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RESEARCH ARTICLE

A CASE OF INTRA-OPERATIVE INJURY TO LEFT MAIN PULMONARY ARTERY REPAIRED WITH A PERICARDIAL PATCH

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Abstract

Introduction: Patients with central lung tumours often undergo surgery, offering them a chance of cure. With central lung tumours, there is always the dreaded risk of injury to the left main pulmonary artery (PA) and rupture of the anterior segmental artery, known as the “artery of sorrow”.

Case Presentation: A 75-year-old lady with a background of breast cancer presented to our cardiothoracic centre because computed tomography (CT) of the chest revealed a left lung lesion of 5 x 4 x 3.7 cm, in contact with oblique fissure, radiological staging T3 N2 M0, which was later shown to be highly avid on positron emission tomography (PET-CT). Resection via thoracotomy was done, due to dense attachment to PA, Left PA defect was noted after resection which was repaired with a pericardial patch with no post-operative complication.

Discussion: In the event of tumours invading the PA, it is safe to divide the tumours completely and repair the PA using a patch if there are any complications.

Conclusion: We performed a repair of the PA using a pericardial patch and reconstruction of the PA using a pericardial patch, and evidence shows that there is excellent long-term survival associated with this.

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Introduction:-

Surgical resection remains the treatment of choice for functionally operable Non-small cell lung cancer (1). Bronchioloalveolar carcinoma (BAC) is a subgroup of non-small cell lung carcinoma (NSCL)(2) and can be categorized into mucinous and non-mucinous adenocarcinoma subtypes. There are different approaches that are employed in the removal of thoracic cancers including Video-assisted Thoracic Surgery (VATS) and thoracotomy, both yielding similar results (1). Intra-operatively lung cancers are staged by frozen section, typically adding 30 minutes to operation time (3). In the UK, there are 47,000 people diagnosed with lung cancer every year, and these usually present without any symptoms, and can be categorised into two broad categories: small cell and NSCL (4).

In the UK, suspected lung cancer lesions are often picked up incidentally and referred to the respiratory team where they are investigated further and discussed at the lung multi-disciplinary teams (MDTs), where they are decided whether or not they are for further investigation, in the form of endobronchial ultrasound (EBUS), for surgical management, for drug therapy or for palliation.

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Injury to the left main PA during upper lobectomy is a dreaded complication (5) due to rupture of the anterior segmental artery from the left main PA. This report showcases a rare case where the left main PA is repaired with a pericardial patch due to the close adherence of the mass to the left main PA. The purpose of this case report is to demonstrate the safety of using pericardial patches in the intra-operative setting, when complications are encountered.

In a literature review, we encountered cases where pericardial patches were used, but none of these were due to intra-operative complications, nor associated with division of tumour from PA.

Presentation of case

We present a 75-year-old lady with a background of treated breast cancer who presented with a left lung lesion which was queried initially after a lesion was spotted on a chest x-ray performed when she was admitted with atrial fibrillation. She presented with no chest symptoms and was further staged with a CT-CAP which demonstrated a left lung lesion of 5 x 4 x 3.7 cm, in contact with oblique fissure. Due to this, she was seen by a respiratory consultant who organised a PET-CT which again showed the large 5 cm mass in the left upper lobe broad-based to the fissure in continuity with abnormal avid node at the left hilum associated with an abnormal avid left paratracheal node. She was discussed in the respiratory MDT and was referred to cardiothoracic surgery for resection, after having satisfactory pulmonary function tests (PFTs). She was initially staged as T3N2M0 and diagnosed as a malignant neoplasm of the left upper lung.

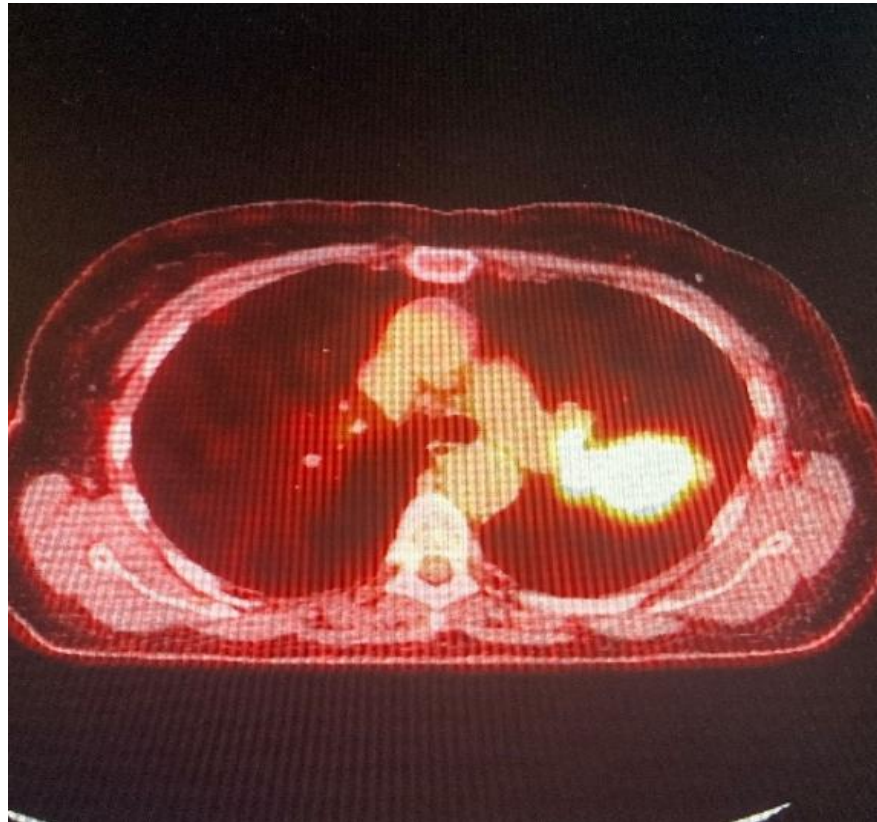


Fig. 1:- PET CT scan showing left side highly avid mass.



Fig. 2:- CT chest showing mass attached to Left PA.

EBUS was non-conclusive and CT guided biopsy was not feasible due to tumour being centric. Lung MDT (multi-disciplinary team) decision was to offer the patient surgery in the rationale of: diagnosis, potential cure, being with low risk, and no other absolute contraindication. Patient was scheduled for Left upper lobectomy / pneumonectomy, with possibility of in operable tumour. Risks given in consent were mortality 2%, stroke 1%, bronchopleural fistula 1%, surgical emphysema 2% multi organ system failure 1%, prolonged ITU stay plus bleeding, infection. Surgery performed via a thoracotomy in the lateral decubitus position. As we proceeded with the operation, tumour noted to be encroaching on the fissure, hilum structures were densely enclosed in reactive fibrous tissue. Careful dissection and division of the tumour away from the PA demonstrated that it was densely stuck to the PA. In order to offer the patient a complete resection, sling control for main left PA was placed, meticulous dissection was performed stating from fissure going up to main PA, division of anterior segmental arteries looked impossible due to dense attachment of the tumour to the artery. Snaring of the left PA was done, good communication with the anaesthetist had a key role. Shaving of the tumour from the PA surface revealed a 2*3 cm defect, vascular clamp were applied to achieve a haemostatic field, direct closure seemed impossible plus risk of compromising distal flow, and therefore decision to use a pericardial patch to repair the PA was taken. Using continuous 5-0 prolene stitch a diamond shaped bovine pericardial patch was fashioned to close the defect. No bleeding noticed after removal of cross clamp, lower lobe inflation revealed well perfusion distally. Operation time 2h 45 min, cross clamp time 20 min. patient extubated on table with minimal air leak No post-operative complication. Drain removed on 4th day post-operative and patient discharged the following day.



Fig.3:- Specimen showing Left PA wall attached to the tumour.

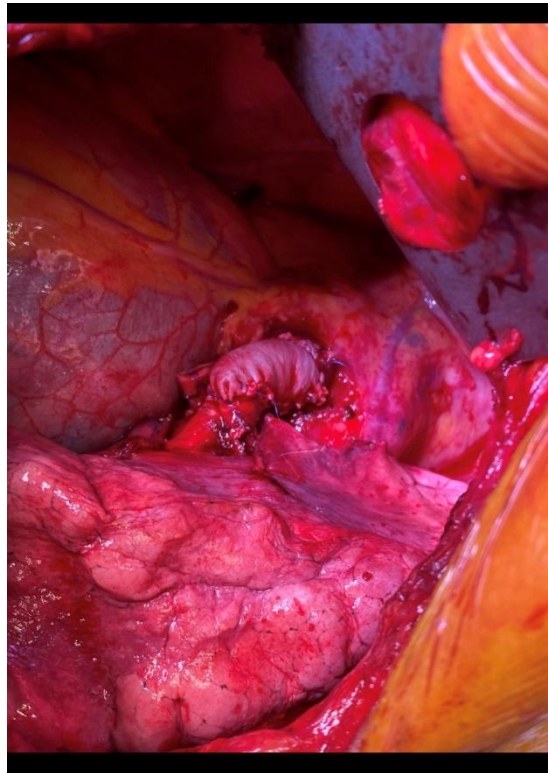


Fig.4:- Pericardial patch repair of the left PA.

After her resection, she was followed-up and discussed in MDT where they concluded to offer her adjuvant chemotherapy, which she declined due to the risks associated with little benefit added (6% survival benefit added). Her histopathology report confirmed her resection as non-mucinous adenocarcinoma, papillary pre-dominant, 58mm

maximum dimension. CT scan done post-operative revealed a patent left PA with no constriction and a well perfused left lower lobe

Discussion:-

This case highlights a few points. Central lung tumours can be surgically removed safely even when the tumour is densely attached to the pulmonary artery. Although, there is always the fear of the recognised complication of injury to the pulmonary artery, with recognised sequelae including rupture of the anterior segmental artery, it is safe to proceed, fully dissecting lesions, so as to completely remove them, rather than leaving them intact. Furthermore, if a lesion can have a resection that is oncologically complete, this should be attempted rather than partial resection with adjuvant therapy. This should be attempted and can be done safely, and therefore calculated benefit from adjuvant chemotherapy will be minimised.

Secondly, our case demonstrates that if complications such as injury of PA do occur intra-operatively, pericardial patches can be employed in repairing the vessels, with no further complications or major adverse effects.

Pericardial patches are employed in pulmonary artery reconstruction for elective surgery and are associated with the best value for money (6). Reconstruction of the pulmonary artery for lung cancer has been proven to be safe with excellent long-term survival, including the use of pericardial patches(7).

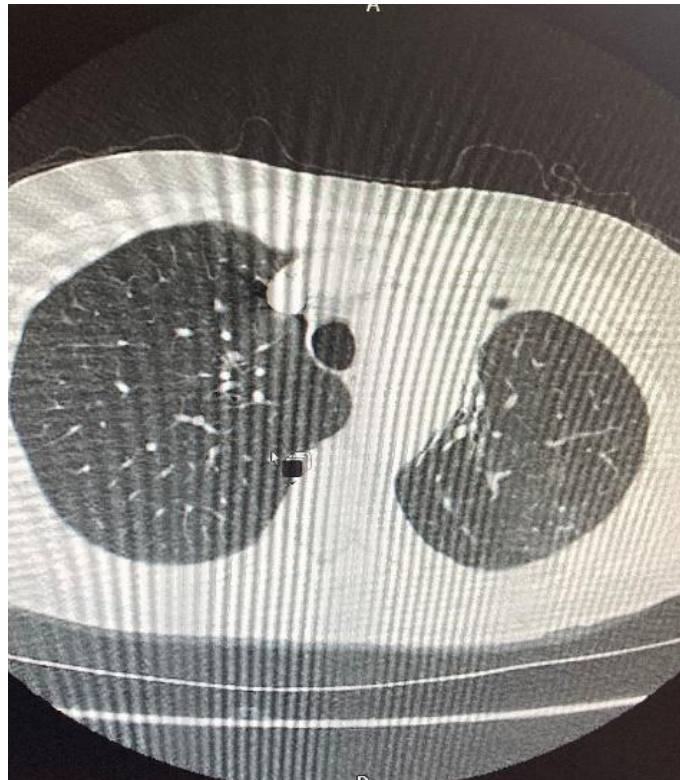


Fig. 5:-2 month post op CT chest showing well perfused left side lung (notice discrepancy in size of both hemithorax)



Fig. 6:- 2 month post op CT chest showing good opacification of left PA with no constrictions.

Conclusion:-

In our case, we performed a complete resection of a central lung lesion using a thoracotomy approach. Intra-operatively, we ran into an unplanned complication involving the left PA, which we successfully attempted repair of using an autologous pericardial patch. Post-operatively, the patient was followed up by the respiratory MDT. A two month follow up CT showed complete excision of the tumour, no recurrence and well perfused left lung with no Left PA constriction. This demonstrates successful resection of a central lung lesion involving the left pulmonary artery and repair with pericardial patch.

Declaration of competing interest

No conflict of interest declared by all author.

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Ethical approval

The study is exempt from the ethical approval in our centre.

Consent:

Written informed consent obtained from the patient for publication of this case report and accompanying images. The consent is available for review by the editor in chief of this journal on request.

Author Contribution:

Ayman asfour: study concept or design, data collection, analysis or interpretation, writing the paper, first author and approval of the final copy.

SudhirBhusari: study concept or design, data collection, analysis or interpretation, writing the paper.

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References:-

1. Schil PE Van, Balduyck B, Waele M De, Hendriks JM, Hertoghs M, Lauwers P. Surgical treatment of early-stage non-small-cell lung cancer. *EJC Suppl* [Internet]. 2013 Sep [cited 2021 Jul 21];11(2):110. Available from: [/pmc/articles/PMC4041566/](http://pmc/articles/PMC4041566/)
2. Chakraborty RK, Sharma S. Bronchoalveolar Cancer. *StatPearls* [Internet]. 2021 May 7 [cited 2021 Jul 21]; Available from: <https://www.ncbi.nlm.nih.gov/books/NBK513281/>
3. Frozen section | Thoracic Surgery University Hospitals Birmingham [Internet]. [cited 2021 Jul 21]. Available from: <http://www.thoracicsurgery.co.uk/frozen-section/>
4. Lung cancer - NHS [Internet]. [cited 2021 Jul 21]. Available from: <https://www.nhs.uk/conditions/lung-cancer/>
5. Chikwe J, Cooke DT, Weiss A. Lung and pleura. In: *Cardiothoracic Surgery (Oxford Specialist Handbooks in Surgery)* [Internet]. Oxford, UK: Oxford University Press; 2013. p. 684–5. Available from: <https://oxfordmedicine.com/view/10.1093/med/9780199642830.001.0001/med-9780199642830-chapter-14>
6. Ebert N, McGinnis M, Johnson W, Kuhn EM, Mitchell ME, Tweddell JS, et al. Comparison of Patch Materials for Pulmonary Artery Reconstruction. *SeminThoracCardiovascSurg* [Internet]. 2021 Jun 1 [cited 2021 Jul 21];33(2):459–65. Available from: <http://www.semthorcardiovascsurg.com/article/S1043067920302847/fulltext>
7. Venuta F, Ciccone AM, Anile M, Ibrahim M, Giacomo T De, Coloni GF, et al. Reconstruction of the pulmonary artery for lung cancer: Long-term results. *J ThoracCardiovascSurg* [Internet]. 2009 Nov 1 [cited 2021 Jul 21];138(5):1185–91. Available from: <http://www.jtcvs.org/article/S0022522309009878/fulltext>