Transforming Cancer Care: Challenges and Opportunities

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Greetings from the United States of America

Objectives

• Briefly describe worldwide cancer landscape
• Describe current and future trends influencing the transformation cancer care
• Discuss nursing challenges and opportunities within the emerging context

Factors Influencing Cancer Demographics

• Population growth worldwide
• 20% of the population will be over 65 by 2030
• Cancer incidence increasing globally
• 81% increase in cancer prevalence by 2020

Contextual Factors

• Cancer is one of the leading causes of death worldwide
  • 6.1 million cases in Asia in 2008 (48% of new cases worldwide)
  • Many patients in Asia diagnosed at advanced stage
• Increasing care complexity, coordination & quality concerns
• Developing new strategies to ensure delivery of quality cancer care
• Diminishing work force
  • The shortage of oncology healthcare professionals will continue to grow as the population ages
Worldwide Cancer Sites by Gender

The 20 Most Commonly Diagnosed Cancers: 2008 Estimates Percentage of New Cases Diagnosed per Year, Worldwide

Contextual Factors Specific to Asia
Major Trends Influencing Cancer Care

- Aging Population
- Improved Survival Rates
- Genetic Technologies
- Advanced Therapeutics
- Increased Intensity of Care

Implications

- Growth in Cancer Services
- Chronic Care
- Competition

Aging Population

Projected Population Growth Worldwide

S’porean Population

Changes in Age Distribution
Aging and Cancer

- Age most significant risk factor for adult malignancies
- As developed nations age, the number and proportion of elderly patients with cancer will increase significantly
- Management of elderly patients with cancer involves unique challenges
  - Comorbidities
  - Increased risk of treatment-related complications
  - Frail elderly risk/benefit assessment
  - Lack of evidence from robust clinical trials
  - Specialized assessment of physical, emotional, and mental state needed to avoid harm and maintain quality of life

Aging and Cancer: 2012 Advances in Care

- Factors affecting safe administration of chemotherapy in the elderly
- Study assessed 348 patients > 70 years who were scheduled to receive initial chemotherapy
- Completed comprehensive geriatric assessment
- Factors associated with early death:
  - Advanced disease
  - Low nutritional assessment score
  - Poor mobility
- Pretreatment mobility and nutritional assessments are extremely important in elderly patients scheduled to receive chemotherapy

Aging and Cancer: Geriatric Research in Asia

- Retrospective investigation to develop a prognostic scoring system for elderly patients with cancer in Asia
- Analyzed retrospective data from 249 patients with cancer who were 70 years or older to identify prognostic factors
- Predictors of survival included:
  - Age
  - Abnormal albumin level
  - ECOG performance status
  - Abnormal geriatric depression scores
  - Advanced disease
  - High malnutrition risk
- Scoring system predicted 1-, 2-, and 3-year overall survival with a high degree of accuracy.

Aging and Cancer: Challenges and Opportunities

- Resources/workforce
  - Develop specialized knowledge in ger-oncology
    - Assessment
    - Treatment
    - Support
  - Research portfolio targeted to include elderly
    - Descriptive
    - Interventional
  - Design programs and services geared to this age population
    - Community based
    - Home care
    - Palliative care
    - Social support
    - Collaborative (comorbidities)

Improved Survival Rates
Survivorship Worldwide

- Cancer survival in 5 continents: a worldwide population-based study (CONCORD)
- Data from 31 countries on 5 continents
- First worldwide analysis of cancer survival with standard quality control procedures and identical analytic measures for all datasets.
- Global variation in survival rates worldwide
  - Race
  - Ethnicity
  - Economic Status

Survivorship Drivers

- Improved public education and changing public perceptions
- Improved screening and diagnostic methods
- Earlier and more specific diagnosis
- Enhanced understanding of cancer biology at a molecular and genetic level
- More effective therapeutic interventions across all modalities
- Advances in supportive care that enable patients to receive aggressive therapy safely and with less effect on QOL

Implications of Survivorship

- Late effects of their disease and treatment
- Secondary neoplasms
- Alterations in fertility
- Psychosocial issues
- Impairments in cognitive function
- Employment and insurance consequences
- Early death

Survivor Perceptions

“Once you have had a cancer or anything else that can recur, that makes you ill and possibly threatens your life – it’s back there. But I don’t dwell on it, but I am totally aware that this cancer can manifest itself in another part of my body if not in my breast.”

Care Trajectory: Transition to Chronic Care Paradigm
Improved Survival: Challenges and Opportunities

- Resources
  - Develop specialized knowledge in survivor care
  - Assessment
  - Treatment
  - Support
- Research portfolio
  - Descriptive, longitudinal
  - Interventional
  - Patient experience: how well are people living?
- Design programs and services geared to this age population
  - Collaborative (coordinated)
  - Community-based
  - Palliative care

Genetic Technologies

Breast Cancer

- Estimated Incidence in 2012
  - 226,870 cases of invasive breast cancer
    - 53,805 cases of DCIS
- Incidence highest amongst Caucasians
- Incidence lowest in Asian Americans
- 2.6 million breast cancer survivors in the United States
- Estimated 75% of breast cancers are ER+

AJCC Breast Cancer Staging

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>5-Yr Survival Rate</th>
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<tbody>
<tr>
<td>0</td>
<td>Ductal / lobular in situ</td>
<td>33%</td>
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<tr>
<td>IA</td>
<td>0.2 cm, node negative</td>
<td>88%</td>
</tr>
<tr>
<td>IIA</td>
<td>2-5 cm, node negative</td>
<td>81%</td>
</tr>
<tr>
<td>IIB</td>
<td>0.2 cm, lymph node involvement</td>
<td>74%</td>
</tr>
<tr>
<td>III</td>
<td>0.5 cm, node negative</td>
<td>67%</td>
</tr>
<tr>
<td>IIIA</td>
<td>0.5 cm, node positive or &gt; 5 cm, node positive with residual lymph nodes</td>
<td>41%</td>
</tr>
<tr>
<td>IIIB</td>
<td>Any T, spread to breast/chest wall or spread to internal mammary nodes</td>
<td>23.8%</td>
</tr>
<tr>
<td>IVA</td>
<td>Distant metastases</td>
<td>15%</td>
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Survival

Regional 5-Yr Rate

<table>
<thead>
<tr>
<th>Stage</th>
<th>Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>98.4% Local</td>
</tr>
<tr>
<td>IIIA</td>
<td>93.9% Regional</td>
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</table>

Individualized Diagnosis and Treatment of Breast Cancer

- Molecular Targets
  - Estrogen
  - Progesterone
  - HER2
  - EGFR, HER1
  - ERBB2
  - VEGF
  - TK
  - PDGF
  - IGF
  - mTOR
  - PARP

Breast Cancer Is Not Just One Disease

- Inflammatory
- Subtype
- Lobular
- Infiltrative

Diagnosis Breast Cancer

Subtype

Molecular Targets

Invasive Ductal Carcinomas = 80%

Unclassified

Luminal A
  - ER+, PR+, HER2-

Luminal B
  - ER+, PR+, HER2+

Basal
  - ER-, PR-, HER2-

HER2+
  - ER-, PR+, HER2+
### Subsets of Breast Cancer

- Not all one disease; subsets are defined by molecular markers
- Each subtype requires personalized treatment

### Prognostic Factors Determine Risk of Recurrence

- Tumor size
- Nodal status and number of lymph nodes involved
- Histologic grade
- HR status (ER/PR)
- HER2 status
- Most recently → genomic profiling

### Genomic Profiling

**What is it and what do nurses need to know?**

### Genomics Looks at Patients Individual Tumor Biology

- Genomics: The study of how genes interact and are expressed as a whole
- Genomics and gene expression profiling tools focus on the cancer itself and can help determine likelihood that a patient may develop recurrence (prognostic) and predicts benefit from chemotherapy and hormonal therapy (predictive)
- No two tumors are the same, just as no two patients are the same
- Understanding genetic variations will guide treatment approaches...treatments will be tailored to a tumor’s genetic makeup and biology

### Genomic Tests: OncotypeDX® Breast Cancer Assay

- Assesses the expression level of 21 genes measured in tumor tissue from patients that have been diagnosed with breast cancer.
- This assay evaluates if a patient is going to recur (prognostic) and predicts benefit from chemotherapy and hormonal therapy (predictive).
- May lead to different choices around therapeutics
- Approved, validated, gaining ground in clinical setting

### Genomic Tests: MammaPrint® Microarray

- Classifies tumors according to clinical behavior, providing a predictor of disease outcome that may also assist in treatment decisions.
- Uses a microarray containing 70 genes related to breast cancer metastases
- DNA from a patient’s breast cancer is tested against the profile to assess risk of recurrence
- High and low risk determined treatment course
- Eligibility: < 55 yo, Stage I ER+/; Stage II, ER -/ and lymph node negative
Genomic Tests Under Development

- Lung
- Non-Hodgkin's lymphoma
- Colorectal
- Prostate

Basser Research Center for BRCA 1/2

- A center focused solely on the prevention and treatment of cancers associated with heritable BRCA mutations, as well as research on the BRCA1 and BRCA2 genes.
  - Biology of BRCA1 and BRCA2
  - Improved understanding about the biology of BRCA-associated cancers to develop new targeted strategies for prevention and treatment
  - Prevention of cancer by developing novel vaccines, gene modification therapies and preventive medications

Genetics Help Us Identify Patients at High Risk of Developing Breast Cancer

- Genetics: Genetics is the study of heredity
  - While genetics influence genomics, genetics is responsible for only 5%–10% of breast cancer
  - Genetics focuses primarily on the likelihood of developing cancer
  - Genetic tests find mutations, not disease

Basser Research Center for BRCA 1/2

- Communication, outreach and risk assessment to increase identification of BRCA carriers, educate families about their risk and create personalized prevention options for BRCA carriers.
- Early detection with novel imaging techniques, identification of new biomarkers for cancer and application of research.
- Treatment of BRCA-associated cancers with molecularly targeted therapeutics and immune therapy.
- Survivorship and managing side effects due to interventions used to reduce cancer risk or treat cancer.
Genetic technologies: Challenges and Opportunities

- Knowledge
  - Genetics Competencies

- Implications for patients
  - Psychological
  - Insurance

- Ethics

- Patient and family education

- Cost
  - Testing versus Treatment

Advanced Therapeutics

- Targeted Therapeutics
  - Oral therapies

- Gene Expression Arrays

- Emerging Technologies

Advanced Therapeutics: Challenges and Opportunities

- Knowledge
- Understanding implications and care requirements
- Coordination of care…most of these advances will be available in the ambulatory setting
- Patient and family education
- Personnel
- Access
- Cost

Targeted Therapeutics

- 7 new anticancer agents approved by the FDA over the past year
- 5 expanded indications for existing agents
- Almost all of these involved targeted agents that work by blocking the activity of specific proteins that affect tumor growth
- Research pipeline indicates that we will continue to see growth in the use of targeted therapies
- Approximately 25% of new agents are oral
  - Adherence
  - Access

Emerging technologies

- Small interfering RNAs
  - Potential to proactively turn specific genes on and off

- Interventional oncology ablative techniques
  - Microwave, laser, cryotherapeutics with offer new options for highly advanced disease

- Pharmacogenetics and SNPs
  - Potential to truly target therapeutics could revolutionize which targeted and cytotoxic therapy should be administered to patients

- Proteomic Arrays
  - Molecular analysis down to the level of proteins

- SuperDimension Bronchoscopy
  - Will allow minimally invasive lung biopsy, new paradigm for screening, detection, and removal of small peripheral lung lesions

- Cancer Nanobombs
  - Therapeutic particles targeted to specific tumor tissues providing highly localized destruction
Increased Intensity and Complexity of Care

Over the past several decades, the delivery of services within healthcare systems across all disciplines, at all levels, and throughout the world, has become more complex. Locus of control for critical aspects of patient management is spread across a broad number of decision makers. Paradigm shift from “Captain of the Ship” to “Floating Captains” across a trajectory of care. Healthcare needs a new kind of hero...and its nurses.

Care Complexity: Challenges and Opportunities

- Comprehending the complexity
- Navigation
- Creating the patient experience...keeping it patient-centric
  - Patient and family education, perspectives, engagement
- Coordination of care
- Leadership
- Collaboration

Take Home: Challenges and Opportunities

- The times they are a changin’...rapidly
- More cancer, older people with cancer, more survivors, more advanced technology, more complex care
- Anticipate that the pace of advances will accelerate
- Changes provide opportunities for oncology nurses to lead in translating new developments into practice
- Oncology nurses in a pivotal position to drive quality as care evolves and to influence the patient experience
- Spectacular time to be in oncology