcinoma.