Exercise & Cancer: Defining the New Normal

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The Many Faces of Cancer

Movement (both exercise & less sedentary time is important)
GREAT NEWS: INCREASE IN # OF CANCER SURVIVORS

SHAPIRO, 2018

OVERVIEW OF TREATMENT OPTIONS

The various treatment options each have different side effects and to varying degrees

TARGET THERAPIES TO TREAT CANCER

- Small molecule therapies used to target the inside of cells
- Monoclonal antibodies use lab produced proteins to attach to specific target cells that either directly inhibit cancer cell growth, apoptosis or increasing recognition by immune cells

National Cancer Institute

Side effects
- Wound healing
- Blood clotting issues
- ↑ Blood pressure
- Fatigue
- Mouth sores
- Skin problems
HORMONE THERAPIES TO TREAT CANCER

- Used to slow or stop cancer growth for tumors that use hormones to grow
- Can be used as adjunct to reduce or prevent symptoms in some cancers

Side effects
- Hot flashes
- Sexual dysfunction
- Enlarged/tender breasts
- Weakened bones
- GI symptoms
- Fatigue
- Mood changes

IMMUNOTHERAPIES TO TREAT CANCER

- Type of biological therapy
- Enhances own immune system to fight cancer
- Types:
  - Checkpoint inhibitors
  - Adoptive cell transfer
  - Monoclonal antibodies

Side effects
- Pain
- Swelling
- Soreness
- Redness
- Itchiness
- Rash
- Flu-like symptoms

CHEMOTHERAPY AFFECTS OUR BODY IN MANY WAYS

Chemotherapy affects our body in many ways. It works by interfering with the ability of cancer cells to grow and divide. This can cause a range of side effects, including:
- Hair loss
- Nausea and vomiting
- Fatigue
- Loss of appetite
- Mouth sores
- Infections
- Blood count changes
- Bladder issues
-常提及的副作用

National Cancer Institute
CANCER SURVIVORSHIP: SIDE EFFECTS

<table>
<thead>
<tr>
<th>Anemia</th>
<th>Appetite Loss</th>
<th>Bleeding &amp; Bruising</th>
<th>Constipation</th>
<th>Delirium</th>
<th>Diarrhea</th>
<th>Edema</th>
<th>Fatigue</th>
<th>Fertility issues</th>
<th>Hair Loss</th>
<th>Infection &amp; Neutropenia</th>
<th>Lymphedema</th>
</tr>
</thead>
</table>

CANCER SURVIVORSHIP: LONG TERM & LATE EFFECT SIDE EFFECTS

<table>
<thead>
<tr>
<th>Cognitive Change</th>
<th>Insomnia</th>
<th>Bone Health Issues</th>
<th>Risk for secondary cancers</th>
<th>Metabolic dysfunction</th>
<th>Cardiac dysfunction</th>
<th>Chronic Fatigue</th>
</tr>
</thead>
</table>

EXERCISE AFFECTS OUR SURVIVORSHIP IN MANY WAYS

- Prolonged inactivity has a negative impact on overall health
- Fatigue & Depression are lowered with a more active lifestyle
- Quality of life is higher with a more active lifestyle
- Movement interventions need to be tailored to individuals' goals
- Movement interventions need to be accessible in the community outside of the clinical settings
EMERGING RESEARCH IS LOOKING AT HOW EXERCISE EFFECTS CANCER CELLS MICROENVIRONMENT

Effects of exercise on circulating tumor cells among patients with resected stage I-II colon cancer

Cancer cells live in an environment (e.g., grass seed in a field). They are surrounded by other cells functioning to promote a healthy environment (e.g., apoptosis). Exercise has the potential to impact the way cancer cells function...more research is needed.
**Movement Pattern Recommendation**

**Exercise and Body Systems**

- Cardiovascular
  - Increased ability to do work
  - Decreased heart rate and blood pressure
  - Increased capillary density in muscle
  - Decreased inflammation

- Musculoskeletal
  - Increase bone mass
  - Increase muscle mass
  - Keep joints moving and healthy
  - Decreased inflammation
  - Decreased risk of falls

- Nervous
  - Increased neuroplasticity
  - Messages get to where they need to go
  - May decrease pain from damaged nerves
  - Generates new brain cells
  - Improved sleep

- Renal
  - Regulate bp and cholesterol
  - Decreases stress on kidneys
  - Helps to regulate better removal

- Respiratory
  - Increased oxygen uptake

- Psychological Health
• **Metabolic**
  - Improved glucose uptake and insulin sensitivity
  - Controls diabetes, may clear
  - Decreases body weight and body fat
• **Endocrine**
  - Promote hormone production
  - Regulate temperature
  - Regulate blood pressure, heart rate
  - Impact metabolism with regulation
• **Immune**
  - Helps fight infection with increase of WBC
  - Keeps stress hormones under control so they don't weaken system
• **Cognitive**
  - Increased learning, memory, executive function
  - May reduce risk of dementia
  - Increased feelings of well-being
  - Decreased risk of fall
• **Psychological Health**
  - Decrease risk of depression and anxiety
• **Other Benefits:**
  - Enhanced physical function
  - Increased quality of life
  - Expanded independence
  - Assist with chronic disease

**AND MAYBE MORE!!!**

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**EXERCISE SPECIFIC TARGETS FOR POST CANCER RECOVERY**

- Increase bone mass
- Increase muscle
- Increase flexibility
- Increase cardiorespiratory function
- Increase neuroplasticity
- Increase self-esteem
- Decrease depression
- Decrease fatigue/improved sleep
- Reduce rate of recurrence
GENERAL POPULATION

EXERCISE PRESCRIPTION

- Aerobic Training
  - 3-5x/wk
  - Moderate/vigorous intensity
  - 150-300 mins/wk
- Resistance Training
  - 2-3x/wk
  - 8-12 reps
  - 2-4 sets
- Flexibility
  - 2-3 days/wk
  - Hold 10-30s
  - Point of tightness not pain

EXERCISE PRESCRIPTION FOR CANCER SURVIVOR

- Aerobic Training
  - 3-5x/wk
  - Moderate intensity
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- Resistance Training
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  - 8-12 reps
  - Start slow & low
- Flexibility
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  - Hold 10-30s
  - Point of tightness not pain

SPECIAL CONSIDERATIONS

- Types of treatment
- What are they at risk for?
- Chemotherapy
  - Decreased Bone/Muscle, Brain function
  - Heart rhythms
  - Neuropathy
- Special training due to treatment effects
- Radiation
  - Heart disease
  - Skin burns, decreased flexibility
  - Scars
- Immune system
  - Fevers, low blood counts, bruises
- Public places may be difficult due to germs
  - Extra cleaning PPE
- Nutrition
  - Watch for Lymphedema
  - 2 hour rule
- **Get a medical clearance for specific activity
WHERE TO START WITH EXERCISE

Let client set goal
Function vs. reps
Start slow and low, let progression happen naturally
Be aware of tolerance
ADLs should be priority

ORDER OF TYPICAL NEED

- Strength and endurance
- Flexibility
- Cardiovascular

STRENGTH EXERCISES

- BANDS
- HIP CIRCLES
- KETTLE BELLS
FLEXIBILITY

- Sitting
- Standing
- Lying

CARDIOVASCULAR EXERCISE

- Walking
- Cycle
- Elliptical
- **Swimming
- Dance

HIPPOTHERAPY

- Strength and balance improvements
- Reduce risks of falls
- Increase ADLs
- Spinal stability
- Balance
- Grip strength
- Overall strength correlation
- General well-being
RESOURCE AND PARTNERSHIP

- LIVESTRONG at the YMCA
- Most Y's nationally have this program
- Specific Trainers
- ACSM Cancer Exercise Trainer
- ACE Cancer Exercise Specialist
- LIVESTRONG.com
- www.cancer.org

CASE STUDY

42 year old female, breast cancer survivor
Surgery (double mastectomy)
4 months chemo
21 days radiation
Claims weakness, fatigue, depression
Medical clearance
Strength training, walking
Get her on a horse!
Watch bruises, bones, fever; assess 2 hours after

SUMMARY

Movement patterns involve BOTH sedentary patterns and physical activity patterns
In survivorship poses new patient-centered questions that need to be addressed:
- how is health-related quality of life (HRQoL) and symptom burden?
- how can we as care providers assist in HRQoL and symptom burden?
- What is the relationship HRQoL, symptom burden and movement patterns?
- Many treatment options each with own side-effects
- Exercise has potential to impact cellular microenvironment
- Movement patterns impact survivorship and NEED to be part of assessment & intervention plan in survivorship care plans
REFERENCES

- McFarland, D. C. (2019). Novel lung cancer treatments (immunotherapy and targeted therapies) and their association with depression and other psychological side effects as compared to chemotherapy. General Hospital Psychiatry, 68, 105894.