Should pathological N1 disease determine the extent of parenchymal resection ?

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- Definition of R0 resection
- Definition of R1 disease
- Case studies – audience participation
- Prognostic factors
- Local vs systemic therapy

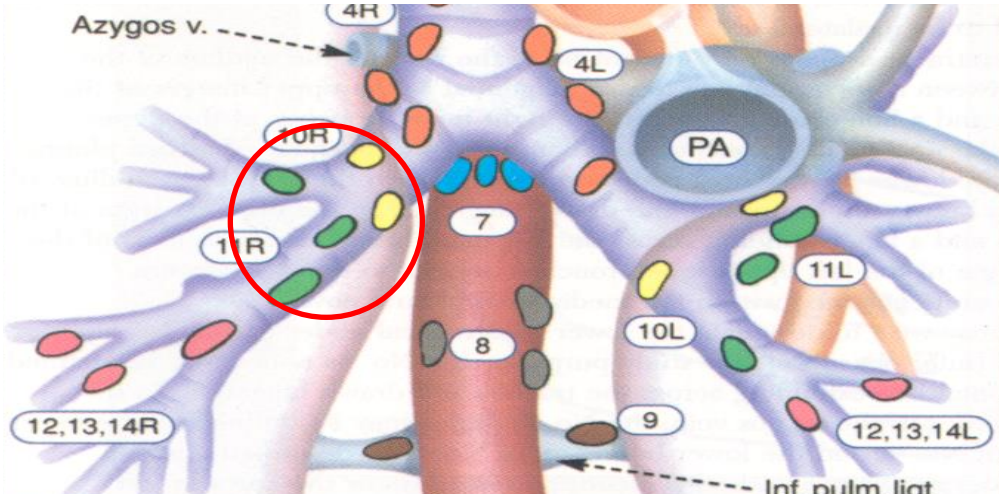
What is an R0 resection ?

Rami-Porta R, Wittekind C, Goldstraw P;
IASLC Staging Committee Lung Cancer. 2005 Jul;49(1):25-33.
Complete resection in lung cancer surgery: proposed definition.

- **R0 resection**
- **Microscopic clear resection margins**
- **Systematic nodal dissection**
- **No extracapsular nodal tumour extension**
- **Highest mediastinal node negative**

Extra-mucosal R1 disease

- submucosal
- peribronchial
- tumour cells in lymph nodes and/or lymph vessels (N1)
- extra-bronchial


Azygos v.
4R
4L
PA
7
11R
11L
10L
8
12,13,14R
9
12,13,14L

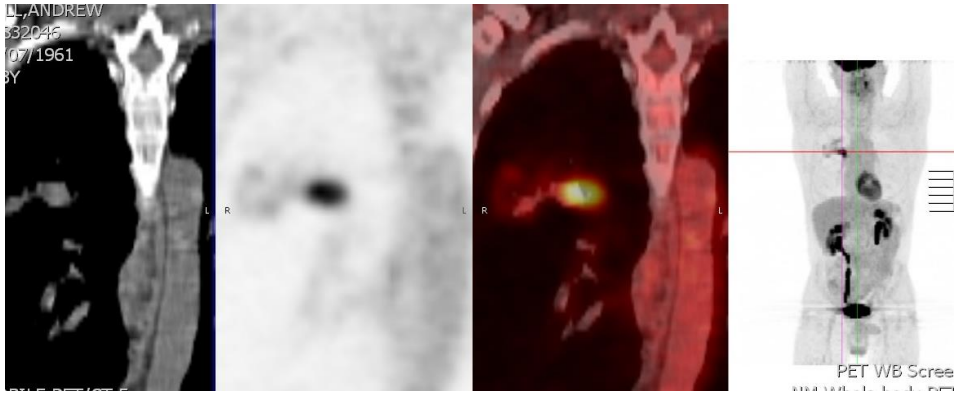
If you found a right/left upper lobe tumour with a station 10/11 node infiltrating the main bronchus would you carry out :

1. **An upper lobectomy and lymph node sampling leaving some nodal tissue on the bronchial stump**

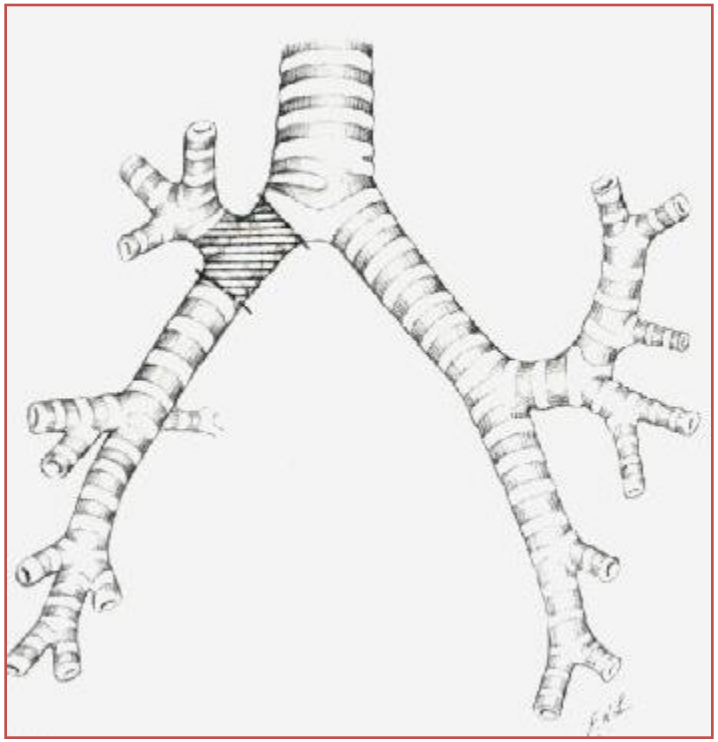
2. **A pneumonectomy with clearance of the hilar nodes**

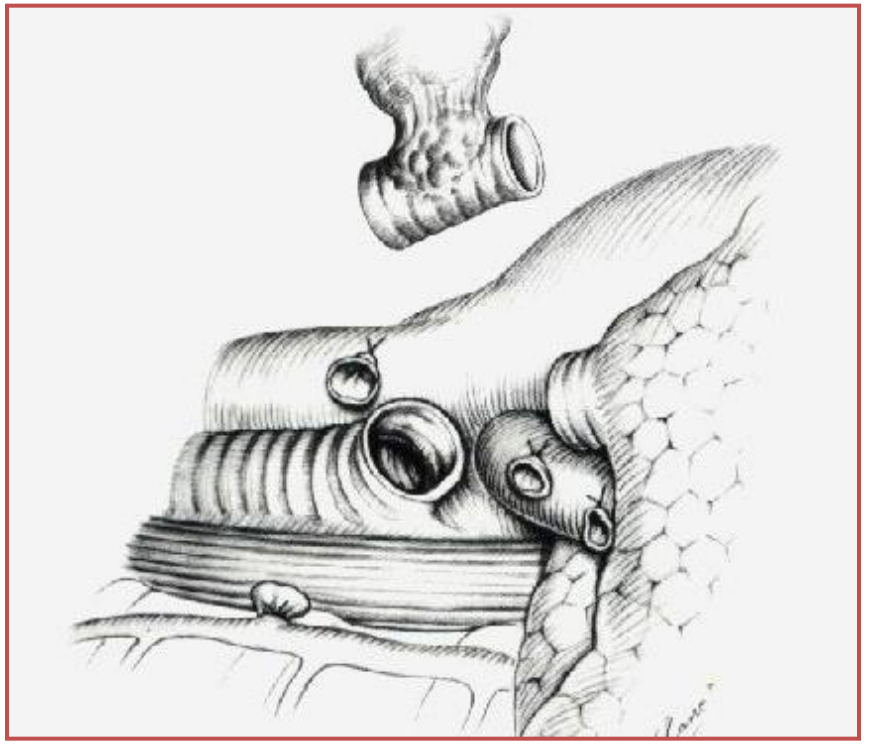
3. **A sleeve upper lobectomy with negative intraoperative frozen section analysis of margins**

1,2 or 3 ?

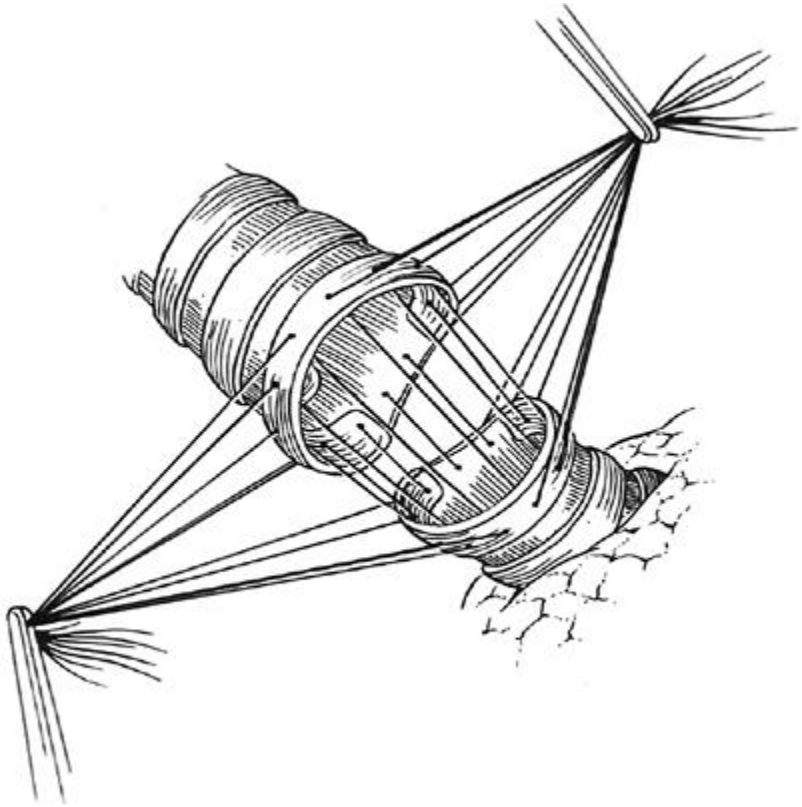


“Sleeve” Resection





Bronchial reconstruction



Avoid pneumonectomy

Sleeve lobectomy carries a much lower (threefold) risk of operative mortality and a significant 20% 5 year survival benefit compared to pneumonectomy

Deslauriers et al,Ann Thorac Surg 2005;77:1152

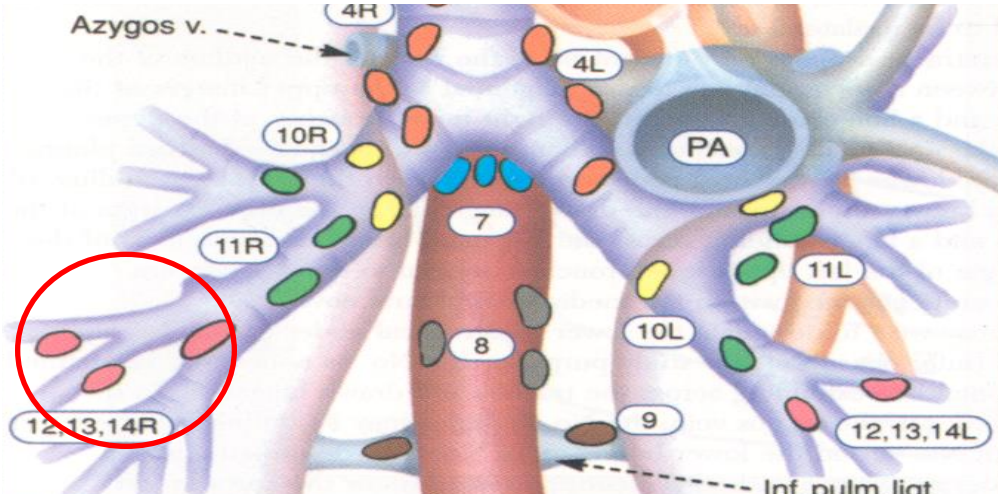
Sleeve resection decreases operative mortality by 35% and increases overall survival by 30%

Ma et al, EJCTS 2007;32:20 Meta analysis of 2984 pts in 12 studies 1996-2006

Practical guidelines

- Minimal macroscopic tumour-free bronchus length of **1.5** cm in **squamous** and **2.0** cm in **adenocarcinoma**
- R1 mainly submucosal in squamous and peribronchial in adenocarcinoma
- Frozen section has limitations in detecting extramucosal e.g. peribronchial R1
- Patients with c N1 (especially adeno) on CT should be considered for additional invasive node biopsy

Wind J, EJCTS 2007;32:29-34


Azygos v.
4R
4L
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12,13,14R
12,13,14L
Inf. pulm. ligt.

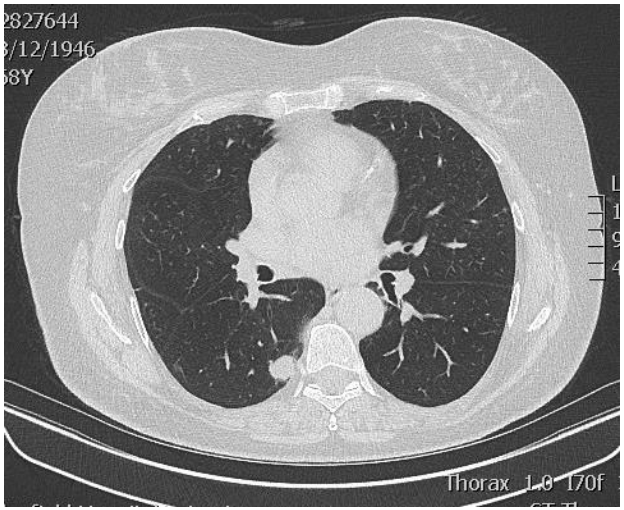
In a patient with limited lung function you intend to resect a c stage I , 2cm tumour from S6, would you :

1. **Begin by sending lobar nodes stations 12 /13 for frozen section analysis and only carry out segmentectomy if these were negative or a lobectomy if positive**

2. **Perform segmentectomy even if these nodes were positive provided they could be completed resected**

3. **Perform a segmentectomy without frozen section analysis but with systematic nodal dissection**

1 , 2, or 3 ?



Favourable results are obtained from anatomical sublobar resections

- **no significant difference in *freedom from disease* or *overall survival* between anatomic segmentectomy versus lobectomy for clinical stage I non-small-cell lung cancer: a propensity-matched analysis**
  Landreneau RJ, J Clin Oncol. 2014 ;32:2449-55
- **Compared with lobectomy , sublobar resection had *no significant impact on disease-free survival* (HR 1.2 CI 0.9-1.6)**
  El-Sherif et al,Ann Thorac Surg 2006;82:408
- **Segmentectomy *reduces operating time* and blood loss without increasing mortality or recurrence so long as the *margin : tumour diameter is > 1***
  Schubert et al, Ann Thorac Surg 2007;84:926

N1 should not preclude segmentectomy

- Peripheral lymph nodes are usually small, and are rarely enlarged more than 1 cm, even when metastatic.
- Tumour cells in the N1 nodes located downstream (ie hilar) are more likely to pass into the mediastinum
- Metastases to hilar and interlobar nodes are associated with a poorer prognosis compared with intralobar lymph nodes or with lymph node involvement by means of direct invasion
- Survival with N1 direct extension was better then hilar N1 ($p = 0.0006$), but the same as lobar N1 . Survival was not related to histologic features, sex, or **type of resection**

Hishida, Thorax 2008;63:526-31,
van Velzen, Chest 1996;110:1469-73
Marra , J Thorac Cardiovasc Surg. 2003;125:543-53

What does predict progression in resected N1 ?

- increased risk of local failure with **VATS** (HR, 2.5), **visceral pleural** invasion (HR, 2.1), and **number of positive N1** lymph nodes (HR, 1.3)

Higgins KA, Int J Radiat Oncol Biol Phys. 2012 ;83:727-33

- predictors of locoregional recurrence and distant metastasis : **visceral pleural** invasion, **multistation N1** disease, and **distinct N1** metastasis

Fujimoto T, J Thorac Cardiovasc Surg. 2006;132:499-506

Summary

- Differentiate invasive vs non-invasive lymphadenopathy
- Differentiate hilar vs lobar N1
- Prognosis from pN1 is unrelated to type of resection

Conclusions

- Why sacrifice functioning lung tissue to control systemic tumour spread ?
- Loss of lung function likely to be more detrimental than lymphadenectomy
- Adjuvant chemotherapy likely to be best additional procedure for pN1
- Adjuvant chemoradiotherapy may be preferred for pN1 (R1)