CASE REPORT

CT coronary angiography evaluation of involvement of the left internal mammary artery graft in advanced left upper lobe lung tumour

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SUMMARY

Evaluation of internal mammary artery graft involvement in upper lobe lung tumour is important to determine an optimal surgical treatment. We report the case of a 52-year-old male patient with an advanced left upper lobe lung tumour located in the proximity of the left internal mammary artery graft. CT coronary angiography showed that the tumour did not invade the graft. The patient underwent a successful palliative left upper lobe lung resection.

BACKGROUND

Establishment of the relationship between lung tumour and internal mammary artery (IMA) graft influences the choice of surgical treatment.¹ If IMA is adhered to the upper lobe of the lung and not in close proximity to lung tumour, then lung resection near the IMA can be performed.² If lung tumour is situated near the pedicle of IMA, then assessment of IMA invasion by the tumour with coronary angiography is necessary.³ We present a case of the use of non-invasive CT coronary angiography for the assessment of IMA involvement in the upper lobe lung tumour that does not have risks of invasive coronary angiography and has high sensitivity and specificity.

CASE PRESENTATION

A 52-year-old male patient presented with a 6-month history of non-productive cough and left-sided knife-like sharp chest pain that was worse with breathing.

In 2007, he developed an acute myocardial infarction and underwent an urgent coronary artery bypass graft surgery using the left internal mammary artery (LIMA) graft to the left anterior descending artery and the left radial artery to the posterior descending artery.

The patient was a current smoker with an overall 80 pack-years history of tobacco smoking. He was a machine operator in a construction industry and was not exposed to asbestosis.

On physical examination, he was afebrile, haemodynamically stable. There were no fingers clubbing and cervical or axillary lymphadenopathy. On auscultation, there were vesicular breath sounds.

INVESTIGATIONS

Chest X-ray demonstrated a rounded opacity in the left perihilar region of the lingular segment of the

left upper lobe measuring 29×35 mm suspicious for a pulmonary neoplasm.

Chest CT revealed a large 37 mm diameter pulmonary mass with spiculated margins within the medial aspect of the lingula. This mass was in close proximity to LIMA (figure 1). There were two enlarged suspicious left mediastinal lymph nodes measuring 12 and 9 mm in diameter. CT-guided fine-needle aspiration biopsy of the left upper lobe lung mass showed adenocarcinoma consistent with a primary lung cancer.

The patient underwent lung function test that showed a forced expiratory volume in 1 s of 2.5 L (75% of predicted) forced vital capacity of 3.5 L (79% of predicted). A subsequent bronchoscopy yielded no evidence of an endobronchial lesion with no malignant cell in bronchial washing.

Integrated CT positron emission tomography demonstrated a 4 cm diameter speculated mass lying medially within the superior lingular segment of the left lung. The mass was clear of the fissure and appeared to invade the mediastinal fat adjacent to the aortic root. In this region, there were numerous vascular clips associated with the left internal thoracic artery graft. In the left kidney, there was a low-density rounded 2 cm lesion, which was not fludeoxyglucose-avid. There were no bony lesions.

A multiphase kidneys CT confirmed a solid contrast-enhancing 2 cm lesion in the interpolar region of the left kidney with appearances suggestive of malignancy.

There was no evidence of vascular involvement or metastatic spread.

Figure 1 Chest CT revealed a large 37 mm diameter pulmonary mass within the medial aspect of the lingula (large arrow), in close proximity to the left internal mammary artery (smaller arrow).

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Figure 2 CT coronary angiography showed that lung tumour did not invade the left internal mammary artery graft.

CT coronary angiography showed that the lingular lung tumour was in contact with the LIMA graft (figure 2). There was no irregularity or narrowing of the graft. The distal anastomosis to LAD was widely patent.

TREATMENT

The patient underwent left posterior-lateral thoracotomy in the fifth intercostal space. It is appeared that the upper lobe tumour invaded parietal pleura. The left upper lobe tumour was carefully dissected from the LIMA graft and a palliative upper lobectomy performed. The postoperative period went uncomplicated. Subsequently, the patient received adjuvant chemoradiotherapy. He was referred to urology services at the base hospital near his home for further investigation and treatment of his renal lesion.

OUTCOME AND FOLLOW-UP

Histology specimen of the left upper lobe lung showed a 32 mm well-differentiated adenocarcinoma. Epidermal growth factor receptor mutation test was negative. The tumour breached the visceral pleura with extension into overlying adherent parietal pleura into the adipose tissue. There was no lymphovascular space or perineural invasion. The bronchial and vascular resection margins were free of tumour. Metastatic carcinoma in one hilar lymph node was present. There were no metastases in subaortic (aortopulmonary window) and para-aortic lymph nodes. The preoperative diagnosis of T4 N2 M0, stage IIIB adenocarcinoma, was confirmed by postoperative histopathological findings.

DISCUSSION

IMA grafts involvement in lung cancer is rare. With a worldwide rising number of patients undergoing coronary artery bypass surgery and a high incidence of lung cancer, there will be a substantial increase in IMA grafts invasion by lung tumours. Previously, the diagnosis of IMA graft involvement by lung tumours was made with the use of coronary angiography.³ We present the case of the use of non-invasive CT coronary angiography that demonstrated a close proximity of the left upper lobe lung tumour with the LIMA graft without invasion. This influences the choice of surgical treatment. A thoracoscopic resection of lung tumour in this patient was considered to put the patient under an increased risk of myocardial infarction due to iatrogenic injury to the LIMA graft. With an open approach, we were able to almost completely resect the tumour and avoid injury to the LIMA graft.

Learning points

- ▶ Upper lobe lung tumours with involvement of internal mammary artery graft is a rare condition.
- ▶ Preoperative assessment of internal mammary graft involvement by the lung tumour is required to determine the extent of surgery.
- ▶ CT coronary angiography is an accurate non-invasive method of evaluation of internal mammary artery graft invasion by lung tumours.
- ▶ Chest CT and integrated CT positron emission tomography are important radiological modalities of assessment for local and distant metastasis and synchronous cancers.

Contributors UB and AMB have discussed the case and written the manuscript.

Competing interests None.

Patient consent Obtained.

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