Difficult to control chest pain in patients with cystic fibrosis

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Objectives

• Understand the essentials, diagnosis and clinical manifestations of cystic fibrosis.
• Discuss the literature regarding pain in cystic fibrosis.
• Discuss options for therapy of pain in patients with cystic fibrosis.
Cystic Fibrosis Patients with difficult to control chest pain

3 CF patients since December:
21 yr old male with pleuritic chest pain
   Deep chest pain worse with cough, nothing has helped so far
   Palliative care consulted to start a trial of methadone therapy.

   PFTs: FVC = 1.78L (34% predicted),
   FEV1 = 0.82L (18% pred)
   FEF_{25-75} = 0.26 (5%)
Non cardiac chest pain

• GI related
  – GERD
  – Esophageal motility disorder
  – Visceral hyperalgesia
• Chest wall or musculoskeletal pain
• Pulmonary related
  – Venous ThromboEmbolic disease (VTE)
  – Pulmonary hypertension
  – Lung parenchyma related
    • Pneumonia / infection
  – Pleuritis / serositis
• Pain referred to chest
Cystic fibrosis - overview

• Most common fatal autosomal recessive disease among Caucasian population.
• A multi system disease affecting the digestive system, respiratory system, sweat glands, and reproductive tract
• Progressive lung disease is the main cause of morbidity and mortality.
• Abnormal transport of chloride and sodium across the respiratory epithelium
Manifestations of Cystic Fibrosis

- General
  - Growth failure (malabsorption)
  - Vitamin deficiency states (vitamins A, D, E, K)

- Nose and sinuses
  - Nasal polyps
  - Sinusitis

- Liver
  - Hepatic steatosis
  - Portal hypertension

- Gallbladder
  - Biliary cirrhosis
  - Neonatal obstructive jaundice
  - Cholelithiasis

- Bone
  - Hypertrophic osteoarthropathy
  - Clubbing
  - Arthritis
  - Osteoporosis

- Intestines
  - Meconium ileus
  - Meconium peritonitis
  - Rectal prolapse
  - Intussusception
  - Volvulus
  - Fibrosing colonopathy (strictures)
  - Appendicitis
  - Intestinal atresia
  - Distal intestinal obstruction syndrome
  - Inguinal hernia

- Lungs
  - Bronchiectasis
  - Bronchitis
  - Bronchiolitis
  - Pneumonia
  - Atelectasis
  - Hemothysis
  - Pneumothorax
  - Reactive airway disease
  - Cor pulmonale
  - Respiratory failure
  - Mucoid impaction of the bronchi
  - Allergic bronchopulmonary aspergillosis

- Heart
  - Right ventricular hypertrophy
  - Pulmonary artery dilation

- Spleen
  - Hypersplenism

- Stomach
  - GERD

- Pancreas
  - Pancreatitis
  - Insulin deficiency
  - Symptomatic hyperglycemia
  - Diabetes

- Reproductive
  - Infertility (aspermia, Absence of vas deferens)
  - Amenorrhea
  - Delayed puberty
CF diagnosis

• Clinical symptoms consistent with CF in at least one organ system
• Evidence of CFTR dysfunction (cystic fibrosis transmembrane conductance regulator)
  – Elevated sweat chloride
  – Abnormal nasal potential difference.
CF GI disease

• Insufficiency of exocrine pancreas
  – Malabsorption of fat and protein
• Insufficiency of endocrine pancreas
• Focal biliary cirrhosis
• Meconium ileus (MI) – pathognomonic
• Distal intestinal obstruction syndrome (DIOS)
  – MI equivalent in older children
• Intussusception
CF - Reproductive system

• Infertility
  – 95% of men with CF are infertile
    • Defects in sperm transport
  – 20% of women with CF
    • Amenorrhea related to malnutrition
    • thick cervical mucous
CF – musculoskeletal system

• Reduced bone mineral content
• Hypertrophic osteoarthropathy
CF respiratory system

• Thick viscous airway secretions
• Chronic infection of respiratory tract
• Eventual infection with Pseudomonas species usually a mucoid phenotype
Respiratory symptoms

- Productive cough
- Chronic sinusitis
- Digital clubbing
- Progressive tissue damage – floppy airways leads to air trapping
- Airway hyper reactivity
- Bronchiectasis
- Obstructive pattern on PFTs
  - Decreased FEV1 and FEF25-75
- Decreased exercise tolerance
- Weight loss
Mucus blocks air sacs (alveoli) in the lungs

Pancreatic duct

Mucus blocks pancreatic ducts

Stomach

Pancreas
Digital clubbing in CF
Pain in CF?
Pain in children and adults with cystic fibrosis: a comparative study

- 73 children, 110 adults
- 59% of children and 89% of adults reported pain in past month
- No difference in patients with severe disease vs milder CF
- Abdomen in children
- Back, head and chest in adults
- Absenteeism in 15%
- 27% reported pain caused negative impact on family life
- Most common therapy – acetaminophen
- Even patients with mild disease had regular painful symptoms
- Chest physiotherapy reported as painful by 28% of children and 17% of adults

Prevalence of pain in adults with cystic fibrosis

- 250 adult CF patients in Italy
- 94.1% reported episodes of pain in the previous 2 months
  - Headache 63%, abdominal 51%, back 48%, “bones or muscular 44%, joints 41%
  - Chest pain #7 on list with 32%
  - 26% of patients with pain did nothing about it
  - 42% asked their CF center physician 3.5% asked PCP for help with pain
  - Affected QOL and every day activities

Chronic pain in cystic fibrosis

• 78 patients in a CF clinic in Boston with chronic pain 1984-93
• Chronic pain increased in the last 6 months of life
• Headache 55%, chest pain 65%, back pain 19%, abdominal pain 19%, limb pain 16%
• Chest pain – musculoskeletal, pleuritis, pneumothorax, rib fracture
• Pain therapy varied – NSAIDs, opiates, TCAs, epidural analgesia

Physiotherapy and massage to treat pain in CF

• 105 patients with CF in Victoria, Australia
• Assessed pain after one treatment “a combination of spinal joint and intercostal mobilization” “soft tissue therapy and remedial massage”
• 90% reported chronic pain
• Short lived reduction in pain intensity

Lee A, Holdsworth M et al. The immediate effect of musculoskeletal physiotherapy techniques and massage on pain and ease of breathing in adults with cystic fibrosis. J Cystic Fibrosis. 8(1);79-81:January 2009.
End of life care in CF

- End of life care differed compared to oncology patients
  - Many continued to receive antibiotics and other preventive and therapeutic therapy until death.
  - Many had blood draws for diagnostics on day of death
  - Out of 44 patients only 1 died at home on hospice

Robinson WM, Ravilly S. Pediatrics 1997;100:205-209. (Boston)
21 yr old male with uncontrolled chest pain – follow up

• Methadone did not seem to help
• Changed to oxymorphone ER also with little help
• Added Nortriptyline at hs
• What next?
• Three patients since December
  – 2 dead
  – 1 being evaluated for transplant
Therapeutic options for refractory pain

• The usual suspects
  – APAP, NSAIDs
    • Maximize dose of NSAIDs
  – Opiates
  – Adjunct medications
    • TCAs, anti-epileptic medications, steroids, topical therapy
  – Blocks, injection therapy
  – OMM?
Opiates at the end of life

• Opiates are safe at end of life and do not accelerate death
Other resources