

# *Tobacco Dependence & Cessation*

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# Tobacco Facts

- **1.1 billion people smoke (WHO)**
  - Developed countries: 300 million (2:1)
  - Under-developed: 800 million (7:1 male/female)
- **25% of US adults are smokers**
  - <high school education: 34%
  - ‘blue-collar’ workers: 36%
  - military: 42%

# Tobacco Facts

- **In US, tobacco-related diseases account for 419,000 deaths**
- **World-wide: accounts for 3 million deaths annually**
- **\$50 billion spent annually on direct health care costs and \$47 billion more indirectly.**

# Tobacco Facts

- Tobacco industry spends over \$6 billion/year on advertising
- 1.5 million people quit/yr and 2/3 of all current smokers wish to quit (1995)
- 1.5 million teenagers begin/yr!!
  - =3000 adolescents/day.
  - 89% of smokers have tried 1st cigarette before 18 years old.

# Cigarette Smoke Composition

- 92% vaporized chemicals and 8% particulate
- Nicotine----->insecticide for tobacco plant
- Acrolein
- Formaldehyde
- Ammonia- alters pH
- Nitrogen oxides
- Toluene
- Pyridine
- Cocoa--->theo-bromide (bronchodilator)
- Menthol--->topical anesthetic

# Diseases associated with smoking

- **Obstructive lung disease**
- **Spontaneous pneumothorax** (*Military Med. 1996*)
- **Pulmonary hypertension**
- **Lung Cancer**
- **Influenza and pneumococcal infxn** (*NEJM 3/200*)
- **Pulmonary Hemorrhage in Goodpasture's**
- **Interstitial lung disease**
  - RBILD-Respiratory bronchiolitis-associated lung disease
  - DIP-Desquamative interstitial pneumonia
  - EG-Eosinophilic granuloma/Langerhans' cell

# Emphysema

- **CAE**-*Centriacinar emphysema*
  - upper lung zones
  - tissue contains black pigment
  - resp. bronchioles and alveolar ducts become distorted due to ‘destruction’ of alveolar spaces/pores
  - bullae----->*placental transmogrification*

# Pulmonary HTN

- Increase in muscular art. media thickness and intimal fibrosis
- Muscularization of the arterioles also occur in smokers

*Clinics Chest Med: 3/200*

# Interstitial Lung Disease

- **RBILD**-pigmented macrophages may be a precursor to CAE (*Yousem & Meyers*)
- **DIP**-extensive desquamation of alveolar cells within the lumen in uniform pattern
  - 5th decade, 90% smokers (*Liebow*)
- **EG**-predominant cell is Langerhan's cell proliferation, ultimately results in dilated air-spaces/cysts
  - may result from altered immune response to tobacco glycoprotein

# Lung Cancer

- Originally noted association with tobacco in 1898, but not until 1950's when a series of case-control studies in US & UK theorized an association.
- 3500 chemicals have been identified in tobacco smoke: Carcinogens include-
  - aromatic amines
  - benzene, formaldehyde
  - radioactive substances (polonium)
- Increases with exposure to asbestos, arsenic, nickel, silica and ? radon.
- Likely a genetic predisposition-acts on CYP1A1, CYP2E1, GSTM1---metabolites bind to DNA-->mutation

# Smoking and post-op complications

- Increased risk of pneumonia
- Increased risk for mechanical ventilation (n=51..all smokers)
- Cessation 8 wks. prior reduces complications (33% vs 14.5%)
- Smokers who reduce w/in 2 wks increase complications 6x. (*VA study of 410 pts.*)

# Why stop smoking?

- If quit by age of 50, decrease risk of death over next 15 yrs. by 50%.
- COPD is the 4th leading cause of death (*15% of smokers develop clinically significant obstruction*)

## *More reasons to stop smoking:*

- Smoking cessation improves prognosis in COPD (**only** other intervention of proven benefit besides O<sub>2</sub>)
- Reduces risk of lung cancer by 92% over 10-20 yrs. (but not to zero!)
- If continue to smoke after tx of Ca. greater risk of developing a second primary
- May see resolution of ILD

## Copenhagen Heart Study

- **No difference in FEV1 decline b/n filtered and unfiltered cigarettes**
- **Inhalation pattern affects rate of FEV1 decline**
  - length of inhalation (breath hold)
  - depth of resp effort (deep)
- *Normal rate of decline in non-smoker is approximately 30cc/yr after age of 35. Estimated decline with tobacco is 2 fold (60cc).*

# The doctor and the smoker

- Physicians have contact with 70% of smokers/yr.
- Smoking pts may be vulnerable during medical visits and susceptible to quit
- Smoking cessation provided by a physician is MORE cost-effective than screening PAPs, mammograms, treating HTN or hyperlipidemia
- Meta-analysis of 231 clinical trials show physician interventions rated among most effective at 1 yr.
  - 6%-minimal (2-3 minutes)
  - 22% moderate
  - **43%-pulmonary patients**

# Navy Health Care Provider Practices

*(Conway et al. Mil. Med. 9/96) n=1151 MC officers*

- 48% spend less than 5 minutes discussing tobacco cessation
- 93% did not receive formal training in past year regarding tobacco cessation
- 46% did not have referral info for pts.

# Tobacco practices of doctors

- Advise to stop 84%
- Advise preg. 80%
- Inform benefits 75%
- Risks 73%
- Record results 42%
- Develop plan 19%
- Referral 18%
- Provide info. 17%
- Rec. gum 14%
- Arrange f/u 6.8%
- Set quit date 7.7%

# Psychopharmacology of smoking

- ***Habit***
- ***Pleasure Seeking***
  - ***within 7 seconds of a puff..a bolus of nicotine is delivered to the brain***
    - ***rate of smoking***
    - ***deeply inhaled***
    - ***length of breath-hold***
- ***Self-medication-to reduce withdrawal***

## Evaluation of level of dependence

- **At present, how long after waking up do you wait before having your first cigarette (in minutes)?**
- **Fagerstrom Tolerance Questionnaire**
- **Fagerstrom Test for Nicotine Dependence**

# Stages in Smoking Cessation

- **Pre-contemplation**
  - negative images, physician advises
- **Contemplation**
  - costs/benefit, illness, media, peer pressure
- **Action**
  - NT, group therapy, hotlines, self-help
- **Maintenance**
  - restriction on tobacco, social support

## Four A's (*NCI guidelines*)

- **ASK:** every visit and document in record
- **ADVISE:** strongly!
- **ASSIST:** plan, provide info, treatment, diary, routines, habit change
- **ARRANGE:** referrals and follow-up

# Use of nicotine for cessation

- First available in 1992
- Up to 25% abstinence rate c/w placebo
- Greatest pitfalls: dose and duration
- Forms:
  - Gum
  - Patch
  - Spray
  - Inhaler

# Nicotine Treatment (NT)

- Does not increase risk of MI
- Is not a risk factors for cancer
- Does not increase stroke
- Does not increase peripheral vasc. disease
- *No current formulation delivers nicotine like a 'smoke'*

# Nicotine

- Weakly water-soluble base which is readily absorbed from resp tract, skin, and buccal mucosa *depending on the pH of the delivery vehicle.*
- Smoking results in rapid rise in blood, lung, liver, spleen and brain (2x of serum levels)
- 5-10% excreted and remainder metabolized in liver
- T 1/2 is 2 hours
- Cotinine is non-psychoactive metabolite with T 1/2 of 15-20 hours.

# Effects of Nicotine

- Lowers body weight 'set-point'
- Increases attention (stimulant)
- Relaxes skeletal muscles
- Acts on CNS nicotinic receptors to release: dopamine, endorphin, serotonin, glutamate
- Nicotine up-regulates receptor sites 2x

# Nicotine Withdrawal Syndrome

- **Anxiety**
- **Irritability, frustration, anger**
- **Decreased heart rate**
- **Difficulty concentrating**
- **Increased appetite**
- **Restlessness**
- **Craving cigarettes**
- **Depression**

# Nicotine Patch

- **Nicotine via skin at constant rate**
  - local irritation
- **7-22mg dose range**
- **worn 16h or 24h/day**
  - begin with higher dose for 6-12 wks
- **Most useful in low level dependence**
  - 30-40% abstinence while patch on
  - 1 yr f/u 10-20% success rate

# Nicotine Polacrilex (gum)

- 2mg and 4mg strength
- modest acute elevation of nicotine
- 'chew and park'
- may help as adjunct to patch
- Side effects: taste, TMJ, reflux

# Nicotine Spray

- Reaches brain faster than gum
- promptly diminishes cravings
- may be used adjunct with patch
  - 31% vs 16% at 6 months, 27% at 1yr.
- 1-2 sprays q 1 hour prn craving
- nasal irritation
- if use with patch use 5-15mg dose x 16h.

# Nicotine Inhaler

- Hand-mouth technique
- delivers *less* nicotine than any others
- Absorbed via oropharynx

# Nicotine overdose

- **Rare in the habitual smoker**
  - insomnia
  - bizarre dreams
  - indigestion
  - nausea
- **Usually occurs in the setting of smoking and NRT**

# Non-pharmacologic approaches

- *“Cold Turkey” - ineffective (<10%)*
- *Behavior Mod.-no outcomes data available and anecdotal, but useful as an adjunct to pharmacologic tx.*
- *Accupuncture*
- *Biofeedback*
- *Hypnosis*

# Bupropion

- Slows re-uptake of CNS dopamine &/or prevents normal degradation
- Effective- up to 44% quit rate while using med
- Optimal dose is 150mg bid
- May be given with NT
- Quit date should be 7 days AFTER start of tx.
- Contraindications: sz., neurosurg, anorexia or bulimia, on theo, alcoholic
- Side effects: awakening, headache, dry mouth.

# Mecaylamine (Inversine)

- **An anti-hypertensive agent which is a nicotine receptor agonist**
- **helps suppress nicotine withdrawal syndrome when administered with a patch**

# Office Visit-individualized approach

- Offer tobacco cessation to every smoker (even the lowest level dependence)
- Explain addictive properties of nicotine
- Discuss benefits of cessation
- Pros and cons of different treatments
- Pt should identify 'triggers'
- Pt sets a quit date
- *Obtain baseline cotinine level*
- Regular follow-up

# Proposed therapy

- **Begin with Zyban**
- **Continue it 2-3 months after abstinence**
- **If not completely successful, but have reduced tobacco, add patch**
- **If acute craving is a problem, consider gum or spray**

# If contra to Bupropion

- Prescribe patch at 15 or 22 mg dose
- If abstinent, continue for 8-12wks. and taper/discontinue
- If craving develops during taper, resume prior dose
  - “Slip”-few cigarettes
  - “Relapse”-regular tobacco use

# The “high dependency” smoker

- Failed multiple attempts/treatments
- Baseline cotinine >250ng/ml (serum)
- Stanford experience supports initiation of poly-therapy
- Achieve goal level of 100-150% of baseline serum cotinine
- Patient education of nicotine OD sx.
- Minimum treatment duration of 2 months and may take up to 6mos.

# The FDA and Tobacco

- **1994: investigations reveals nicotine is addictive and known to tobacco industry**
  - DeNoble & Mele testify to Congress
  - NY Times publish Brown & Williamson documents
  - *a cigarette is “a dispenser for a dose unit of nicotine” Phillip Morris executive*
- **Tobacco companies target children**
  - 30% of age 3 and 91% of age 6 kids identify Joe Camel with smoking.
  - 46% of children age 8-13 saw cigarette ads on billboards

# The FDA Regulates Tobacco to Minors

- Text-only
- No billboards w/in 1000 feet of schools
- No promotional items at sports
- Tobacco industry to educate children about tobacco hazards

## *Americans with Disabilities Act-1990*

- Limits tobacco use in the work-place
- Title III of ADA Act applies to public accommodations
  - grocery stores, malls, restaurants
  - hospitals
  - physician offices
- Physicians helped to make the modification

*JAMA 9/96*

1990

2000

- Smoking in hosp.
- Tobacco to minors
- Advertising
- Smoke at Fed. Inst
- Restaurants
- \*\*\*Bars
- ADA act
- FDA Regulation
- FDA
- ADA
- ADA
- California State reg

*“We’ve come a long way baby!”*