Laryngeal tumors assessment by computed tomography and magnetic resonance imaging

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(1) Clinical evaluation of the lesion:- Positive findings:1- High accuracy in evaluation and staging of glottic tumors (84.6%), especially T1 tumors.2- High accuracy in evaluation and staging of small and superficial lesions.- Negative findings:1- Low -accuracy in evaluation and staging of transglottic (0% in our series), glottic supraglottic (42.9%), and supraglottic (45.5%) tumors.2- Significantly high understaging (67.8%) of twenty-eight malignant laryngeal tumors.3- Inability to detect laryngeal space invasion.4- Inability to detect tumor submucosal extension.5- Inability to detect cartilage invasion.6- Inability to detect extralaryngeal spread.(2) CT evaluation of the lesions:-Positive findings:High accuracy in:1- Assessment and staging of transglottic (77.8%), glottic-supraglottic (57.1%) and supraglottic (100% in our series) tumors in comparison with clinical staging.2- Showing laryngeal space invasion (100% in our series).3- Showing cartilage invasion (83%).4- Showing extralaryngeal spread (100% in our series).5- Showing lymph node staging (89%).Negative findings:1- Inability to evaluate accurately small and superficial lesions.2- Understaging in 14.3% of all cases.3- Overstaging in 7.1% of all cases.4- CT showed false positive and false negative cartilage invasion in 6.7% and 10% of all cases respectively. It is less sensitive than MRI in evaluation of cartilage invasion.5- Sensitivity to ionic contrast media in some cases.6- Hazards of exposure to X-ray associated with CT scanning.(3) MRI evaluation of the lesion:-Positive findings:High accuracy in:1- Assessment and staging of transglottic (88.9%), glottic-supraglottic (57.1%) and supraglottic (100% in our series) tumors in comparison to clinical staging.2- Showing laryngeal space invasion (100% in our series).3- Showing cartilage invasion (87%). It is also more sensitive than CT in evaluation of cartilage invasion.4- showing extralaryngeal spread (100% in our series).5- Showing lymph node staging (89%), however, coverage of the nodal areas is a problem with MR imaging. With CT, one can quickly obtain a few extra scans to cover the key regions with MR imaging, the number of sections possible in a high resolution short-TR sequence is currently limited, and thus MR imaging may give inadequate coverage. The node bearing regions can be covered on the long-TR axial sequence, which produces more sections. Alternatively the area can be visualized with the sagittal and coronal short-TR images. Neither CT nor MR imaging can be used to completely exclude microscopic involvement.Negative findings:1- Inability to evaluate accurately small and superficial lesions.2- Understaging in 7.1% of all cases.1- Overstaging in 10.7% of

all cases.2- MRI showed false positive and false negative cartilage invasion in 10% and 3.3% of all cases respectively.3- Claustrophobia in 6.7% of all cases.4- Motion artifacts degrading in imaging in 6.7% of all cases.5- MRI is contraindicated in patients with a pacemaker or aneurysm clips.RecommendationsBased on the findings in this study, we suggest the following recommendations:1- The use of CT or MRI in evaluating and staging laryngeal tumors should be mandatory. This is because CT or MRI is of significant value in detecting tumor space invasion, submucosal extension, cartilage invasion, extrlaryngeal spread and occult neck metastases. These are usually undiagnosed clinically which may load to clinical understaging of the tumor.2- The combination of clinical examination and CT or MRI increases the staging accuracy of the tumors.3- CT should be used as a first choice to study laryngeal tumors because it is less expensive than MRI and it takes shorter time of examination. MRI may be used as an adjuvant to CT in suspected submucosal extension, cartilage invasion or vascular invasion. MRI can be of great value in patients who are sensitive to contrast material and cannot get examination with contrast.4- MRI is the modality of choice in the diagnosis of cartilage invasion, especially if the patient is fairly cooperative and is thought able to undergo the examination.6- The imaging modality used is less important than the radiologist’s knowledge of the Key anatomic landmarks. The most important landmarks, from a surgeon’s perspective, are the ventricle, anterior commissure, and the cricoid cartilage. The structures most helpful in identifying the ventricle are the paraglottic fat, the thyroarytenoid muscle, and the crytenoid cartilage.