

# Smoking Cessation and Thoracic Surgery

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# Epidemiology

- ▶ At time of diagnosis of lung cancer<sup>1</sup>:
  - ▶ 58% past smokers
  - ▶ 24-40% current smokers
  - ▶ 20% smoke at time of surgery, of which half of these continue to smoke postop

# Perioperative Risk

- ▶ Postoperative complications are known to increase costs, worsen QOL and increase LOS<sup>1,2</sup>.
- ▶ Smoking at time of operation increases risk of postoperative pulmonary complications, LOS and morbidity<sup>2</sup>.
- ▶ Large retrospective study of 7,990 patients by Mason et al. in 2009 looked at perioperative outcomes based on smoking status<sup>3</sup>. Results included:
  - ▶ Increased risk of perioperative mortality in past or current smokers (1.5%) compared to never smokers (0.3%)
    - ▶ Risk of mortality declined as interval of smoking cessation increased
  - ▶ Increased risk of perioperative pulmonary complications in current or past smokers (5.7%) compared to never smokers (2.6%)
    - ▶ Risk of pulmonary complications declined as interval of smoking cessation increased
    - ▶ Interestingly showed no increase risk with late cessation prior to surgery
- ▶ A smaller prospective study of 462 patients by Lugg et al. in 2017 also evaluated perioperative risk<sup>4</sup>:
  - ▶ Increased risk of perioperative pulmonary complications in current smokers (22%) compared with never smokers (2%), p=0.004
  - ▶ Trend to reduced risk of pulmonary complications in ex-smokers (<6 weeks 10.9%, ≥6 weeks 11.8%)

# When to Quit Preoperatively?

- ▶ Several studies have suggested that smoking cessation should be >4 weeks prior to surgery, with potentially increased risks of postoperative pulmonary complications <4 weeks<sup>2</sup>.
  - ▶ Nakagawa et al. in 2001 (288 patients)<sup>5</sup>: 53.4% (2-4 weeks) versus 34.7% (>4 weeks)
  - ▶ Vaporciyan et al. in 2002 (257 patients)<sup>6</sup>: 21.7% (<4 weeks) versus 9.2% (>4 weeks)
- ▶ However, these are small retrospective studies, and must way up risk of tumour progression and likelihood of successful smoking cessation
- ▶ The large study by Mason et al. found no correlation between increased postoperative complications and short duration of smoking cessation

# Smoking and Wound Healing

- ▶ Smoking:
  - ▶ Decreases tissue oxygenation
  - ▶ Attenuates inflammatory healing response
  - ▶ Proliferative response impaired by reduced fibroblast migration and therefore downregulated collagen synthesis deposition
- ▶ Cessation of smoking restores tissue oxygenation and metabolism rapidly
- ▶ Inflammatory cell response reversed within 4 weeks
- ▶ Nicotine does not affect tissue microcirculation but appears to impair inflammation and stimulate proliferation
- ▶ RR 2.1 (95% CI 1.6-2.7) for wound complications in current smokers with no correlation with pack year history

# Smoking Cessation and QOL

- ▶ A prospective trial of 70 patients by Balduyck et al. in 2011 looked at the effect of smoking on QOL post thoracic resection<sup>7</sup>. They found:
  - ▶ Non-smokers returned to baseline QOL within 1 month of surgery
  - ▶ Recent ex-smokers reported decreased physical function during first 6 months and temporary increase in dyspnoea and fatigue in the first 3 months. However these returned to baseline
  - ▶ Current smokers did not return to baseline QOL in regards to physical functioning, role functioning and social functioning. At 12-months they reported increased dyspnoea compared with baseline. Also reported significantly more pain at 12-months compared with baseline

# Long-term Survival

- ▶ Higher risk at baseline of morbidity and mortality due to increased risk of CVA, IHD, COPD and other malignancies<sup>2</sup>.
- ▶ Long-term survival post lung cancer resection is improved by smoking cessation at the time of diagnosis prior to lung cancer resection:
  - ▶ Nia et al. evaluated 311 patients demonstrating improved prognosis in ex-smokers compared with patients who continued to smoke<sup>8</sup>.
- ▶ Parsons et al. in 2010 performed a meta-analysis looking at effect of smoking cessation on early-stage lung cancer<sup>9</sup>:
  - ▶ Continued smoking associated with significant increased risk of all-cause mortality: HR 2.94 (95% CI 1.15 to 7.54)
  - ▶ Recurrence in early stage NSCLC: HR 1.86 (95% CI 1.01-3.41)

# Prehabilitation - Is it the new standard of care?

- ▶ Tarumi et al. performed retrospective study in 82 patients undergoing neoadjuvant CRTx prior to surgery<sup>10</sup>
  - ▶ Admitted patients for mean 10 weeks prior to surgery
  - ▶ Included:
    - ▶ Relaxation
    - ▶ Respiratory training
    - ▶ Cough training
    - ▶ Lower extremity exercise
    - ▶ Smoking cessation
  - ▶ Significant increases in FVC, FEV1, particularly in current/former smokers and those with respiratory impairment
  - ▶ No control group
- ▶ Early evidence suggests that prehabilitation (including smoking cessation) can turn an inoperable patient due to poor lung function into an operative candidate
  - ▶ 8 inoperable patients underwent four weeks of prehabilitation, with no mortality and 25% morbidity rate<sup>11</sup>
  - ▶ 11 inoperable patients underwent four weeks of prehabilitation with improvement of 2.8mL/kg/min of VO2 max and subsequent operation with 0% mortality and 72% rate of pulmonary complications<sup>12</sup>

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