

BREAST CANCER PRESENTATION AND TREATMENT PATTERNS AND OUTCOME DATA: AULTMAN HOSPITAL EXPERIENCE: 1998-2007

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BACKGROUND

Breast cancer continues to be a major public health problem. In 2006 there were approximately 200,000 new cases of breast cancer diagnosed in the U.S. and a total of 40,000 deaths. Despite the stable incidence of the disease during the past several decades, mortality from breast cancer has started to decline considerably over the past 15 years.¹ The reason for this decline in mortality is probably multi-factorial. Although early detection of the disease with screening mammography and more effective treatment of advanced disease clearly deserve some of the credit for the reduction in mortality, there is general agreement that adjuvant systemic therapy (adjuvant hormonal therapy and adjuvant chemotherapy) are mostly responsible for this progress.² Since 2002, a significant decline in the incidence of ER-positive, postmenopausal breast cancer has been observed, attributed to a considerable decrease in the use of hormone-replacement therapy after menopause.³

AULTMAN EXPERIENCE 1998-2007

Demographics

Between 1998-2007, a total of 2,704 new cases of breast cancer were diagnosed and/or treated at the Aultman Cancer Center. Figure 1 depicts the distribution of these cases according to stage at presentation. Twenty-one percent of the patients presented with non-invasive disease (Ductal Carcinoma in Situ [DCIS] or Lobular Carcinoma in Situ [LCIS]) whereas 36% presented with stage I and 30% with stage II disease. Only 10% of the patients presented with advanced disease (7% stage III and 3% stage IV). In 3% of the patients stage was unknown.

Figure 1: Stage Distribution of 2,704 Breast Cancer Cases at Aultman Cancer Center Between 1998-2007.

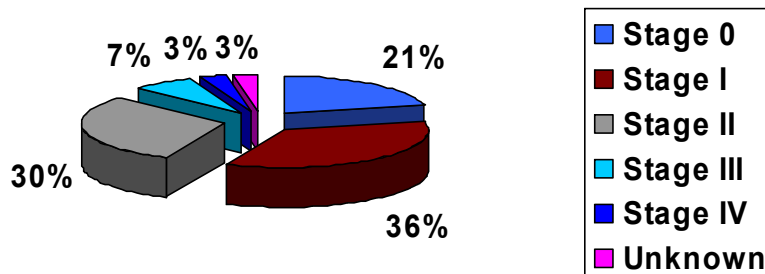


Figure 2a depicts the annual number of new breast cancer cases by calendar year of presentation. As it can be seen, the number of new breast cancer cases steadily increased from 1998 until 2002 and then steadily decreased until 2005 (in concordance to the nationally observed trends). Thereafter, the number of new cases has been fairly stable.

Figure 2a: Breast Cancer Cases at Aultman Cancer Center Between 1998-2007 by Calendar year of Presentation

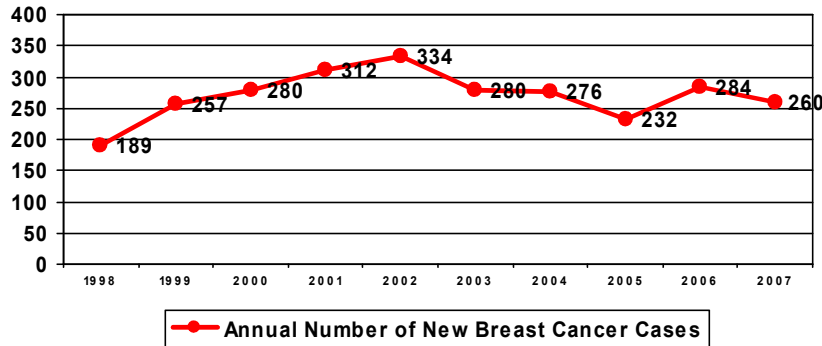
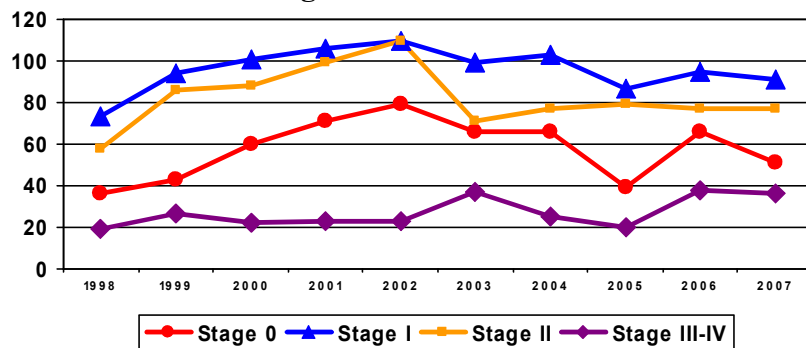


Figure 2b depicts the number of new breast cancer cases by calendar year and stage at presentation. As it can be seen, there were steady increases in the number of new cases from 1998 until 2002 for stages 0, I and II, followed by a steady decrease until 2005 with stabilization thereafter. Interestingly, the number of new stage III-IV cases remained stable between 1998 and 2002 with possibly a slight increase in the later years.

Figure 2b: Breast Cancer Cases at Aultman Cancer Center Between 1998-2007 by Calendar Year and Stage at Presentation



Breast Cancer Survival

Figures 3a and 3b depict the 5-year overall survival for patients presenting between 1998-2000 at the Aultman Cancer Center and for those included in the NCDB data base. As it can be seen the outcomes stage for stage were similar between the two cohorts with significant decreases in breast cancer survival according to stage at diagnosis. For stage 0 the 5-year overall survival was 89% for the Aultman cohort and 95% for the NCDB cohort. For stage I, the 5-year overall survival was 88% and 91% respectively, for stage II 81% and 82% respectively, for stage III 45% and 56% respectively and for stage IV 12% and 18% respectively.

Figures 3a and 3b: 5-Year Overall Survival Data for Cohorts of Breast Cancer Patients Presenting Between 1998-2000 at the Aultman Cancer Center (Figure 3a) and Those Included at the National Cancer Data Base (NCDB) (Figure 3b)

Figure 3a: Aultman Cancer Center

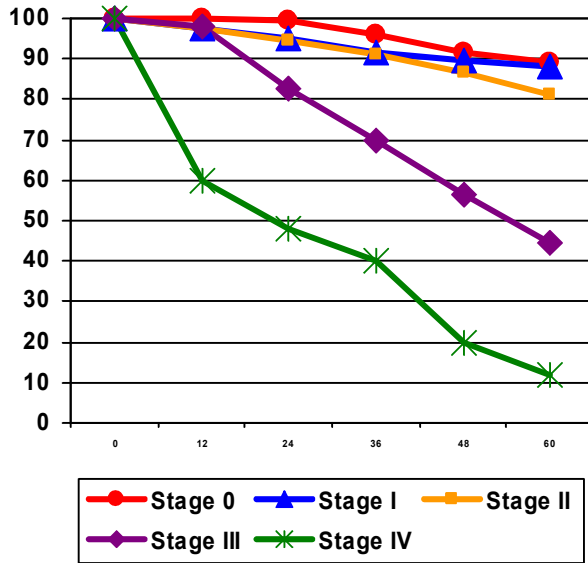
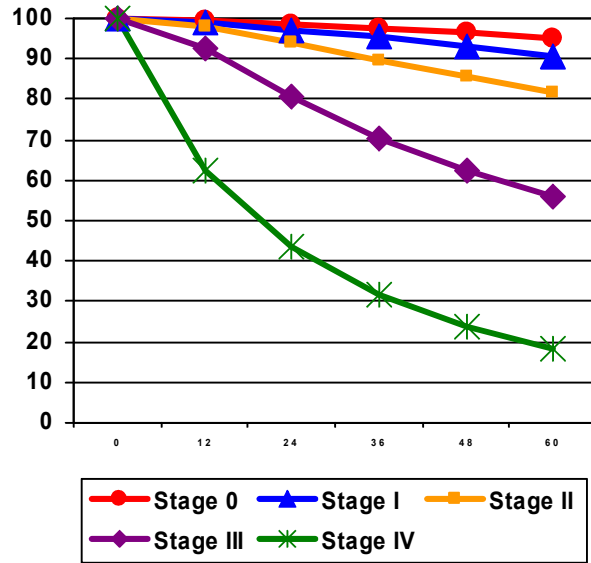


Figure 3b: National Cancer Data Base



Surgical Treatment

The frequency of lumpectomy as the initial surgical procedure increased steadily from 1998 to 2007 (with the exception of 2005). The frequency of lumpectomy was 50% in 1998 and 72% in 2007, reaching 74% in 2006. This pattern was seen in the overall cohort of patients (Figure 4a) but it was generally more evident for patients presenting in stages 0, I, II and III (Figure 4b). The frequency of lumpectomy remained fairly stable over time for patients presenting with stage IV disease (Figure 4b). When all calendar years were combined, the frequency of lumpectomy was highest for stage 0 (78%) and stage I (80%) than for stage II (62%), stage III (24%) and stage IV (27%).

Figure 4a: Proportion of Patients who Underwent Lumpectomy as Their Initial Surgical Procedure by Calendar Year at Presentation

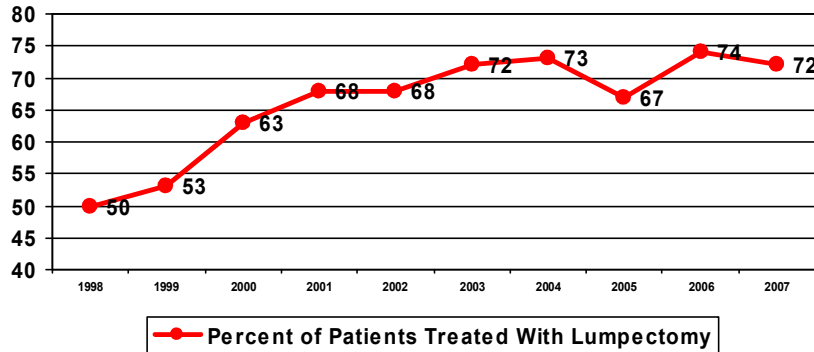
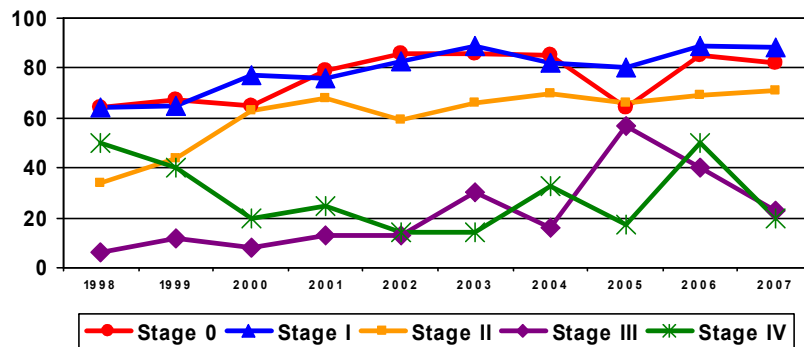
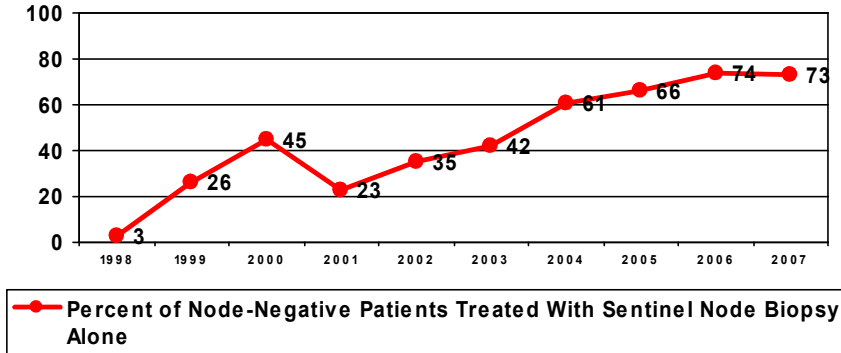


Figure 4b: Proportion of Patients Who Underwent Lumpectomy as Their Initial Surgical Procedure by Calendar Year and Stage at Presentation



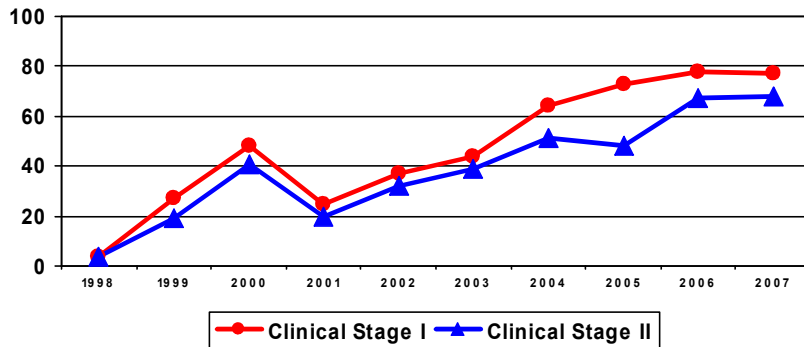
The proportion of node-negative patients undergoing sentinel node biopsy alone also increased steadily between 1998-2007 (Figure 5a.) The frequency of sentinel node biopsy increased from 3% in 1998 to 74% in 2006 and 73% in 2007.

Figure 5a: Proportion of Node-Negative Patients who Underwent Sentinel Node Biopsy Alone as their Initial Axillary Staging Procedure by Calendar Year at Presentation



The rate of sentinel node biopsy increased steadily both for patients presenting with clinical stage I disease as well as in those presenting with clinical stage II disease (Figure 5 b). When all calendar years were combined, the frequency of sentinel node biopsy was higher for clinical stage I (49%) than for clinical stage II (40%).

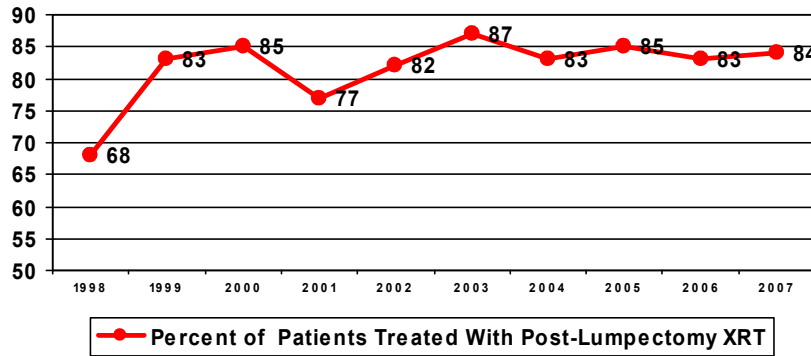
Figure 5b: Proportion of Node-Negative Patients who Underwent Sentinel Node Biopsy Alone as their Initial Axillary Staging Procedure by Calendar Year at Presentation and Clinical Stage at Diagnosis



Use of Radiotherapy Following Lumpectomy and Following Mastectomy

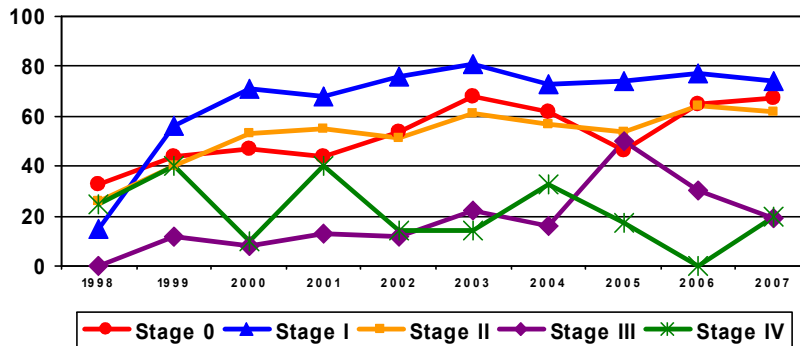
Use of radiotherapy following surgery varied according to the surgical procedure performed and according to stage of disease at presentation. The majority of patients who underwent lumpectomy also received post-lumpectomy breast radiotherapy. The rates of post-lumpectomy breast radiotherapy increased from 68% in 1998 to 87% in 2003 and have since remained stable at 83-85% since (Figure 6a).

Figure 6a: Rates of Post-Lumpectomy Radiotherapy by Calendar Year at Presentation.



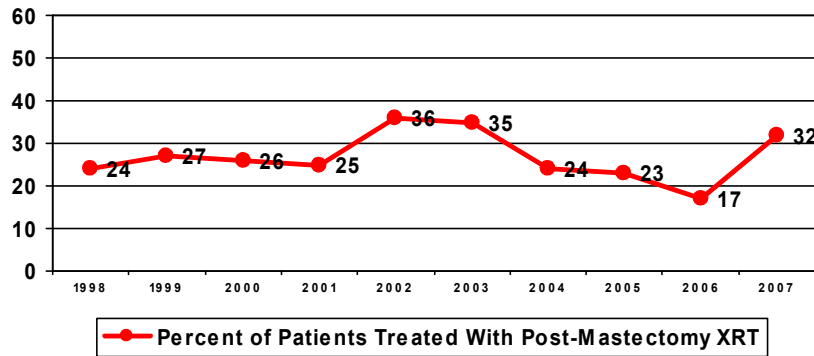
The increase in post-lumpectomy radiotherapy by calendar year was evident for stage 0, I,II and III disease at presentation although the rate of post-lumpectomy radiotherapy was stable for patients with stage IV disease. When all calendar years were combined, the rate of post-lumpectomy breast radiotherapy was 54% for Stage 0, 70% for stage I, 53% for stage II, 19% for stage III and 19% for stage IV. The lower rates of post-lumpectomy radiotherapy reflect the fact that a proportion of stage II, III and IV patients also received regional nodal XRT. (Figure 6b).

Figure 6b: Rates of Post-Lumpectomy Radiotherapy by Calendar Year of Presentation.



The use of post-mastectomy radiotherapy remained stable between 1998 and 2007 (Figure 6c). Overall, the rate of post-mastectomy XRT was 27%.

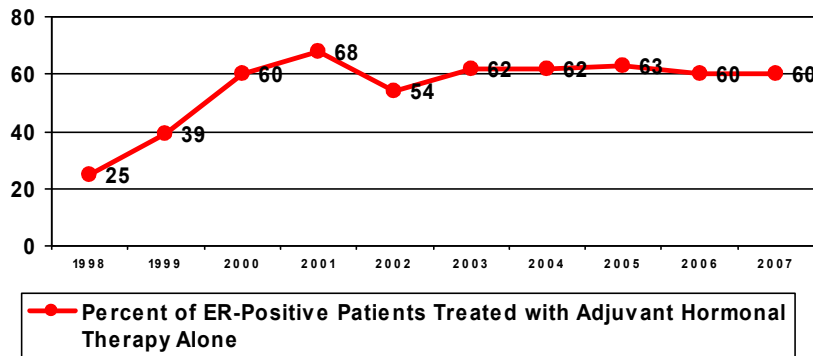
Figure 6c: Frequency of Post-Mastectomy Radiotherapy by Calendar Year



Adjuvant Hormonal Therapy

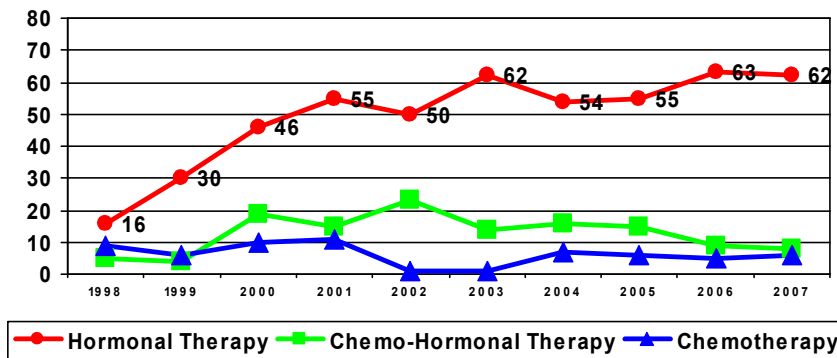
The proportion of patients treated with adjuvant hormonal therapy increased from 1998 to 2001 and has remained stable since (Figure 7a).

Figure 7a: Frequency of Adjuvant Hormonal Therapy Alone in Patients with ER-Positive Breast Cancer



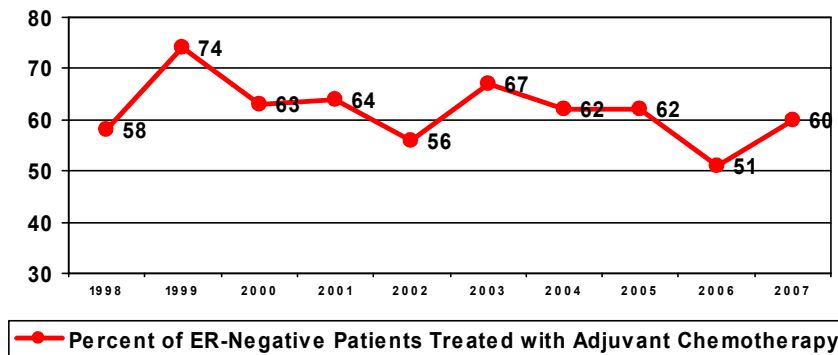
This trend was more evident in patients who presented with node-negative and ER-positive breast cancer (Figure 7b). As one can see in Figure 7b, the majority of such patients received hormonal therapy alone, a smaller proportion, chemo-hormonal therapy and a minority chemotherapy alone. The latter group of patients may include patients in which the use of hormonal therapy was contraindicated or patients in which the use of hormonal therapy was either undocumented or refused by the patient.

Figure 7b: Frequency of Adjuvant Hormonal Therapy Alone in Patients with ER-positive, Node-Negative Breast Cancer



Finally adjuvant chemotherapy use was common in patients presenting with ER-negative disease and its use was stable over time (Figure 8a).

Figure 8a: Frequency of Adjuvant Chemotherapy in Patients with ER-negative Breast Cancer



Adjuvant chemotherapy was used in 48% of ER-negative patients presenting with Stage I disease, in 80% of patients presenting with Stage II disease, in 80% of patients presenting with Stage III disease and in 60% of patients presenting with Stage IV disease.

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2. Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: an overview of the randomised trials. *Lancet* 365:1687-717, 2005
3. Ravdin PM, Cronin KA, Howlader N, et al: The decrease in breast-cancer incidence in 2003 in the United States. *N Engl J Med* 356:1670-4, 2007