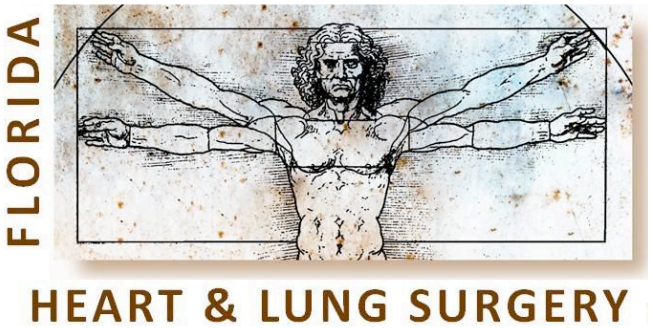
Review of Thoracic Surgical Oncology



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Edited by K. Eric Sommers, MD, FACS

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Editor's note: This month's issue features two interesting neurogenic tumors, both arising from Schwann cells: a Schwannoma, and a plexiform neurofibroma. I hope these will be of interest to readers.

SBRT for NSCLC

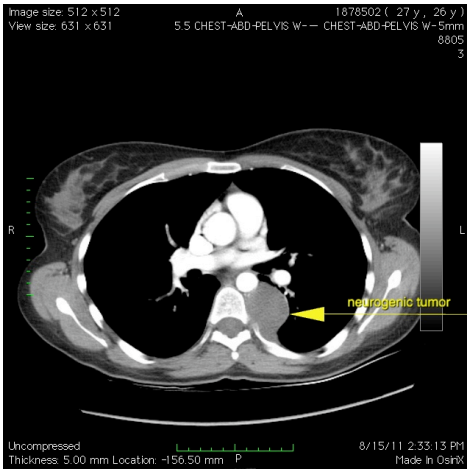
Chest wall toxicity in NSCLC patients treated with SBRT

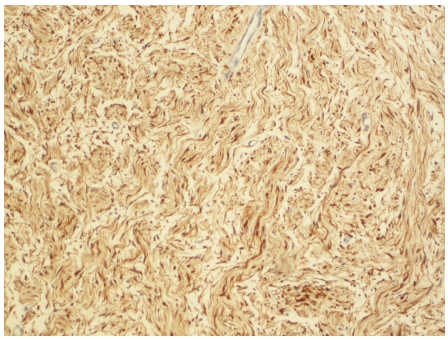
J Thorac Oncol. 2011 Dec;6(12):2052-7. Incidence and risk factors for chest wall toxicity after risk-adapted stereotactic radiotherapy for early-stage lung cancer. Bongers EM, Haasbeek CJ, Lagerwaard FJ, Slotman BJ, Senan S. Department of Radiation Oncology, VU University Medical Center, Amsterdam, The Netherlands. e.bongers@vumc.nl INTRODUCTION: High local control rates are reported after stereotactic ablative body radiotherapy (SABR) in stage I non-small cell lung cancer. Toxicity is uncommon, but few reports on long-term follow-up are available. We studied the incidence of chest wall pain (CWP) and rib fractures in patients with long-term follow-up.METHODS:Between 2003 and 2009, 500 patients (530 tumors) underwent SABR using risk-adapted fractionation schemes, consisting of three fractions of 20 Gy, five fractions of 12 Gy, or eight fractions of 7.5 Gy. Toxicity data were collected in a prospective database and scored using Common Terminology Criteria for Adverse Events (CTCAE) version 4.03. Chest wall volumes receiving doses of 30, 40, 45, and 50 Gy (V30 Gy-V50 Gy) and maximum dose in 2 cm of chest wall (D2 ml) were determined for patients with CWP or rib fractures (n = 57).RESULTS:With a median follow-up of 33 months, the 3-year overall survival and local control rates were 53.1% and 90.4%, respectively. CWP developed in 11.4% of patients and was severe (grade 3) in 2.0%. Rib fractures were observed in eight patients (1.6%), accompanied by CWP in seven of these patients. On multivariate analysis, patients with CWP had larger treatment volumes and shorter tumor-chest wall distances, whereas patients with rib fractures had larger tumor diameters and treatment volumes. Grade 3 CWP and rib fractures were associated with larger volumes of chest wall receiving doses of 30 to 50 Gy and rib fractures specifically with a higher maximum dose in the chest wall.CONCLUSIONS:Severe (grade 3) chest wall toxicity is uncommon after risk-adapted SABR and manifests in 2% or fewer of patients.

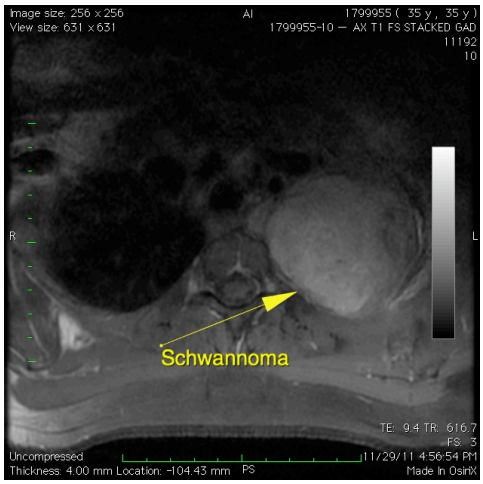
Editor's commentary: It is likely that we will be seeing an increasing use of SBRT in the treatment of NSCLC in the future. This paper describes a chronic, severe complication of chest wall pain and rib fracture in 13% of these patients. Features of this report re-inforce many of the issues with SBRT: only 36.4% of patients actually had pathologic proof of cancer; the **three** year rate of "local control" was measured at 90% and survival was 53%. In my opinion, one has to wonder about a technique that offers "local control" but so little in the way of survival benefit, at the costs of significant potential side effects.

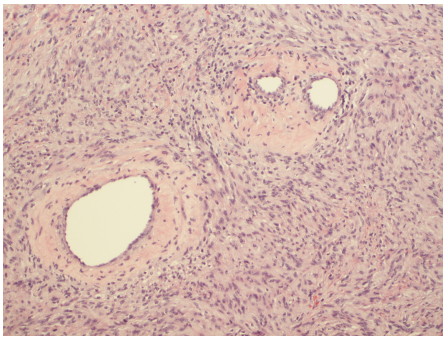
Interesting case presentations: thoracic Schwannoma (neurilemomma) and plexiform neurofibroma

Case History #1: A 26 yo WF was evaluated for back pain with a MRI. An abnormality was identified at T5-6 in the left paraspinal area. CT scan of the chest showed the left paravertebral mass at the attachment of rib six. She underwent robotic assisted resection of the mass which appeared to be originating from the sympathetic chain. The photomicrograph (below center) shows a low-power view of nests of pale eosinophilic cell groups imparting a plexiform appearance, with S100 immunostain.









Case History # 2: A 35 yo WF was referred to FHLS from a neurosurgeon who had been following a left apical mass. MRI of the chest demonstrated a large tumor occupying the apex of the left hemithorax without apparent invasion into the neural foramina. This mass was resected at left thoracotomy and appeared to be originating from the T1 nerve root. A medium power photomicrograph (left) shows hylanized blood vessel walls characteristic of neurilemomma or Schwannoma.

Discussion: Both neurofibromas and neurilemommas are derived from Schwann cells. Neurofibromas are associated with neurofibromatosis or Von Recklinghausen's disease. In neither case are these tumors considered frankly malignant, but they are both well described to cause spinal nerve root canal invasion and difficulty in surgical resection. Differential diagnosis should include paraganglioma, which rarely can produce symptoms similar to pheochromocytoma on the basis of catecholamine secretion.

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Lung cancer screening

Widespread lung cancer screening will cost $1.3 to $2 billion despite earlier detection benefits

J Natl Compr Canc Netw. 2012 Feb 1;10(2):267-75. Lung cancer screening with low-dose computed tomography: costs, national expenditures, and cost-effectiveness. Goulart BH, Bensink ME, Mummy DG, Ramsey SD. From aResearch and Economic Assessment of Cancer and Healthcare (REACH), Fred Hutchinson Cancer Research Center, and bUniversity of Washington, Seattle, Washington. A recent randomized trial showed that low-dose CT (LDCT) screening reduces lung cancer mortality. Health care providers need an assessment of the national budget impact and cost-effectiveness of LDCT screening before this intervention is adopted in practice. Using data from the 2009 National Health Interview Survey, CMS, and the National Lung Screening Trial (NLST), the authors performed an economic analysis of LDCT screening that includes a budget impact model, an estimate of additional costs per lung cancer death avoided attributed to screening, and a literature search of cost-effectiveness analyses of LDCT screening. They conducted a one-way sensitivity analysis, reporting expenditures in 2011 U.S. dollars, and took the health care payer and patient perspectives. LDCT screening will add $1.3 to $2.0 billion in annual national health care expenditures for screening uptake rates of 50% to 75%, respectively. However, LDCT screening will avoid up to 8100 premature lung cancer deaths at a 75% screening rate. The prevalence of smokers who qualify for screening, screening uptake rates, and cost of LDCT scan were the most influential parameters on health care expenditures. The additional cost of screening to avoid one lung cancer death is $240,000. Previous cost-effectiveness analyses have not conclusively shown that LDCT is cost-effective. LDCT screening may add substantially to the national health care expenditures. Although LDCT screening can avoid more than 8000 lung cancer deaths per year, a cost-effectiveness analysis of the NLST will be critical to determine the value of this intervention and to guide decisions about its adoption.

Editor's commentary: This article extrapolates the findings from the NLST to 50% or 75% of the potentially eligible smokers nationwide. Obviously, many assumptions had to be made in this model but the results suggest that any savings achieved by finding lung cancer in a more curable stage are offset to a greater degree by the costs associated with screening and the work-up of true and false positives. The model does not consider smoking cessation associated with lung cancer screening efforts, nor the costs associated with organization, implementation, and follow up of screening programs, which are likely to be huge.

NSCLC

NSCLC patients with solitary metastatic disease can have long term survival

Eur J Cardiothorac Surg. 2012 Jan 4. Which metastasis management allows long-term survival of synchronous solitary M1b non-small cell lung cancer?

Mordant P, Arame A, De Dominicis F, Pricopi C, Foucault C, Dujon A, Le Pimpec-Barthes F, Riquet M. General Thoracic Surgery Department, Georges Pompidou European Hospital, 20 rue Leblanc, 75015 Paris, France and. OBJECTIVESPatients with extrathoracic synchronous solitary metastasis and non-small cell lung cancer (NSCLC) are rare. The effectiveness of both tumour sites resection is difficult to evaluate because of the high variability among clinical studies. We reviewed our experience regarding the management and prognosis of these patients.METHODSThe charts of 4668 patients who underwent lung cancer surgery from 1983 to 2006 were retrospectively reviewed. We analysed the epidemiology, treatment, pathology and prognostic characteristics of those with extrathoracic synchronous solitary metastasis amenable to lung cancer surgery on a curative intend.RESULTSThere were 94 patients (sex ratio M/F 3.2/1, mean age 56 years). Surgery included pneumonectomy (n = 27), lobectomy (n = 65) and exploratory thoracotomy (n = 2). Pathology revealed adenocarcinomas (n = 57), squamous cell carcinoma (n = 20), large cell carcinoma (n = 14) and other NSCLC histology (n = 3). Lymphatic extension was N0 (n = 46), N1 (n = 17) and N2 (n = 31). Metastasis involved the brain (n = 57), adrenal gland (n = 12), bone (n = 14), liver (n = 5) and skin (n = 6). Sixty-nine metastases were resected. Five-year survival rate was 16% (median 13 months). Induction therapy, adenocarcinoma, N0 staging and lobectomy were criteria of better prognosis, but metastasis resection was not.CONCLUSIONSThese results suggest that extrathoracic synchronous solitary metastasis of pN0 adenocarcinoma may achieve long-term survival in the case of lung resection with or without metastasis resection. This pattern may reflect a specific tumour biology whose solitary metastasis benefits both from surgical or non-surgical treatment.

Editor's commentary: This review concerns patients who are found to have a solitary metastasis from NSCLC. As the authors speculate, the biology of these tumors would appear to lend a more favorable survival, as one would expect. It is important to note the N0 status of these patients. It is reminiscent of the importance of N0 status in the treatment of Pancoast tumors and chest wall tumors considered for surgery in general.

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