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The Surgeon, Journal of the Royal Colleges
of Surgeons of Edinburgh and Irelandwww.thesurgeon.net

Management of pulmonary nodules in head and neck cancer patients – Our experience and interpretation of the British Thoracic Society Guidelines

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ARTICLE INFO

Article history:

Received 25 May 2016

Received in revised form

9 October 2016

Accepted 10 October 2016

Available online xxx

Keywords:

Pulmonary nodules

Head and neck cancer

Imaging

ABSTRACT

Background and purpose of the study: The frequency of lung nodules in the head and neck cancer population is unknown, currently the only guidance available recommends following local policy. The aim of this study was to determine the incidence of pulmonary nodules in our head and neck cancer group and interpret the recently updated British Thoracic Society (BTS) Lung Nodule Guidelines in a head and neck cancer setting.

Methods: 100 patients were diagnosed with head and neck cancer between July 2013–March 2014, clinico-pathological, demographic and radiological data was extracted from the electronic records. Images with lung findings were re-reviewed by a single consultant radiologist for patients with lung pathology on the initial staging CT report.

Results: Twenty patients (20%) had discreet pulmonary findings on CT. Eleven (11%) had lung nodules, 6 (6%) had lesions suspicious for metastasis and 3 (3%) had co-incidental bronchogenic primary cancers. These patients were re-imaged between 6 and 18 months and in 1 patient the previously identified 7 mm nodule had progressed to 16 mm at 1 year. There was no set follow up imaging protocol used.

Conclusion: The MDT in NHS Lothian has reviewed the BTS guidance and now has a local policy for the management of lung nodules in head and neck cancer patients. Lung Nodules in the head and neck cancer population are common >10%. Higher risk patients with larger nodules should be risk assessed with validated assessment tools. PET-CT has a place in the assessment of lung nodules when risk of malignancy is high.

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<http://dx.doi.org/10.1016/j.surge.2016.10.002>

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Background

Pulmonary nodules represent a challenge to all those involved in their investigation and management. The continuing rise in access to computerised tomography (CT) and the increasing quality of imaging has resulted in greater number of lung nodules being identified. The incidence is thought to be between 11% and 33% in high-risk patients.¹

All patients diagnosed with a head and neck cancer in the UK are recommended to undergo CT assessment of the thorax during the process of staging pulmonary metastases and to exclude synchronous pulmonary malignancy. Many of these patients are smokers and as such at increased risk of having lung nodules. The frequency of lung nodules in the head and neck cancer population is unknown, as such the current UK guideline recommends following local policy applied to other patient groups.² The lack of evidence specific to head and neck cancer patients means that most centres will apply national guidelines designed for patient groups without active malignancy.

The aim of this study was to determine the incidence of pulmonary nodules in our head and neck cancer patient group and interpret the recently updated British Thoracic Society (BTS) Lung Nodule Guidelines in a head and neck cancer setting.

Methods

The study was registered with NHS Lothian audit department, ethical approval was not required.

One hundred consecutive patients diagnosed by NHS Lothian Head and Neck Cancer Multidisciplinary Team Meeting (MDT) were identified from prospectively collected electronic records. Patients were diagnosed between July 2013–March 2014. Clinico-pathological, demographic and radiological data was extracted from the electronic patient record. CT images were re-reviewed by a single consultant radiologist for all of the patients with lung pathology on the initial staging CT report.

Results

Twenty patients (20%) had discreet pulmonary findings on CT. Eleven (11%) lung nodules, 6 (6%) lesions suspicious for metastasis, 3 (3%) co-incidental bronchogenic primary cancers were identified.

Of the co-incidental bronchogenic primaries, histological sampling confirmed 1 adenocarcinoma, 1 squamous cell carcinoma and 1 large cell undifferentiated carcinoma.

Of the 11 patients with pulmonary nodules, 3 died within three months of diagnosis so were not re-imaged. The staging of the 8 remaining showed 4 AJCC stage IV disease and 4 stage I. These patients were re-imaged between 6 and 18 months, in 1 patient the previously identified 7 mm nodule had progressed to 16 mm at 1 year, the patient was referred to the lung MDT for further investigation. The other seven remained stable or reduced in size.

There was no set follow up imaging protocol used. Clinical details of all patients with pulmonary nodules are displayed in [Table 1](#).

Discussion

The definition of a lung nodule is a well or poorly circumscribed, approximately rounded structure that appears on imaging as focal opacity and by traditional definition they are ≤ 3 cm in diameter and surrounded by aerated lung.³

The Fleischner society in 2005 published recommendations regarding the follow up of lung nodules.⁴ In 2015 the BTS published new guidance, which unlike previous documents included guidelines designed to be applied to patient groups with known malignancies.

When presented with a patient who has a solid lung nodule, the aim of assessment is to determine the level of suspicion for malignancy. Level 2 + evidence shows that older patients and smokers are at increased risk of malignancy. There is conflicting evidence over the link between the type of malignancy that prompted the investigation and the rate of malignancy within pulmonary nodules.^{5,6} Currently evidence relating specifically to the head and neck cancer population is lacking.

Radiologically, increasing nodule diameter, spiculation, pleural indentation and upper lobe location are also predictors of malignancy. The presence of multiple nodules has a small negative effect on the likelihood of malignancy in any one nodule. Decisions on further investigation and management should be based on the characteristics of the largest nodule when more than one is present.²

The BTS base their guidance on the size of the nodule and the presence of risk factors listed above. A patient with a nodule less than 5 mm has the same chance of lung cancer as a patient with no nodule, therefore the BTS recommend no further investigation if a nodule < 5 mm.⁷

If the nodule is 5–8 mm with high risk features, patients should undergo CT surveillance either at three months or one year depending on the initial size of the nodule. If the nodules are equal or greater than 8 mm (or 300 mm cubed using volumetric analysis) the patient should be assessed using a validated malignancy predictive model. The recommended tool is the Brock model.⁸ This provides an individualised prediction of the risk of malignancy within a nodule. [Table 2](#).

Having determined the risk of malignancy within a nodule, further assessment may be required. Nodules 5–8 mm should be offered CT surveillance. 5–6 mm nodules should be rescanned at 1 year and 6–8 mm nodules at 3 months. The accuracy of re-scanning smaller nodules is lower at 3 months than at 1 year. An increase of at least 25% in size is required before it is considered significant and due to the constraints of conventional CT, small nodules are less likely to show progression at 3 months. 3D Volumetric assessment is more sensitive, although to date its use has not been assessed in extra-pulmonary malignancies.¹¹

For those nodules that meet the criteria for follow-up, the BTS currently recommends scanning at 3 months if indicated and then again at 12 months. If volumetric analysis is

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