One of the largest uncertainties in radiotherapy treatment planning for squamous cell carcinomas of the head and neck is contouring the gross tumour volume (GTV). The treatment planning CT is used to contour the GTV, but under-contouring of the mucosal extent of the disease is common. Endoscopy exams can be used to reduce GTV errors by registering endoscopy images to the CT to project contours of the mucosal extent of the disease viewed under endoscopy. To register endoscopy and CT images, a rigid registration pipeline was developed using electromagnetic tracking and image based registration with a target of achieving a contouring error of less than or equal to 2mm between the two image sets. Inputs to the pipeline are endoscopic images, EM tracker positions and the CT image. First, a surface rendering of the airway is generated from the CT image. A real endoscopic image is then chosen and the corresponding EM tracker position of this image defines an initial camera pose with respect to this surface rendering. A virtual endoscopic image is generated at this camera pose that should match the real image. The real and virtual images are compared using image based metrics and input to a global optimization routine to find the best virtual camera pose. The pipeline was tested on four clinical cases (three laryngeal tumours and one buccal tumour) and a rigid phantom. On phantom data, a contouring error of less than or equal to 2mm was achieved in 14 of 18 images. On four images of glottal tumours from two clinical cases, the contouring error ranged between 2.4-6.1mm due to local deformation of the airway and the inclusion of trivial image features in the registration.