Early Stage Lung Cancer Survival in Kentucky: Exploring the Influence of Smoking Cessation and Mental Health Status

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Background – U.S.

- Estimated 221,130 new cases in U.S. for 2011
- 14% of all diagnosed cancers
- Relative survival:
  - 1 year: increased from 35% in 1975-79 to 43% in 2003-06
  - 5 year:
    » Overall = 16%
    » Localized = 53%

- Early stage only 15% of cases
- But...that represents about 33,170 cases
  - Total ovarian and uterine cancers combined
Background - Study

– Lung cancer survival in Kentucky: a multifactorial approach (Kentucky Lung Cancer Program)
– Ongoing at 9 sites, through Kentucky Clinical Trials Network (KCTN)
– Investigating variations in survival among early stage lung cancer patients
  • Smoking & ETS
  • Geography
  • Health behaviors
  • Family history
  • SES
  • Comorbidities
  • Occupation
  • Psychosocial
Eligibility Criteria

- Post-resection, histologically-confirmed stage
- Stages I, II (and IIIa)
- No prior history of cancer in last 5 years
- Kentucky residents
- Adults (> 18)
- Recruited at study sites
Research Protocol

- **Enrollment, consent, Q1 (max 10 wks after dx)**
  - Demographics, SES
  - Tobacco use (lifetime and current for cigarettes, cigars, pipes, marijuana)
  - Family history of cancer (all types)
  - ETS exposure (lifetime and current)
  - Occupational history
  - Comorbidities
  - Alcohol consumption
  - Potential exposure to lung carcinogens
  - Social support
  - Diet and exercise
Research Protocol (cont)

Q2 at 3 months post-enrollment
- Current tobacco use
- Current ETS exposure
- Alcohol consumption
- HADS (anxiety and depression)
- IES-R (distress)
- Diet and exercise

Q3 at 6 months post-enrollment
- Current tobacco use
- Current ETS exposure
- Alcohol consumption
- HADS (anxiety and depression)
- Diet and exercise

Linked to Kentucky Cancer Registry data
Subject accrual ongoing

- **151 subjects** enrolled and completed Q1 so far
  - 116 finished Q2
  - 92 finished Q3

[Map showing distribution of research subjects across Kentucky counties]
Today’s Presentation: 3 Factors

- Smoking cessation after diagnosis
- Mental health: anxiety and depression
- Residence in Appalachian Kentucky
Smoking Cessation

- Evidence of **better survival** among lung cancer patients **who quit smoking** after diagnosis (e.g., Baser et al. 2006, Sardari Nia et al. 2005, Dresler 2003)

- Little research on **smoking cessation patterns** among lung cancer patients

- This study collects data on **smoking at several time points**:  
  - Lifetime history  
  - 6 months prior to enrollment (Q1)  
  - At enrollment (Q1)  
  - 3 months post-enrollment (Q2)  
  - 6 months post-enrollment (Q3)
Smoking Cessation, cont.

- Of 112 patients with complete smoking data:
  - 58 had quit smoking at least 6 months before enrollment
  - 30 out of 54 smokers quit smoking by 6 months post-enrollment:

<table>
<thead>
<tr>
<th>N</th>
<th>6-months prior to enrollment?</th>
<th>At enrollment</th>
<th>3 months post-enrollment</th>
<th>6 months post-enrollment</th>
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Environmental Tobacco Smoke (ETS) and Smoking Patterns

- ETS exposure at home at enrollment is associated with continuing to smoke at 6 months post-enrollment

<table>
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<tr>
<th>ETS at home</th>
<th>Smoking Status Post-enrollment</th>
<th>Former</th>
<th>Quit</th>
<th>Smoking</th>
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</table>

P=0.02
Anxiety & Depression

• Research demonstrates higher rates of anxiety and depression among smokers (Bonnet et al. 2005, Covey et al. 1998)
  – Smokers with higher levels of anxiety and depression also have more difficulty quitting

• Lung cancer patients also experience high levels of anxiety and depression (Massie 2004, Uchitomi et al. 2003)

• This study included the Hospital Anxiety and Depression Scale (HADS) at Q2
Anxiety & Depression, cont.

• The HADS contains 14 questions (coded 0-3).
  Some examples:
  – I feel tense or “wound up”
    • Most of the time
    • A lot of the time
    • From time to time, occasionally
    • Not at all
  – I can laugh and see the funny side of things
    • As much as I always could
    • Not quite so much now
    • Definitely not so much now
    • Not at all

• Subscales for anxiety and depression separately
  – 0-7 = non case
  – 8-10 = borderline
  – 11+ = case
HADS Sub-scales & Smoking

• Mean depression score higher among continuing smokers (at 6 months post-enrollment):
  – Former (n=45) 4.8
  – Quit (n=30) 4.9
  – Smoking (n=24) 8.2 p=0.001

• Mean anxiety score higher among continuing smokers:
  – Former (n=45) 5.7
  – Quit (n=30) 7.3
  – Smoking (n=24) 10.6 p<0.0001
HADS Sub-scales & Smoking

• **Depression** (HADS $\geq 11$) associated with continued smoking (comparing quitters to continuing):
  - Normal/borderline: 64 vs. 36%
  - Depression/severe: 20 vs. 80%
  $P<0.02$

**Anxiety** (HADS $\geq 11$)
  - Normal/borderline: 64 vs. 36%
  - Anxiety/severe: 39 vs. 61%
  $P<0.10$
Appalachia

• The Appalachian region is known for poor health, low educational attainment, and high poverty

• Previous analysis demonstrates lower survival among Appalachian lung cancer patients relative to the rest of Kentucky
  – HR=1.25 after adjustment for several other relevant factors (Christian & Hopenhayn 2010)

• Almost two-thirds (64%) of our sample are residents of Appalachia
Appalachia, Smoking and Anxiety/Depression

• Patients from Appalachia seem to be less likely to quit smoking after diagnosis (p=0.015):
  – Appalachian: 57.6% (19/33)
  – Non-Appalachian: 23.1 % (5/21)

• But patients from Appalachia
  – did not have higher HADS score for anxiety or depression
  – were not more likely to be exposed to ETS at home
Multivariate Regression

• Preliminary multivariate analysis suggests Appalachian residence is associated with continued smoking at 6 months post-enrollment, even after adjustment for other significant factors:
  – Stage of disease
  – Presence of comorbid conditions
  – Anxiety & depression
  – ETS exposure at home

• Age and gender were not significant predictors of continued smoking after adjustment for the above factors
Conclusions

• So far, 21% of early lung cancer patients were smoking 6-8 months after diagnosis
• ETS at home was associated with continued smoking after diagnosis
• Continuing smokers were more likely to have higher HADS total scores
• Appalachian study participants were more likely to continue to smoke, but not to be exposed to ETS
• Anxiety/depression, stage, ETS, Appalachian residence and co-morbidities all seem to be independently associated with continued smoking