

# Changing Patterns in the Treatment of Early Breast Cancer: A Historical Perspective and a Review of Changing Local Trends

E. Sim, FRCS

T.C. Lim, FRCS

W.T.L. Tan, FRCS

A. Rauff, FRCS

*Department of Surgery, National University Hospital, Singapore*

## Summary

Over the past 50 years, a variety of surgical procedures have been advocated for the treatment of operable breast cancer, ranging from local excision to supradical mastectomy. Today, the surgical treatment of breast cancer remains highly contentious.

We review the historical development of breast cancer surgery and analyse the available evidence supporting conservative procedures. We also express our opinions on the treatment of early breast cancer and illustrate the changing patterns of surgery with our experience at National University Hospital.

*Key words:* Early breast cancer, surgical treatment, Singapore.

## Introduction

Over the past 50 years, a variety of surgical procedures have been advocated for the treatment of operable breast cancer, ranging from local excision to supradical mastectomy. Today, the surgical treatment of breast cancer remains highly contentious.

The choice of the surgical options available has been influenced by:

1. Changing concepts of the natural history of the disease; where there is increasing evidence that most patients die of systemic disease and survival is unaffected by the loco-regional treatment of the disease<sup>1,2</sup>.
2. The rising public awareness of the various lesser procedures and alternatives to mastectomy which has led to increasing involvement of the patient in the decision-making process. Although various options remain available, the recent trend has been consistently towards less radical operations with an expanding role for reconstructive procedures.

## The Magnitude of the Problem

Breast cancer remains the most common cancer in Singapore women<sup>3</sup>. Although the incidence in Singapore (26.5) is still less than half that in Western Europe and the United States (where as many as 1 in 12 women

suffer from the disease), both the number of new cases each year and the age standardised rates continue to show a rising trend (Table I).

Between 1968 and 1987, the number of new cases diagnosed in each successive 5 year period was 666 cases between 1968 and 1972, 854 cases between 1973 and 1977, 1,217 cases between 1979 and 1982 and 1,701 cases between 1983 and 1987 (Table I).

This trend indicates that by the turn of the century the incidence will be twice that of today; with more than 1,000 women afflicted by the disease per year<sup>3</sup>. In our Department, the number of cases treated each year has also shown a gradual rise over the last 4 years from 40 cases treated in the first year to 73 cases in the fourth (Table II).

### **A Historical Perspective on the Surgical Treatment of Breast Cancer**

The surgical treatment of breast cancer has been practiced since ancient times, and for practical purposes may be divided into 3 distinct but chronologically overlapping periods using the Haldstedian era of radical mastectomy as the dividing landmark.

#### **Pre-Haldsted era**

Tumours of the breast have been known to exist since ancient times and the Edwin Smith Papyrus, written more than 5,000 years ago, contains descriptions of breast tumours. In Greek times, Hippocrates, Galen and Celsus all recorded their views on the surgical treatment of breast cancer. By the 1st century AD, Leonides of Alexandria had recorded the details of the surgical treatment of breast cancer<sup>4</sup>. During the Renaissance, developments in anatomy stimulated renewed interest in the development of surgery. Descriptions and illustrations of operations during that period survive to this day. By the 18th century, Le Dran (1685-1770) postulated that breast cancer in the early stages was a local disease which spread to the regional lymph nodes via lymphatics and that early operation was the best chance of cure<sup>5</sup>. Petit (1674-1750) believed that the root of the cancer was the enlarged lymph glands and that they should be looked for and removed during surgery<sup>5</sup>. These concepts, together with the rapid development of inhalation anaesthesia and aseptic techniques, spurred surgeons to perform increasingly extensive operations to ensure adequate clearance of the cancer. This was to culminate in the era of William Haldsted and the radical mastectomy.

#### **The era of William Haldsted and the radical mastectomy**

The development of breast cancer surgery reached a landmark in 1880 when a young surgeon named William Haldsted introduced his method of radical mastectomy, which included the removal of the Pectoralis Major. Haldsted was meticulous in recording and teaching his technique and even employed a medical artist to record in great detail his operations. Haldsted's convictions for carrying out this operation were supported by his results in reducing the high incidence of local recurrence that plagued almost all of the great surgeons of that era. Billroth and Bergman, for example, noted recurrences of 82% and 60% respectively.

Haldsted, in contrast, reported a local recurrence rate of only 6% and a late regional recurrence rate of 16%<sup>6</sup>. As for survival rates, Haldsted himself, as far as can be determined, produced no evidence to show that survival rates were enhanced. There were others, however, who were convinced that survival was improved. Mrs Lane Claypon, in 1924, analysed 20,000 operated cases of breast cancer and concluded that after nonradical mastectomy the 3 year survival was only 29.2% as compared to radical mastectomy where the survival was 43.2%<sup>7</sup>. Haldsted's operation thus gained popularity and, for much of the early 20th century, has been the treatment of choice for breast cancer. Expanding from Haldsted's concepts, another school of thought extended the field of the operation to include excision of the ribs, supraclavicular nodes and even amputation of the arm in advanced cases. Although there were encouraging results from a few individual series, there was no convincing evidence to support such mutilating procedures.

### The post-Haldstedian era

As the popularity of the Haldsted mastectomy reached its zenith, new thoughts in breast surgery were evolving. Surgeons began to question whether smaller and less mutilating procedures could achieve the same results as radical mastectomy. Certainly, there was already much evidence that smaller procedures, combined with radiotherapy, could achieve comparable results. Hence the tide of opinion began to swing against radical mastectomy and was directed towards progressively smaller operations such as simple mastectomy, quadrantectomy or segmental excision and local excision.

### Changing Concepts in the Natural History of the Disease

In 1927, Samson Handley proposed that breast cancer spread in a centrifugal pattern; and that the tumour remained localised at first. The lymph nodes provided the first barrier to spread by enlarging, but if the disease were allowed to progress the lymphatic fields would be overcome and there would be widespread dissemination of the disease. Handley's theory supported the Haldstedian procedure of radical mastectomy and gave hope of achieving cure of the disease if it was arrested early<sup>8</sup>.

As Handley's theories had supported the Haldstedian radical mastectomy, the post-Haldstedian era required an alternative concept which departed from the century-old classical theory of breast cancer spread, to explain why smaller procedures were just as effective. Bernard Fisher produced such a concept. Fisher proposed that years before a cancer is detected, individual cancer cells had already been disseminated and widespread metastases may have occurred. Hence, the ultimate fate of the patient would depend on the biological activity of the tumour and the body's ability to resist this tumour. Fisher's concept indicated that the disease was systemic from the beginning and advocated the use of adjuvant therapy.

### The Crux of the Present Problem

Today, the question remains as to which is the better operation: modified radical mastectomy or breast conservation with radiotherapy. The central argument is that, if modified radical mastectomy achieves the same result as a conservative procedure, then certainly a less mutilating operation will be more acceptable to the patient.

### The Establishment of Conservative Surgery for Breast Cancer

Since 1940, many retrospective reports on the results of conservative procedures with radiotherapy have been published. As early as 1928, Keynes from St Bartholomews Hospital reported favourable results of biopsy-proven breast cancer treated with biopsy and radiotherapy<sup>10</sup>. Over the next few decades, as experience accumulated, others reported that smaller procedures with radiotherapy could afford results comparable to radical mastectomy. Although many of these early reports are difficult to assess by today's standards, the work of these early investigators such as McWhirter<sup>11</sup> and Williams<sup>12</sup> have provided impetus towards less mutilating surgical procedures.

### Definitive trials of conservative surgery

It is only in the 1980s that interest in breast-conserving surgery with radiotherapy has greatly increased, following the results of 2 definitive trials of conservative surgery: that of Varonesi<sup>13</sup> and Fisher<sup>14</sup>. Varonesi *et al*, from the Milan Tumour Institute, reported in 1981 the results of a randomised, prospective trial comparing Quadrantectomy, axillary dissection and radiation therapy (QuART) with radical mastectomy alone, for patients with T1 N0 disease. In the initial report, the mastectomy group had a slightly higher number of local recurrences<sup>15</sup>. However, more patients in the QuART group had contralateral cancers (which is difficult to explain) and 4 (1.1%) had second primaries in the ipsilateral breast. Distant metastases and 5 year survival rates were not significantly different. When the results of the study were updated in 1985, there was again no

significant difference in the disease-free interval or overall survival rates; however, there were 7 second primary tumours found in the treated preserved breast<sup>13</sup>. In the NSABP B-06 trial reported by Fisher in 1985, the indication for conservative treatment with radiotherapy was extended to include tumours up to 4 cm<sup>14</sup>. Patients were treated by total mastectomy, segmental mastectomy with radiotherapy or segmental mastectomy alone. Again, the disease-free interval was similar in all 3 groups. However, the local recurrence was 0%, 8% and 28% in the respective groups.

In summary, there is sufficient evidence to support the role of breast-conserving procedures for

- a. small tumours, and
- b. large breast (for a good cosmetic effect)

**If**

- a. clear pathological margins can be obtained,
- b. axillary clearance is performed (for staging as well as therapy) and
- c. careful follow-up is available.

It is our opinion that

1. Enthusiasm for breast-conserving procedures is best tempered with critical caution.
2. When indicated, breast-conserving procedures require careful attention to surgical technique, well-planned radiotherapy and meticulous follow-up.
3. Mastectomy is not an inferior form of treatment to breast-conserving procedures.
4. There is no ideal treatment; and each case has to be considered on its own merits.
5. The patient must be informed of all treatment options available and their sequelae; and be encouraged to participate in the decision-making process.

In the management of early breast cancer

1. A tissue biopsy of the tumour is obtained to establish the diagnosis and the characteristics of the tumour.
2. The patient is offered the best choice of local control, be it modified radical mastectomy or a breast-conserving procedure with radiotherapy.
3. Axillary dissection is performed for pathological staging as well as for its therapeutic value.
4. Adjuvant treatment is used for patients with a high risk of micrometastasis.

### **Changing Patterns of Surgery in the National University Hospital**

Total mastectomy with axillary clearance (modified radical mastectomy operation, Patey's mastectomy) is still the most commonly performed in NUH for operable breast cancer. Over the last 4 years, total mastectomy with axillary clearance has been performed for 126 of the 135 cases of operable breast cancer (93.33%) with 9 cases of breast-conserving operation done. However, there has been an increasing trend towards smaller procedures. In the 3 years between July 1985 and June 1987, there were only 4 cases of breast-conserving operations (5%) performed in 93 cases of operable breast cancer; compared to 5 cases (12%) of breast-conserving operations in 42 cases for the year July 1988 to June 1989 (Table III). Local regional recurrence rate for modified radical mastectomy for stage I and stage II breast cancer was 10% and 25% respectively. However, the period of follow-up at present has been short, with a mean of 18 months for stage I and 16 months for stage II cases (Table IV).

In all cases of breast-conservation, the patient was offered a choice between Patey's mastectomy and the smaller procedure. Certainly, in the years to come, we expect to see an increasing number of women participating in making the decision of the operative procedure; and following this trend we expect to see more breast-conserving procedures being performed.

**Table I**  
**Breast cancer in Singapore women**

	1968-1972	1973-1977	1978-1982	1983-1987
Number of cases	666	854	1217	1701
Age standardised rate per 100,000 per year	19.9	21.8	26.5	

**Table II**  
**Rise in no of cases treated from July 1985 to June 1989**

	July85-June86	July86-June87	July87-June88	July88-June89
No of cases	40	39	52	73

**Table III**  
**Operations performed for operable breast cancer in NUH**

	Jul 85- Jun 86	Jul 86- Jun 87	Jul 87- Jun 88	Jul 88- Jun 89
Operable breast carcinoma	26	30	37	42
Total mastectomy + axillary clearance	25	28	36	37
Conservative procedure	1	2	1	5

**Table IV**  
**Recurrences on follow-up**

	Total no	Mean follow-up period	No of cases with recurrences
Stage I	80	18 months	8 (10%)
Stage II	56	16 months'	14 (25%)

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