

Hong Kong College of Radiologists
Position Statement on
Role of Radiological Investigations and Radiologists
In the Management of Patients with Clinically Suspected Lung Cancer

In response to the possible concern of medical professionals and the public on the role of radiological investigations, in particular chest radiographs, in the management of patients with suspected lung cancer, the Council of Hong Kong College of Radiologists issued this Position Statement after full deliberation to elucidate the limitations of radiological imaging, appropriateness of referral to different imaging options and the role of radiologists in the care pathway of patient with suspected lung cancer.

Introduction

Lung cancer is one of the leading causes of cancer death in Hong Kong. Patients with lung cancer may present with various symptoms such as cough, hemoptysis, chest pain, hoarseness, dyspnea, weight loss or they may even be asymptomatic. The diagnosis of lung cancer requires combination of information from clinical history, physical examination, radiological investigations and pathological investigations such as sputum cytology and tissue biopsies.

Role of Radiological Investigations

Radiology is one of the many facets in the management of patients with clinically suspected lung cancer. The roles of radiological investigations include detection of lesions, characterization of lesions, providing guidance for the site and method of pathological confirmation, assessing the extent of disease and monitoring of disease progress.

In the detection and diagnosis of lung cancer, chest radiograph (CXR) is often the first line radiological investigation. Comparison with old CXR is helpful when it is available. Computed Tomography (CT) scan is often used for characterization of lesions detected on CXR, for further investigation when CXR is negative despite high clinical suspicion of lung cancer, for evaluation of suspicious lung lesions that are incidentally detected in other radiological investigations, and for staging of lung cancer. Low dose CT thorax is used for screening lung cancers in asymptomatic high risk patients in some countries (1,2).

There are on-going researches on issues such as how to best select screening participants, how to reduce the number of false positives, and how to minimize the radiation dose in the use of low dose CT scan as a screening tool. On the other hand, large scale study on the role of low dose CT thorax as first line investigation in symptomatic patients with clinically suspected lung cancer is still not yet available. In usual circumstances, symptomatic patients with clinical suspicion of lung cancer would require standard dose CT scan for workup.

Various imaging techniques including CT and ultrasound are useful to guide biopsies in the workup of suspected lung cancer. In patients without conclusive diagnosis, the baseline radiological investigations will be useful as references for comparison in follow up imaging. PET-CT is useful in staging of lung cancer and it can also facilitate the detection of lung cancer in patients with metastasis from unknown primary.

After the diagnosis of lung cancer is confirmed, radiological investigations would play an important role in the monitoring of subsequent treatment response.

Limitation of Radiological Investigations

Radiological investigations are essential components in the management of patients with clinically suspected lung cancer. Nevertheless, they are not without limitations.

There are often differential diagnoses for radiological findings. Tuberculosis, pneumonia due to various causes, benign masses such as hamartomas, metastasis from other malignancies etc. are common differential diagnoses of lung cancer. Lung cancer may also develop from a pre-existing lesion or arise in close proximity of a pre-existing lesion, which cause difficulty for the analysis of radiological investigations. Therefore, clinical information must be taken into account during the interpretation of radiological findings and further investigations including tissue biopsies are usually needed to confirm the diagnosis of lung cancers.

Like all other investigation methods in medicine, every radiological investigation has limited sensitivity and specificity, which vary between different studies. In one of the recent large scale studies, the sensitivity and specificity of CXR in detection of lung cancer are reported as 73.5% and 91.3% (3) respectively. The interpretation of CXR can be limited by overlapping of structures, such as, hilar vessels, cardiac shadow, diaphragms and bones. In the same study, the sensitivity and specificity of CT scan in detection of lung cancer are reported as 93.8% and 73.4% (3) respectively. Despite imperfect

sensitivity and specificity, CXR remains a very valuable first line investigation in patients with clinically suspected lung cancer because of its wide availability, low radiation dose and relatively low cost.

Considering its limitations, a negative CXR should not stop further investigations, such as follow up CXR, CT scan, sputum cytology and bronchoscopy etc. in patients with strong clinical suspicion of lung cancer. The need and choice of further investigations would depend on the clinical status of the patient and require the assembly of all the relevant information from clinical history, physical examination, radiological investigations and pathological investigations, including recommendations from radiologists. The referring clinician and clinical team should assimilate all these essential information to discuss with patient for management plan.

Role of Radiologists

Like all medical doctors, radiologists owe a duty of care to their patients and to those working with them. It is the responsibility of radiologists to protect patients from unnecessary radiation. The choice of the appropriate modality for radiological investigation should be balanced against the benefits and risks to the patient. The actual radiation dose to individual patient caused by various radiological investigations may vary substantially according to patient factors and technical factors. As reference, radiation dose to adults from common imaging examination can be found in below links: <https://www.acr.org/~media/ACR/Documents/PDF/QualitySafety/Radiation-Safety/Dose-Reference-Card.pdf> and <https://www.radiologyinfo.org/en/info.cfm?pg=safety-xray>

Radiologists should provide professional interpretation of the radiological investigations with the clinical history provided by the requesting clinician. Radiology reports are medical reports and should be properly signed. Relevant medical information should be communicated in time to the relevant parties for medical care of patients and recommendations on further management should be documented where appropriate.

Conclusion

Radiological investigations play an important role in the management of patients with clinically suspected lung cancer. There are limitations in all radiological investigations. Understanding that the sensitivity and specificity of all radiological investigation are not

100%, the clinical information pertinent to individual patient should be considered during the interpretation of radiology reports. Radiologists have the responsibility to protect patients from unnecessary radiation and advise on the appropriate radiological investigation for patients. Radiologists should provide professional interpretation of the radiological investigations with the clinical history provided by the requesting clinician. Relevant radiological information should be communicated in time to the related parties for patient care and recommendations on further management should be documented where appropriate. The clinician and clinical team should take all relevant information into account and a negative CXR alone should not stop a patient with high clinical suspicion of lung cancer from further investigations.

References

1. Moyer VA; U.S. Preventive Services Task Force. Screening for Lung Cancer: U.S. Preventive Services Task Force Recommendation Statement. *Ann Intern Med* 2014; 160: 330-338.
2. Canadian Task Force on Preventive Health Care; Lewin G, Morissette K, Dickinson J, Bell N, Bacchus M, Singh H, Tonelli M, Jaramillo Garcia A. Recommendations on Screening for Lung Cancer. *CMAJ* 2016; 188: 425-432.
3. The National Lung Screening Trial Research Team; Church TR, Black WC, Aberle DR, Berg CD, Clingan KL, Duan F, Fagerstrom RM, Gareen IF, Gierada DS, Jones GC, Mahon I, Marcus PM, Sicks JD, Jain A, Baum S. Results of Initial Low-Dose Computed Tomographic Screening for Lung Cancer. *N Engl J Med* 2013; 368: 1980-1991.
4. The Royal College of Radiologists. *iRefer: Making the best use of clinical radiology*. London: The Royal College of Radiologists, 2012.
5. American College of Radiology. *ACR Appropriateness Criteria®*. Available at <https://acsearch.acr.org/list>. Accessed 2017 May 02.

香港放射科醫學院 就放射科檢查及放射科醫生 於診治懷疑罹患肺癌的病人的角色 的立場聲明

為回應醫護專業及社會公眾對放射科檢查(特別有關於胸部放射造影)於診治懷疑罹患肺癌的病人的角色的關注，本學院之委員會現作出聲明，就放射科檢查之角色與局限性、轉介各項放射科檢查之適當性及放射科醫生之角色作出闡述。

引言

肺癌是本港其中一種最常引致死亡的癌症。罹患肺癌的病人可能會有各種症狀，如咳嗽、咳血、胸口痛、聲音沙啞、氣喘、體重下降等，但亦可能完全沒有症狀。診斷肺癌需要綜合包括臨床病歷、臨床檢查、放射科檢查及病理科檢查(如痰細胞檢驗和活組織檢驗)等各種資料才能確定。

放射科檢查之角色

放射科檢查於診治懷疑罹患肺癌的病人方面肩負相當重要的角色。各項放射科檢查的作用在於搜尋病變位置，推斷病變性質，引導進一步的病理科檢查，評估病變所影響的範圍及監察治療的成效等。

胸部放射造影(即肺部X光)通常是懷疑罹患肺癌的病人所接受的首個放射科檢查項目。如果病人以往曾經進行肺部X光造影檢查並留有記錄以茲比較，這將對診斷有相當大的幫助。再進一步，病人可以進行電腦掃描造影作以確定肺部X光造影所發現的病變及推斷其性質。由於電腦掃描造影比肺部X光造影精確，當遇上高度懷疑罹患肺癌的病人但其肺部X光造影並無明顯異常情況時，電腦掃描造影將為病人作出更可靠的診斷。倘若病人因其他原因進行放射科檢查而偶然發現肺部有可疑病變時，電腦掃描造影可加強為病人作評估。若病人確診肺癌，電腦掃描造影更可為病人作分期預後。有些國家已採用低放射劑量電腦掃描造影為未有病徵的高危病人作肺癌篩查，並正研究如何選取最適合的

病人作篩查、減少假陽性結果及降低輻射劑量等方面。然而，一般情況下，已有病徵懷疑罹患肺癌的病人，仍需接受標準劑量之電腦掃描造影作診斷，因目前仍未有大型科研證據支持利用低劑量電腦掃描造影作為對已有病徵的病人進行肺癌的一線檢查。

此外，放射科醫生會利用電腦掃描造影或超聲波掃描引導抽取活組織作病理檢查。假若懷疑罹患肺癌的病人接受各項檢查後仍無法被確診，已進行的各項放射科檢查有助於將來覆檢時作比較。正電子電腦斷層掃描可為病人進行肺癌的分期評估，也能為於診斷癌症時未能確定癌細胞來源的病人尋找癌細胞的源頭。

當病人確診肺癌後，其所進行的各項放射科檢查將有助監察病人接受治療的成效。

放射科檢查之局限性

雖然放射科檢查對診治懷疑罹患肺癌的病人相當重要，但亦有其局限性。

放射科檢查有助搜尋肺部病變及推斷其性質，可是，各種肺部病變(如肺癆、肺炎、良性瘤如錯構瘤、其他癌症的肺部轉移等)均和肺癌相類似，而肺癌亦有機會於其他已存在的肺部病變內或其附近產生，故診斷肺癌有一定難度。因此各項放射診斷檢查必需以其他臨床資料為基礎，才能作出正確判斷。一般而言，病人均需要進行進一步的病理檢查才可以確診肺癌。

放射診斷檢查跟所有其他醫學檢查一樣並不完美，其敏感性和特異性均有局限。根據最近一項大型醫學文獻的發現，肺部X光造影檢測肺癌的敏感性為73.5%，特異性為91.3%。由於各種胸腔組織的重疊，醫生往往未能於肺部X光造影偵測出肺部病變。另一方面，該醫學文獻亦指出電腦掃描造影檢測肺癌的敏感性為93.8%，特異性為73.4%。儘管肺部X光造影在偵測肺癌的敏感性不及電腦掃描造影，但由於肺部X光造影比電腦掃描造影更為普及，所產生的輻射較少，亦相對便宜，故大部份懷疑罹患肺癌的病人仍會以肺部X光造影作為首項檢查。

由於肺部X光造影的局限性，當遇上高度懷疑罹患肺癌的病人時，即使肺部X光造影並無明顯異常，醫生仍需根據臨床判斷以決定是否需要作進一步檢查，如肺部X光造影覆檢、電腦掃描造影、痰細胞檢驗、支氣管鏡檢查等。通常病

人的主診醫生或醫療團隊須綜合各方面資料如臨床病歷、臨床檢查、已進行的放射科檢查（包括放射科醫生的建議）及已進行的病理科檢查等，與病人討論診治方針，以決定後續的工作。

放射科醫生之角色

與所有醫生一樣，放射科醫生須盡力為病人提供所需的診治，並維護病人及其他醫護人員之健康，免受不必要的輻射傷害。因此，放射科醫生有責任提供專業意見，讓病人及其主治醫生選擇最適合的放射科檢查。因應個別病人本身的不同因素和其他技術因素，各項放射科檢查對人體造成的實際輻射劑量會有差異。就成人於各項常見的放射科檢查時所接受的輻射劑量可以參考下列網頁：

<https://www.acr.org/~media/ACR/Documents/PDF/QualitySafety/Radiation-Safety/Dose-Reference-Card.pdf> 及

<https://www.radiologyinfo.org/en/info.cfm?pg=safety-xray>

此外，放射科醫生須根據主治醫生提供的病人概況，為放射科檢查的結果作專業判斷，簽發放射科檢查報告，在適當時提出有關更進一步檢查的專業建議，並及時通知病人的主治醫生或醫療團隊。

總結

放射科檢查於診治懷疑罹患肺癌的病人方面有相當重要的功用。由於放射科檢查有其局限性，其敏感性和特異性並非百分之百，故所有放射科檢查的判斷必須以考慮所有臨床資料為基礎。放射科醫生有責任讓病人獲得最適合的放射科檢查，並減少輻射所造成的傷害。放射科醫生亦需根據主治醫生提供的病人概況為放射科檢查的結果作專業判斷，及時為病人及其醫療團隊提供放射科檢查報告，並適時提出進一步檢查的專業建議。當遇上高度懷疑罹患肺癌的病人時，即使其肺部X光造影並無明顯異常，主治醫生及醫療團隊仍須根據臨床判斷以決定是否需要進行進一步檢查。