Clinical Highlights from the National Cancer Data Base: 1997

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Introduction

The National Cancer Data Base (NCDB) is a community-oriented cancer management and outcomes database that is a joint project of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. The ongoing assessment of patient care performed by the NCDB includes patient care evaluation studies as well as annual reports for individual disease sites.

Patient care and outcome data from more than 1,600 hospitals are funneled to NCDB Central, where they are first subjected to edit checks and then analyzed. The data are then sent back to the 1,600 hospitals and their physicians and communities with findings and statistical comparisons. Dissemination is facilitated by a triad consisting of (1) a network of 2,000 oncologists affiliated with hospital cancer committees, (2) American Cancer Society state and local unit staff, and (3) more than 2,000 hospital-based cancer registrars.

The NCDB assesses patient care using both hospital cancer registry data collected annually (longitudinal data) and specifically targeted patient care evaluation hospital studies conducted periodically (cross-sectional data). These evaluations enable clinicians to appraise trends in specific treatments and survival in relation to stage and histologic type of malignancy. Further, the evaluations permit individual contributing hospitals to compare their results with state, regional, and national standards.

Sources of the Data

The methodology of the NCDB has been described elsewhere. Case information for the highlights described in this article is based on six annual NCDB calls for data and recent NCDB/patient care evaluation studies. The NCDB data received include 232,577 cases from 501 hospitals in 1985 (24% of...
estimated cases in the United States): 238,157 cases from 496 hospitals in 1986 (26%); 364,120 cases from 740 hospitals in 1987 (38%); 486,354 cases from 935 hospitals in 1988 (49%); 435,752 cases from 839 hospitals in 1990 (42%); 519,293 cases from 978 hospitals in 1991 (47%); 647,950 cases from 1,144 hospitals in 1992 (57%); and 608,289 cases from 996 hospitals in 1993 (52%). The cumulative total is 3,532,492 cases. Data have been received from a total of 1,601 hospitals for at least one diagnosis year.

The Data Base

Data—which are voluntarily submitted to the NCDB in computerized form by hospitals, central registries, and software providers—comprise a large convenience sample of cancer cases. These data are diverse, including all forms of cancer diagnosed in patients of both sexes and all ages (including childhood cancer), in each of the 50 states, and in all ethnic groups. Patients are believed to be drawn from all nationalities, native and migrant, and to have been treated by a wide range of different clinicians in all types of hospitals in both rural and urban locations.

In 1993, 31% of the patients were 70 years or older. The number of childhood cases (4,114) represented approximately 50% of all estimated childhood cancer cases in the United States. The percentages of males (49.5%) and females (50.5%) in the reported cases were similar.

Numerous cases were reported from each of six regions, ranging from 29,906 cases reported from hospitals in the Mountain Region to 151,692 cases reported from the Midwest Region. Cases were widely reported from each state. Most (87.8%) patients were classified as non-Hispanic white; the remaining patients (12.2%) included 7.9% African-American, 2.9% Hispanic, 1.4% Asian, and 0.1% American Indian. Even the ethnic group with the smallest percentage, American Indians, included 5,448 patients in this large national sample.

The 1993 cases were reported from hospitals with varying annual cancer caseloads, including 2% from hospitals with caseloads of fewer than 150 cases per year, 20% from those with 150 to 499 cases, 41% from those with 500 to 999 cases, 35% from those with caseloads of 1,000 or more, and 2% from those with unknown caseloads.

In 1993 most of the cases were reported from hospitals with Commission on Cancer approval status, including 4% from National Cancer Institute (NCI)-designated cancer centers (comprehensive and clinical), 5% from government hospitals, 16% from teaching hospitals, 35% from community comprehensive cancer centers, 27% from community cancer centers, and 3% from for-profit hospitals. Ten percent of cases were reported from hospitals without approval status.

The cumulative NCDB data file includes large numbers of the most common cancers—for example, 545,057 breast cancer cases and 421,082 prostate cancer cases. This allows a wealth of subset analysis without loss of sufficient sample size. In addition, rare tumors are present with some frequency—for example, 2,906 cancers of the eye and 5,744 nasopharyngeal cancers. In the future the NCDB should be a resource for patient care evaluation of rare tumors or other subgroups of interest.

Patient Care Evaluation

Since 1996 most hospitals have voluntarily submitted data for patient care evaluation studies in electronic form. Before 1996 all hospitals submitted data in paper questionnaire form. These studies are usually specific to a particular type of cancer and are designed to
answer questions about patient demographics, diagnosis, treatment, staging, and outcomes in greater detail than is available from the NCDB longitudinal data. Feedback on the data collected for each study is returned to participating hospitals to help them develop their own patient care evaluations, which are required for approval status with the Commission on Cancer. In addition, aggregate analyses are published in peer-reviewed journals.

Characteristics of hospitals participating in the studies and demographics of submitted cases are similar to those in the NCDB. However, not all hospitals that participate in the NCDB participate in the patient care evaluation studies. In general, about 700 to 1,000 hospitals participate in each study. Since 1976, 33 studies have been conducted by the Commission on Cancer. In addition, two studies were recently distributed to hospitals for patients diagnosed in 1997 with colorectal cancer or non-Hodgkin’s lymphoma.

Summary

The following highlights summarize the principal findings of the NCDB, which are presented in more detail in other reports, some of which have been published4-16 and others of which are in press or submitted awaiting review. Collectively, these findings present a broad pattern of NCDB assessment of cancer patterns of care. In addition to the resulting journal publications, 1,600 NCDB participating hospitals receive a customized summary of similar patterns of care and outcome at their facility compared with national norms, which is then used for quality assurance purposes.

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American Joint Committee on Cancer Staging

The mean hospital rate of American Joint Committee on Cancer (AJCC) staging was 87% in 1993, an increase over the 65% reported in 1988 (Fig. 1). Approximately 64% of hospitals staged more than 90% of their stageable cases; 3% staged less than 5%. Even facilities with “complete” staging implementation were unable to stage substantial portions of cancers at some sites.

Accessibility of tumor and overall prognosis affected whether pathologic or clinical staging was chosen. Staging completeness and the mix of pathologic and clinical staging also differed by the category of the reporting hospital. AJCC staging is used frequently for common tumors for which treatment depends on the stage of disease.

Bladder Cancer

Current trends for bladder cancer are: (1) younger patients (49 years of age and younger) present with earlier stages of disease than do older patients; (2) women are slightly more likely to be diagnosed with stages II, III, and IV bladder carcinoma than are men; (3) African-Americans are less likely to be diagnosed with stage 0 or stage I disease than are either Hispanic or non-Hispanic whites; and (4) NCI-designated centers treat more patients with advanced disease than do other types of hospitals. These data reflect a decrease in the use of adjuvant chemotherapy.
Anal Cancer

- The use of chemotherapy increased between 1988 and 1993 (from 62% to 67%), and management of squamous carcinomas and adenocarcinomas of the anus differed substantially. The majority of squamous carcinomas were managed nonsurgically, principally with combined chemotherapy and radiation, whereas 75% of adenocarcinomas were treated with surgery.

- The most important factors for favorable 5-year survival were early stage (ranging from 71% for stage I to 23% for stage IV), squamous carcinoma histology (58% versus 41% for adenocarcinoma), and female gender (56% versus 50% for males). For stages I and II squamous carcinomas, the 5-year survival for patients receiving nonsurgical treatment with radiotherapy was equivalent to that of patients receiving surgical treatment (64% and 65%, respectively).

Breast Cancer

- Records of 4,000 and 8,500 women who were treated (nonrandomized) with segmental mastectomy, axillary dissection, and radiotherapy with and without systemic therapy, respectively, were compared with 18,000 and 44,000 women who were treated with modified radical mastectomy, with and without systemic therapy, respectively. Within each AJCC stage, reported survival was equal or more favorable for patients managed with breast preservation compared with those treated with modified radical mastectomy. This comparability was seen in all subsets analyzed, including those defined by age at diagnosis, histologic grade, and tumor diameter.

- The interrelationship of age and breast cancer was studied. A variety of findings, including survival comparison, are consistent with the hypothesis that younger women are at increased risk for biologically more aggressive breast carcinoma. In an analysis of women 75 years or older diagnosed with breast cancer, fewer cancers were detected mammographically and needle localized biopsies were performed less often in the elderly. Most of these elderly women underwent breast-conserving surgery.
Cervical Cancer

- The use of hysterectomy as definitive therapy increased markedly from 1984 to 1990 and was associated with low complication and high 5-year survival rates. Gynecologic oncologists now perform the majority of hysterectomies for this type of carcinoma, with general specialists playing a lesser role than in earlier years.4

- A subset of pregnant patients diagnosed with cervical cancer was examined. The prognosis of these patients with invasive cervical carcinoma was similar to that of nonpregnant patients. Thirty-one percent of patients were diagnosed in the first trimester, 34% in the second, and 38% in the third. The significant number of patients diagnosed in the second and third trimesters and the frequent finding of large tumors in all trimesters emphasize the need for early prenatal evaluation, including cervical cytology and biopsy of any clinically abnormal cervix.6

Childhood Cancer

- For a sample of 4,400 children with cancer reported by more than 200 hospital cancer registries, an analysis was performed to better understand the national utilization of controlled clinical trials. Members of the Pediatric Oncology Group (POG) and the Children’s Study Group (CSG) submitted 55% of the cases, and other institutions submitted 45%. More patients treated by POG and CSG members were on protocols (54%) than those treated at other institutions (25%); in general, the younger the patient, the greater the likelihood of being on protocol. The type of insurance seemed to have no effect on protocol participation, but less protocol participation occurred in the Mountain Region than in other regions. The continuing challenge of pediatric cancer centers is to encourage the participation of more children with cancer in controlled clinical trials. Specific emphasis must be placed on the adolescent age group.
| Colon Cancer |
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| The elderly (aged 80 years or older) present with earlier stage disease than do younger patients. |
| All ethnic groups have generally similar stages of disease at presentation, except for African-American patients who have a slightly higher incidence of stage IV disease. |
| The proximal migration of colon cancer continues, with 55% of primary colon cancer arising in the right colon in 1993 compared with 51% in 1988. |
| An interaction seems to be present between grade and stage of cancer. |
| Patients with stage III colon cancer who received adjuvant chemotherapy had a 5% improvement in 5-year relative survival. African-Americans and other ethnic groups have the same outcome as non-Hispanic whites but may have less access to medical care. |

| Endometrial Cancer |
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| African-Americans present with more advanced disease and subsequently have a decreased survival compared with non-Hispanic whites. Time trends indicate that nodal dissection is becoming a more common operative practice in this disease and that radiation therapy is used less often. The current AJCC staging accurately reflects differences in prognosis by stage. |

| Renal Cancer |
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| Renal cell carcinoma is being diagnosed at an earlier stage, most likely because of the increase in radiologic evaluations of patients who are asymptomatic but are being studied for other reasons. Surgery remains the most effective form of treatment, and partial nephrectomy is being used more frequently. Younger patients have longer stage-specific survival. |
Laryngeal/Hypopharyngeal Cancer

- Various treatments are available for patients with laryngeal and hypopharyngeal squamous cell carcinoma (SCC) within all four stage groups as shown by the differences in application of surgery, radiation therapy, and chemotherapy. A slight increase occurred between 1980 to 1985 and 1990 to 1992 in the proportion of patients with laryngeal SCC presenting with advanced disease (stage IV).

- The largest proportion of patients with early stage hypopharyngeal SCC either were asymptomatic or had the common and nonspecific complaint of gastroesophageal reflux. An association also appeared to exist in these patients between hypopharyngeal SCC and the presence of a simultaneous cancer.

- The present AJCC scheme of stratifying by anatomic extent of disease is a useful prognosticator of outcome for laryngeal SCC, with 5-year survival rates ranging from 90.7% for stage I to 41.8% for stage IV cases. However, a great difference in survival was noted within modified groupings of the T and N classifications that disaggregated stage III and IV cases into localized disease (87.5% for early and 76.0% for more advanced tumor progression) versus regionally metastatic disease (46.2% for nodal involvement). It is hoped that current efforts to revise the AJCC staging system will improve its prognostic utility.

Lung Cancer

- Outcomes for 12,000 primary lung cancer patients diagnosed with non–small cell carcinoma between 1985 and 1988 were examined. Large cell undifferentiated, squamous cell, and adenocarcinoma cases were compared in terms of local, regional, or distant type of recurrence and temporal recurrence patterns. Generally, the patterns of failure and temporal appearance of relapse were quite similar for the different histologic types. It seems reasonable to continue to generally group large cell undifferentiated carcinoma, squamous cell carcinoma, and adenocarcinoma together for cancer management purposes.
Ovarian Cancer

- Most women with epithelial ovarian cancers continue to present with advanced disease (Fig. 2). No improvements in early detection were apparent in the reference years studied.
- The benefits of the addition of chemotherapy to the treatment of this disease were most obvious in patients with stage II and III disease, grade 3 or 4, and those with stage IV disease. These benefits were less clear in early stage disease.
- There continues to be significant room for improvement in diagnosis and treatment. African-American women with advanced epithelial ovarian cancer appear to have received less aggressive treatment than have white women and experienced a poorer prognosis.

![Percentage stage group distribution for cancers of the breast (gray) and ovary (blue), 1993.](image)

Prostate Cancer

- The clinical patterns of prostate cancer have changed markedly in recent years. The proportion of men diagnosed when aged younger than 70 years increased from 38% in 1986 to 50% in 1993. The proportions of both the earliest (stages 0 and I) and the most advanced (stage IV) stages declined. The proportion of stage II prostate cancer increased from 19% in 1986 to 48% in 1993. The proportion of grade 2 (moderately differentiated) tumors increased from 39% in 1986 to 58% in 1993. The proportion of patients treated by prostatectomy increased from 10% in 1986 to 29% in 1993. The proportion of patients receiving no cancer-directed treatment declined from 42% in 1986 to 22% in 1993.
**Soft Tissue Sarcoma**

- A relative increase occurred in sarcomas originating in the pleura with a concurrent increase in mesotheliomas. A shift toward more advanced disease was also noted. Limb-sparing surgical procedures are now common. It appears from stage subset analysis that many stage II and III patients frequently do not have multimodality therapy.

**Stomach Cancer**

- In a nonrandomized survival comparison of 3,800 stomach cancer patients, it was found that lymph node dissection of N2 nodes did not augment survival compared with gastrectomy without node dissection. This statement also reflects the inclusion of perigastric nodes in the resection. Subgroup analysis of patients with gastric carcinoma who had a curative resection did not show a benefit for the extragastric node dissection.

**Vulvar Cancer**

- A series of pathologically staged cases was reviewed. In recent years the tendency to use conservative surgery (partial or simple vulvectomy) has increased. In small node-negative lesions (smaller than 2 cm), conservative surgery without radiation was used 56% of the time. In node-positive lesions larger than 2 cm, radical vulvectomy was used 52% of the time, and 48% of the patients received radiation. The likelihood of receiving radiation increased from 40% for patients with one positive node to more than 55% for those with two or more positive nodes. Five-year relative survival for patients with node-negative lesions was 93% when lesions were smaller than 2 cm and 87% when lesions were larger than 2 cm; for patients with node-positive lesions, 5-year relative survival was 64% when lesions were smaller than 2 cm and 43% when lesions were larger than 2 cm. A larger number of positive nodes adversely affected survival.