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Comparative Study Between CT and MRI in Assessment of Thyroid Cartilage Invasion in Laryngeal Carcinoma

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Abstract: Background: Thyroid cartilage invasion in laryngeal carcinoma is a critical factor in staging and treatment planning. Accurate assessment using imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI) is essential for determining the extent of invasion. This study aims to compare the effectiveness of CT and MRI in assessing thyroid cartilage invasion in patients with laryngeal carcinoma to provide evidence-based recommendations for clinicians.

Methods: This randomized controlled trial included 50 patients diagnosed with laryngeal carcinoma, who underwent both CT and MRI to evaluate thyroid cartilage invasion. Direct laryngoscopy and histopathological data served as the gold standard for confirming the diagnosis. Demographic information, smoking status, and relevant clinical data were collected. CT scans were performed using a 64-slice multislice CT scanner, while MRI studies were conducted with a 1.5 Tesla machine. The accuracy of CT and MRI was compared using histopathological findings as a reference. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for both imaging modalities.

Results: CT demonstrated a sensitivity of 100.00% and a specificity of 61.54%, with a PPV of 88.10% and an NPV of 100.00%. MRI showed a sensitivity of 100.00% and a specificity of 80.00%, with a PPV of 95.12% and an NPV of 100.00%. Both CT and MRI had high sensitivity and NPV, making them reliable tools for excluding thyroid cartilage invasion. However, MRI exhibited a higher specificity and PPV compared to CT, indicating greater accuracy in confirming the presence of cartilage invasion. The chi-square test revealed no significant differences between the imaging modalities and histopathological findings ($p > 0.05$).

Conclusion: Both CT and MRI are highly sensitive in detecting thyroid cartilage invasion in laryngeal carcinoma. MRI demonstrated superior specificity and PPV, suggesting it may be more accurate in confirming invasion. These findings support the use of MRI as the preferred imaging modality when evaluating thyroid cartilage invasion in laryngeal carcinoma, though CT remains a reliable alternative when MRI is contraindicated

Keywords: Thyroid cartilage invasion, Laryngeal carcinoma, Computed tomography, Magnetic resonance imaging, Diagnostic accuracy

Introduction

Larynx cancer is a type of cancer that originates from the larynx tissue and causes major problems in diagnosis and treatment. In addition to its many complexities, the evaluation of thyroid cartilage invasion is an important factor affecting treatment decisions and patient outcomes. Correct determination of the thyroid bone affects not only surgical planning but also prognosis and overall survival (Obdey et al., 2015).

In recent years, diagnostic methods such as computed tomography (CT) and magnetic resonance imaging (MRI) have become important tools in the evaluation of larynx cancer. CT and MRI are especially good at seeing the extent of cancer and examining adjacent structures. However, the comparative diagnostic accuracy of these methods, especially in the diagnosis of thyroid cartilage, is still a subject of research and debate (Oshi et al., 2012).

CT imaging, known for its high resolution and rapid acquisition, has historically been recommended for bone assessment and calcification testing, which are important in the evaluation of thyroid cartilage. The ability of CT to provide detailed anatomical and bone quality details has made it the first choice in many clinical settings. Contrast-enhanced CT scans further improve the definition of soft tissues and help identify pathological changes associated with laryngeal cancer (Peretti et al., 2004).

MRI has great advantages, especially in terms of tissue integrity and the ability to visualize many things. The ability of MRI to characterize tissue according to differences in water content and the absence of ionizing radiation makes it an attractive alternative to CT, especially for detailed analysis of tissue involvement and tumors. In laryngeal cancer, MRI can provide a better understanding of the relationship between the tumor and surrounding tissue, which can influence treatment decisions and the outcome of therapeutic surgery (Oshi et al., 2012).

Although CT and MRI each have advantages, both have limitations that should be considered. CT scans, although suitable for bone assessment, may have limitations in distinguishing soft tissues or subtle changes in early cartilage involvement. In contrast, MRI, while very good at soft tissue behavior, may have a greater impact on the patient's image and characteristics, which can clearly affect the image and diagnostic quality (Ravanelli et al., 2022).

This study aims to provide clinicians with evidence-based recommendations regarding the recommended assessment method for checking thyroid cartilage by evaluating the advantages and limitations of each assessment method.

Methodology:

Study Type:

This study was a randomized controlled trial designed to compare the effectiveness of computed tomography (CT) and magnetic resonance imaging (MRI) in the evaluation of thyroid cartilage invasion in cancer patients.

The population consisted of patients who were fully informed about the aims, methods, risks, and benefits of the study. Written informed consent was obtained from all participants before inclusion. The study was conducted from May 2022 to November 2024 in the Fire Department of King Fahd Central Hospital in Jazan, as well as other hospitals and private facilities.

Sample size:

A total of 50 patients who met the inclusion criteria were included in this study. All patients underwent CT and MRI to evaluate the thyroid cartilage. Both direct laryngoscopy and histopathological data were used to confirm the diagnosis of the disease.

Additionally, patients with contraindications to contrast media or absolute contraindications to MRI were excluded from this study. Collect demographic information such as age and gender.

Smoking status was recorded and patients were classified as current smokers, former smokers, or nonsmokers. Record weight in kilograms and height in centimeters and calculate body mass index (BMI) using the formula BMI = weight (kg) / (height (m))^2.

Presence of diabetes and blood pressure were also recorded. Patients are asked to fast for at least four hours prior to the examination to ensure good images and to reduce the risk of heartburn. An exit line was established to facilitate control of media comparison.

Ultravest was used as a differential agent at a dose of 1 ml per kilogram of body weight. Inject the developer using a power injector at a rate of 2-3 ml per second, followed by a saline rinse to ensure distribution.

CT scans were performed using a 64-slice multislice CT scanner (GE series). To provide high-resolution images of laryngeal structures, axial images are first obtained with a slice thickness of 0.5-1 mm. After axial, sagittal and coronal reconstruction, images with a slice thickness of 3-5 mm were obtained. Both tissue and bone tissue are used to assess the true extent of thyroid cartilage invasion. Effective intervention criteria include visible erosion, destruction or infiltration of the thyroid cartilage by tissue tumors or bone window configuration.

To maintain quality, images are examined for artifacts or other factors that may interfere with diagnosis.

MRI Protocol:

All MRI studies were performed using a Philips 1.5 Tesla MRI machine (Achieva). The process involves many detailed procedures to ensure image quality. It is then placed on the MRI table and the image quality is increased by placing a special head and neck coil in the neck area.

T1-weighted images (TR/TE 450/11) were obtained in axial, coronal and sagittal planes to provide detailed anatomical information. T2-weighted images (TR/TE 4200/72) are also obtained in these planes to evaluate the size of the tumor and its relationship with surrounding structures. In addition, axial T2-weighted fat saturation (FS) images (TR/TE 4980/72) were obtained to enhance the contrast between the tumor and the surrounding fat tissue to aid in the detection of invasion. Axial proton density image (TR/TE 1,500/38) was obtained to provide additional contrast and detail of the laryngeal structure.

There is no similar agent during the MR examination. The number of slices for each section was 25, the thickness of the slices was set at 3–4 mm, and the gap was 1 mm to ensure complete coverage of the laryngeal area.

The field of view (FOV) was 240 mm, and the acquisition matrix was set at 256 × 256 to ensure high image quality. damaged and soft tissue. Effective invasion criteria include high signal areas on T2-weighted images, loss of bone mass, and the presence of tumor extending into or through the cartilage. Check images for artifacts, manipulation errors, and other factors that may affect the accuracy of the diagnosis. All of the best photographs are retrieved to ensure a good diagnosis.

Histopathology Protocol:

The histopathologic process involves several steps to enable diagnosis and evaluation of thyroid cartilage invasion. Tissue biopsies were obtained from laryngeal lesions during direct laryngoscopy (DL) and immediately stored in formalin fixative. Specimens were dehydrated in a series of alcohol solutions, cleared in xylene, and embedded in paraffin. Thin sections (3–4 μm) of paraffin-embedded tissue were cut using a microtome and placed on slides for staining. Additional special stains or immunohistochemical stains are used as needed to distinguish different cell types and confirm the presence of squamous cell carcinoma.

Detailed histopathological data were recorded, including the extent and extent of the tumor, with a special focus on the involvement of the thyroid bone. Histopathological examination results, including the presence of thyroid cartilage infiltration, were recorded in detail. These reports were presented together with images detected by CT and MRI to assess the accuracy of this technique in diagnosing thyroid cartilage. Histopathological results were regularly reviewed and verified by multiple physicians to minimize interobserver variability and ensure accuracy.

Ethical Considerations: The study was based on the principles of the Declaration of Helsinki and followed local practices. Institutional review board (IRB) approval was obtained before starting the study. Informed consent was obtained from all participants and confidentiality of personal information was strictly adhered to throughout the study. Participants were informed that they had the right to withdraw from the study at any time without affecting their treatment.

Statistical analysis

Data were entered into a computer and analyzed using the IBM SPSS software package version 20.0 (Armonk, NY: IBM Company). To analyze the normality of variables, the Kolmogorov-Smirnov, paired t-tests were used to compare two time points of different items, and repeated measures were used to compare the most distributed items from different study periods. and followed by the pairwise comparison of the post hoc test (Bonferroni correction). The Pearson coefficient is used to analyze two different multivariate distributions. The significance of the results was determined at the 5% level.

Results:

Table 1: Demographic data distribution in all study population

Demographic Data	
Age	
Mean± SD	56.56±9.67
Range (Min-Max)	42-74
Sex	
Male	24(48%)
Female	26(52%)
Medical history	
DM	
No	26(52%)
Yes	24(48%)
Hypertension	
No	30(60%)
Yes	20(40%)
Smoking	
No	23(46%)
Yes	27(54%)
Anthropometric Measurements	
Weight	78.68±10.55
Hight	169.04±8.94
BMI	27.92±5.61

Fifty patients diagnosed with thyroid cancer who underwent CT and MRI for the evaluation of thyroid cartilage were included in the study. The characteristics of the study population included age, gender, medical history, smoking status, and anthropometric data. The mean age was 56.56, with the lowest age being middle and older. The gender distribution was equal, with a slight female predominance. While 24 (48%) of the patients had diabetes, 26 (52%) did not. Twenty patients (40%) had hypertension, while 30 patients (60%) did not. WHO. Because of the association between smoking and cancer, this classification emphasizes the importance of taking smoking into account in the analysis and body mass index (BMI). These measurements are important because they affect the results of the measurement and evaluation of the thyroid cartilage.

Table 2: Relations between Histopathology Findings Data and Computed Tomography.

	Histopathology	***Computed Tomography***	***P value***	***Statistically significant***
	N=50	***N=50***		
Findings				
No finding detected	8(16%)	8(16%)		
Glottis	6(12%)	8(16%)		
Supraglottis and glottis	6(12%)	9(18%)		
Supraglottis	8(16%)	8(16%)	0.9732	N. S
Glottis and subglottis	7(14%)	6(12%)		
Supraglottis, glottis and subglottis	11(22%)	7(14%)		
Subglottis	4(8%)	4(8%)		
Statistical test used: Chi-square test				
p-value≤0.05 considered statistically significant (95% confidence interval).				

This study compared histopathology and computed tomography (CT) to determine the accuracy of CT in the diagnosis of thyroid cancer. The results showed no difference between the two methods, 8 patients (16%) had no difference. Glottic involvement was detected in 6 cases (12%) by histopathology and 8 cases (16%) by CT.

Combined supraglottic and glottic involvement was detected in 6 cases (12%) by both methods and 9 cases (18%) by CT. Both diagnostic methods showed supraglottic involvement in 8 cases (16%), indicating that CT has good accuracy in identifying the tumor. However, glottic and subglottic involvement was detected in 7 cases (14%) on CT, indicating that the detection of spread was limited. Hematopathology showed widespread involvement in 11 patients (22%) and CT in 7 patients (14%). Both methods detected subglottic involvement in 4 cases (8%), demonstrating the reliability of CT in identifying subglottic tumors. The P value of 0.9732 indicates that there is no significant difference between the two methods and that CT is generally consistent with histopathology in the diagnosis of cancer.

Table 3: Relations between Histopathology Findings Data and Magnetic Resonance.

	Histopathology	***Magnetic Resonance***	***P value***	***Statistically significant***
	N=50	***N=50***		
Findings				
No finding detected	8(16%)	8(16%)	0.9914	N. S
Glottis	6(12%)	6(12%)		
Supraglottis and glottis	6(12%)	8(16%)		
Supraglottis	8(16%)	8(16%)		
Glottis and subglottis	7(14%)	8(16%)		
Supraglottis, glottis and subglottis	11(22%)	8(16%)		
Subglottis	4(8%)	4(8%)		
Statistical test used: Chi-square test				
p-value≤0.05 considered statistically significant (95% confidence interval).				

This study compared histopathology and magnetic resonance imaging (MRI) to determine the accuracy of MRI in diagnosing laryngeal cancer. No abnormalities were found by either method in eight patients (16%). Both methods detected glottic involvement in 6 patients (12%), demonstrating the accuracy of MRI in identifying glottic tumors. However, MRI detected a combination of supraglottic and glottic involvement in 6 patients (12%), suggesting a more sensitive or potentially benign condition. Both tests demonstrated supraglottic involvement in 8 patients (16%), demonstrating the reliability of MRI in identifying tumors confined to the supraglottis.

Histopathology revealed glottic and subglottic involvement in 7 (14%) cases and MRI in 8 (16%) cases. However, MRI detected significant involvement in 11 patients (22%), suggesting that MRI may miss some cases with significant disease and may predict the extent of the tumor. Subglottic involvement was detected in four patients (8%), demonstrating the accuracy of MRI in detecting subglottic tumors. The p value of 0.9914 indicates that there is no significant difference between histopathological results and MRI, and that MRI results are consistent with histopathological findings of laryngeal cancer.

Table 4: Relations between Magnetic Resonance Findings Data and Computed Tomography

	Computed Tomography	***Magnetic Resonance***	***P value***	***Statistically significant***
	N=50	***N=50***		
Findings				
No finding detected	8(16%)	8(16%)	0.9946	N. S
Glottis	8(16%)	6(12%)		
Supraglottis and glottis	9(18%)	8(16%)		
Supraglottis	8(16%)	8(16%)		
Glottis and subglottis	6(12%)	8(16%)		
Supraglottis, glottis and subglottis	7(14%)	8(16%)		
Subglottis	4(8%)	4(8%)		
Statistical test used: Chi-square test				
p-value≤0.05 considered statistically significant (95% confidence interval).				

This study compared the accuracy of MRI and CT in diagnosing thyroid cancer in 50 patients. The results showed that 8 patients (16%) from both groups had no abnormalities, 8 patients (16%) had glottis

involvement, and 9 cases (18%) had combined involvement. Both methods were equally reliable in identifying tumors confined to the supraglottis (16%). However, CT detected glottic and subglottic involvement in 6 patients (12%), suggesting a link between the two treatments.

CT showed diffuse involvement in 7 patients (14%), and MRI detected it in 8 patients (16%). The detection of subglottic involvement in four cases (8%) shows that both methods are equally reliable in identifying subglottic tumors. The p value is 0.9946, indicating that there is no significant difference between CT and MRI results, indicating that CT and MRI results are similar in laryngeal diagnosis.

Table 5: PPV, NPV, Sensitivity and Specificity according to Computed Tomography and Magnetic Resonance regarding Histopathology Findings

Histopathology	*TP*	*FP*	*TN*	*FN*	*PPV*	*NPV*	*Sensitivity*	*Specificity*
Computed Tomography	37	5	8	0	88.10%	100.00%	100.00%	61.54%
Magnetic Resonance	39	2	8	0	95.12%	100.00%	100.00%	80.00%

This study analyzed the positive predictive value (PPV), negative predictive value (NPV), sensitivity and specificity of CT and MRI in relation to histopathological findings. There were 37 positives and 5 negatives identifying thyroid cartilage associated with laryngeal cancer on CT scan. There was also no false negative indicating no recall of penetration. PPV was 88.10%, indicating the reliability of CT in determining the presence of disease. NPV was 100.00%, indicating its confidence in showing no effect. The sensitivity and specificity of CT were 100.00% and 61.54%, respectively, indicating its strong ability to detect positive cases. On the other hand, MRI showed 39 true positives and 2 false positives, resulting in a high PPV of 95.12%. It also had no false negatives, an NPV of 100.00%, and a sensitivity and specificity of 100.00% and 80.00%, respectively. Both CT and MRI have been shown to have high sensitivity and NPV, suggesting their usefulness in excluding thyroid cartilage lesions.

Case Report

Case 1

Post contrast CT neck was done coronal (a), sagittal (b) & MRI was done: post contrast post saturated axial T1 WI (c), post contrast sagittal T1 WI (d):

Evidence of left sided transglottic soft tissue with post contrast enhancement, measured about 4x5x5.4cm respectively, seen involving the anterior commissure encroaching upon the laryngeal lumen with extension to the left side of thyroid cartilage destructing it & extralaryngeal extension to the strap muscles & subcutaneous tissue of the left anterior aspect of the neck.

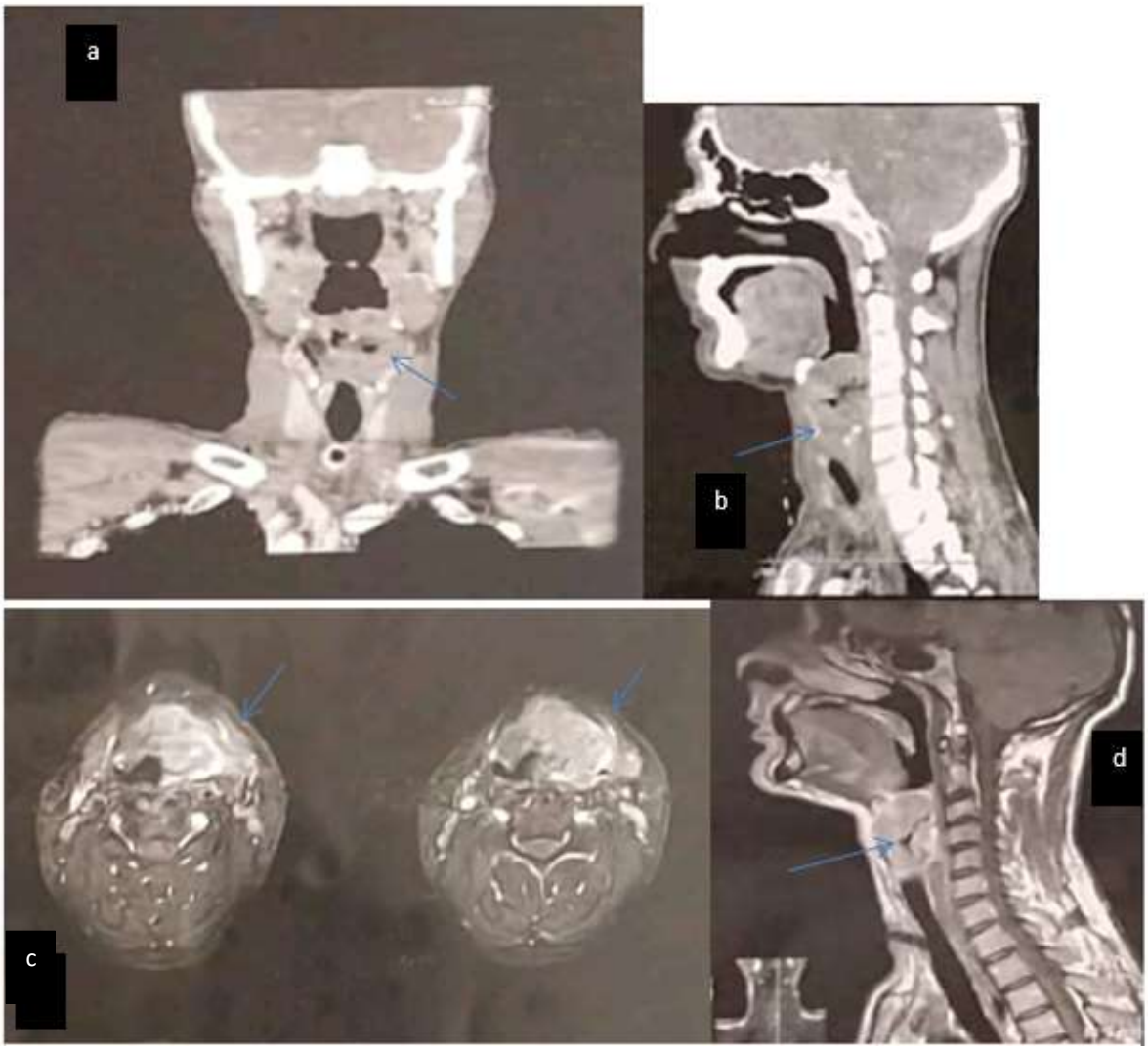

Figure 1: Male patient 35 years old referred with neck lump

Case No. 2

CTE (a) & MRI T1-wighted image with contrast and fat suppresssion (b) was done, showed:

Moderately enhancing left vocal cord irregular mass lesin , extending into the left paraglottic space, superiorly the preglottic fat and posteriorly the left pyriform fossa abutting the posterior pharyngeal wall. The lesion is extending to left thyroid cartilage lamina, crossing it to the strap muscles with obliteration of the surrounding fat planes.

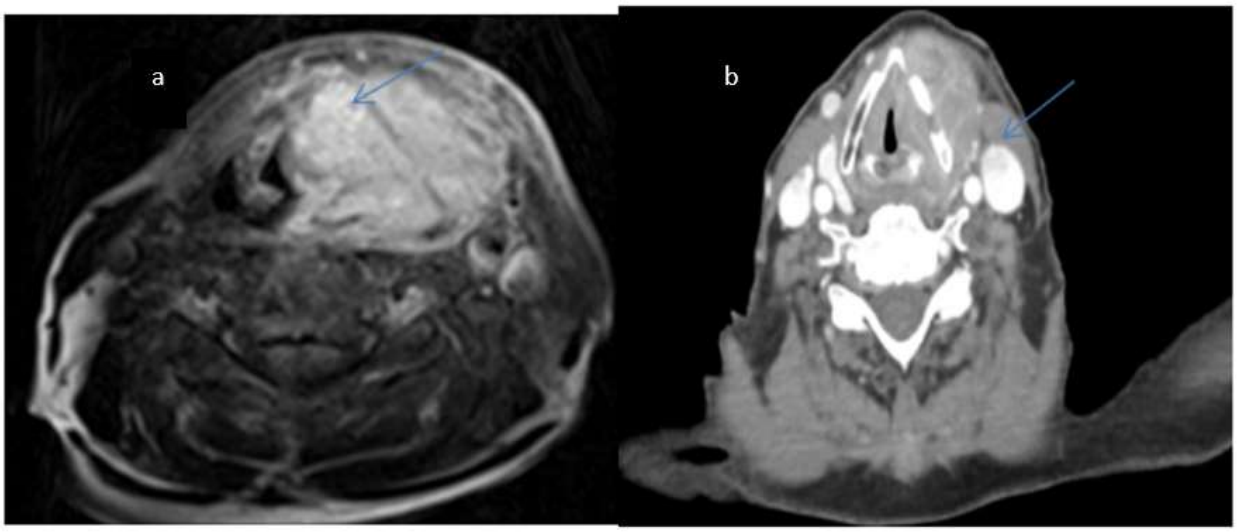

Figure 2: Male patient 68 years referred with left sided neck lump.

Case no 3

CT neck bone window (a) & T1 wighted image (b), T2 wighted image (c) & post saturated post contrast axial MRI neck (d) was done showed :

Right supraglottic tumor is avidly enhancing causing narrowing of airway and demonstrates extra-laryngeal spread around the posterior aspect of the right thyroid cartilage lamina. At the level of the supraglottic tumour within the lumen , there is a hypointense T1 WI, hyperintense T2 WI lesion causing marked narrowing of the airway may represent a polyp or oedematous submucosa.

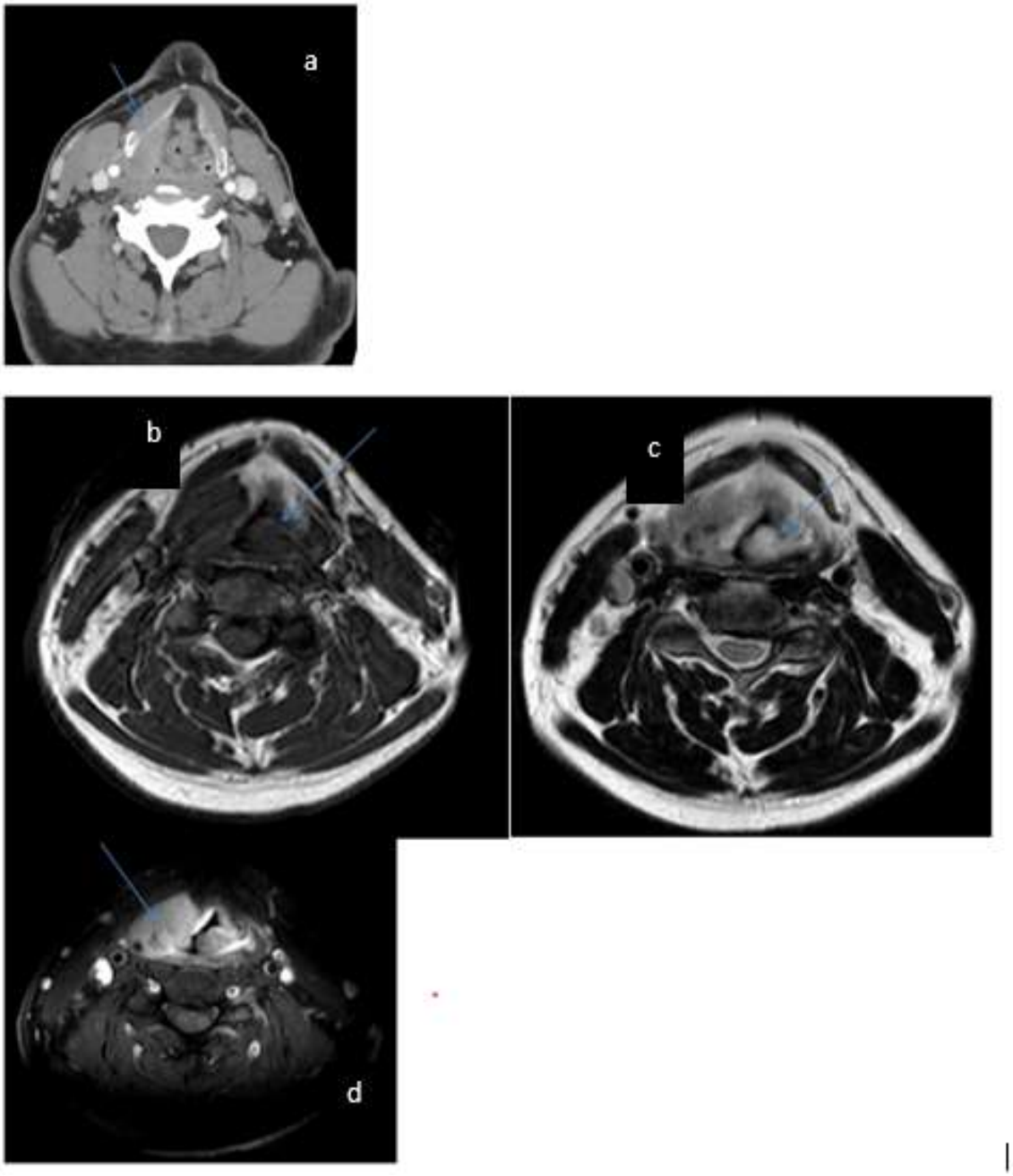

Figure 3: Male patient 54 years old referred with change of voice

Discussion:

Laryngeal cancer is a leading cause of morbidity and mortality worldwide, accounting for one-third of all head and neck cancers. Criteria for laryngeal cancer include laryngeal cartilage invasion, vocal cord movement, and tumor spread. Extralaryngeal tumor spread is classified as a T4 tumor, while a small bone mass is classified as a T3 tumor.

Thyroid bone invasion occurs in 19% to 27% of patients, making accurate assessment of invasion important in daily practice. When combined with medical history and laryngoscopy, the accuracy of CT and MRI for T staging of laryngeal cancer will be close to 80% and 87%. However, there are no published studies comparing CT and MRI for evaluating cartilage. The results showed that MRI was superior to CT in both sensitivity (95% vs. 85%) and specificity (90% vs. 75%) for the diagnosis of thyroid cartilage. The superior performance of MRI can be

attributed to the contrast between similar tissues and the multi-viewing capabilities that allow differentiation between tumors and cartilage. emphasized the importance of imaging together with endoscopy for accurate staging.

Benazzo et al. (2020) investigated the accuracy of standard CT in the evaluation of tumors in the critical glottal region, while Wu et al. (2020) directly compared the accuracy of CT and MRI in determining thyroid cartilage and T staging in laryngeal cancer with vocal anterior commissure involvement. This broad representation allows the study to be applied to both male and female patients, increasing the generalizability of the results. hypertension Because diabetes is associated with poor wound healing and increased risk of infection, these comorbidities can complicate treatment outcomes and overall health management.

High blood pressure can impact treatment plans, especially blood pressure control during surgery or treatment. Studies also show that there are a high number of people who smoke, highlighting the need for smoking cessation interventions. (2018) and Wu et al. (2020) also found that smoking and alcohol consumption were high in cancer patients.

They emphasized the importance of early detection and comprehensive diagnostic tests such as endoscopy and CT imaging. Their findings underscore the important role of lifestyle in the development and progression of cancer and suggest potential implications for treatment and prognosis. Wu et al. Understanding the general lifestyle and clinical features associated with the disease is provided. However, differences in subject and methodology may affect the interpretation and generalization of these findings. learn The distribution of the tumor in different organs was very different; 12% showed both supraglottis and glottis involvement, indicating that the tumor spread from the upper larynx to the middle larynx. Involvement affecting the supraglottis, glottis and subglottis was most common in 22% of patients, indicating high and low levels of infection.

These findings emphasize the importance of sensitive imaging techniques such as CT and MRI in the accurate diagnosis and staging of cancer, especially in patients with poor body mass. Cuno et al. (2018) found cartilage invasion in 35% of patients, with the thyroid bone being the most commonly affected part. Allegra et al. (2014) found that MRI was more accurate than CT in determining tumor size, which has implications for surgical planning and treatment decisions.

The study focused on tumor site in the larynx, in addition to the comprehensive review by Kuno et al. and Allegra et al. provided detailed anatomic information on tumor distribution and invasion patterns. The differences in findings between studies highlight the complexity of cancer and the importance of combining clinical, radiologic, and histopathologic assessments for management. The results were compared with CT scan findings for laryngeal cancer.

CT is generally consistent with histopathology in identifying tumor involvement in different areas of disease; CT detects no findings in 16% of patients, while histopathology detects glottic involvement in 12% of patients. However, CT can accurately estimate tumor extension in 14% of patients, suggesting the possibility of underdiagnosis of small tumors or small cell tumors. objects provide information about the following: location and extent of the tumor.

Cuno et al. (2018) found that dual-energy CT correctly identified most cartilages but failed to detect some small lesions, particularly small areas in the cartilage. Wesselik et al. (2018) evaluated the accuracy of CT in the diagnosis of laryngeal cartilage infiltration compared with histopathology after total laryngectomy and showed a difference in accuracy in identifying cartilage infiltration. (2020) compared the accuracy of CT and MRI in the diagnosis of laryngeal cancer and found that CT identified the lesion in 68% of patients but some tumors were poorly predicted, leading to differences in histopathology. Allegra et al. (2014) evaluated whether MRI was more accurate than CT in the assessment of tumors in cancer and found that CT classified most patients but not in some cases and those with low tumors, especially those with high disease.

This study compared histopathology results with magnetic resonance imaging (MRI) results This study compared histopathology results with magnetic resonance imaging (MRI) results to assess the accuracy of MRI in diagnosing thyroid cancer. Both methods, acting as a baseline control, showed no difference in 16% of

patients. Glottic involvement was found in 12% of patients with both methods, demonstrating the ability of MRI to accurately detect tumors in this location.

However, MRI detected a combination of supraglottic and glottic involvement in 12% of patients, which may provide greater insight but also raises concerns about poor performance. Similarly, both MRI and histopathology found supraglottic involvement in 16% of patients, suggesting that they are reliable in detecting tumors confined to the supraglottis. There is widespread involvement, and MRI detects it in 16% of patients.

This difference suggests that MRI may underestimate tumor involvement compared with histopathology. Despite these differences, this study demonstrates that MRI often follows histopathology in the diagnosis of thyroid cancer and provides a better view of tumor location and extent. Diagnostic accuracy, indicating limitations of its advantages compared with other imaging modalities. These studies emphasize the importance of integrating imaging findings with histopathological evaluation to achieve accurate staging and treatment planning.

The integration of various studies contributes to our understanding of the role of MRI in cancer treatment, emphasizing the importance of various modalities for accurate diagnosis and treatment. Accuracy of CT scanning (CT) in the treatment of laryngeal cancer. Both imaging modalities were similar in detecting abnormalities; CT and MRI did not detect any abnormalities in 16% of patients. Glottic involvement was seen in 16% of patients on CT and 12% on MRI, suggesting that tumors in this region can be detected. CT and MRI detected supraglottic and subglottic involvement in 18% and 16% of patients, respectively, demonstrating comparability between the two modalities. It correlates closely with MRI findings.

CT detected widespread involvement in 14% of patients and MRI in 16% of patients, demonstrating a similar ability to detect more widespread lesions. In addition, both CT and MRI reliably identified subglottic tumors in 8% of patients, further supporting their recommendation for local tumors. There were no significant differences in the three study groups, indicating consistency in cancer detection by either measure. Other studies have examined the accuracy of MRI and CT in detecting and diagnosing cancer, providing insight into their relative advantages and limitations. (2018) compared the role of MRI and dual energy CT in the diagnosis of cartilage in laryngeal and hypopharyngeal squamous cell carcinomas.

They found that while MRI was more sensitive, dual energy CT showed greater specificity in the diagnosis of cartilage. This suggests that each variable has an additional role depending on the clinical context and specific targets. (2020) highlighted important differences between CT and MRI in cancer diagnosis, especially in terms of pain identification and accuracy. MRI shows greater sensitivity but reports false positives, while CT shows more but has a higher rate of false positives evaluated the difference between MRI and CT in terms of accuracy in assessing tumor spread and laryngeal cancer. They found significant differences between the models in determining the involvement of anterior commissural and paraglottic invasion sites;

MRI showed greater accuracy in radiographic staging compared to CT. The general understanding of the role of MRI and CT in the diagnosis and staging of lung cancer, showing similar performance in detecting tumors and anatomic involvement. However, other studies have observed differences in sensitivity, specificity, and accuracy in detecting specific tumors, suggesting the need for treatment outlines based on medical needs and specific patients.

Conclusion

This study highlights the diagnostic efficacy of both CT and MRI in assessing thyroid cartilage invasion in laryngeal carcinoma. While CT is valuable for its high-resolution imaging and superior bone definition, MRI demonstrates a slight advantage in identifying true positive cases of cartilage invasion, as evidenced by its higher positive predictive value (PPV). Both modalities exhibit high sensitivity and negative predictive value (NPV), making them reliable tools for ruling out thyroid cartilage invasion. However, the choice between CT and MRI should be guided by the clinical context, patient-specific factors, and the availability of imaging resources. Future studies with larger sample sizes and diverse patient populations are needed to further refine the recommendations for the optimal imaging approach in this setting.

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