REVIEW ARTICLE

Breast Cancer Care: A Historical Review

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Abstract

Breast cancer management has undergone several changes with time. With all the armament we now have against this disease, one may wonder how things have been before the advent of modern tools. This paper gives a historical background to breast cancer; its theories of origin, surgical and non surgical management and the changes in attitude towards breast cancer patients and treatment.

Keywords: Breast cancer, history, cancer theory

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Early history

Breast cancer was one of the most feared diseases of the ancient world. Most other cancers were invisible, and a logical correlation with death would not be made. Breast cancer, on the other hand, made an easy causal connection with death. Egyptians of the New Kingdom more than 3500 years ago had struggled with breast cancer. They noted that treatment was futile, and recommended that all treatments be withheld for fear of worsening the disease.[1]

Queen Atossa's attitude to her breast lump illustrates the terrifying ordeal women associated with the condition. Atossa was the daughter of the King of Babylon around 500 years BCE. She noticed a lump in her breast which kept on worsening. Knowing very well what this may be, she went into hiding, bathing in private and staying away from the king. She finally called upon Democedes, a Greek slave. Confident that this was an abscess, he traded his freedom for the treatment. He lanced the lump, confirming the diagnosis, and the infection subsided.[2]

Theories of breast cancer origin

The humoral theory

Hippocrates, the father of western medicine, described four bodily fluids: blood, phlegm, yellow bile and black bile. All diseases, in his opinion, were the result of an imbalance among these. He believed that cancer erupted from an excess of black bile, which was logically demonstrated in advanced breast cancer with necrotic tissue generating blackish odorous fluid. Clarissimus Galen, a second century Greek physician, accepted and promoted the humoral theory, describing cancer as one of the dangers of black bile. Early treatment of breast cancer, therefore, revolved around this principle. Galen's favourite remedy was tapping into the patient's vein and draining blood and excess fluids so the 'inner heat' could stimulate humoral stability.[1]

Hippocrates takes credit for the term cancer. He described the appearance of breast cancers to be similar to a crab, with the tumour seeming to have tentacles like the legs of a crab. He named cancer as 'Karkinos' which is a Greek word for crab.

Death of the humoral theory

The humoral theory gradually lost its popularity with several contributions. Hunter (London, 1763) disputed the humoral theory from the outset. Astruc, a graduate of the medical school at Montpellier in France, burnt a piece of beef and breast cancer tissue and noted no difference in their taste. With this observation, he rejected the black bile theory of cancer.[3]

Breast Cancer – Contagious?

It was a common belief that breast cancer was contagious. Benjamin Rush (Philadelphia) had concluded that breast cancer was not contagious. Nooth (Dorchester) also argued that breast cancer was not contagious. To prove this, he implanted a breast cancer specimen into his arm which formed a scab and fell off.[4]

Cellular theory

Rudolf Virchow (1821-1902) is regarded as the founder of cellular pathology. He studied normal and abnormal cells and described disease to be a result of cellular disorders. He described the anatomical changes in cancer cells, and differences between benign and malignant cells.[5]

Surgical treatment

Early history of surgical treatment

Surgical treatment has been used for breast cancer long before radical mastectomy was popularized by William Halsted towards the end of the nineteenth century. There are records of surgical intervention for breast cancer from about the first century AD.[6] In the sixth century, Aetios of Amida advocated surgery as the only treatment of breast cancer. Aetios was the court physician to Justinian and Theodora, the emperor and empress of Byzantium. He described incising the healthy part of the breast beyond the cancerous areas and cauterizing, repeating this often.[7] Mastectomy was performed by German surgeons as early as early 17th century. Instruments they used included a hand held forceps which squeezed the base of the breast enabling it to be cut off the patients chest; and the use of large fishhook lances to lift the breast by pulling on attached ropes.[8] Jean Louis Petit (1674-1750, Paris) is thought to be the first surgeons advising en-bloc excision for breast cancer.[6]

The limitations of extensive surgery

In the Pre Halstedian era, the main limitations that limited the performance of an extensive surgery included post surgical infections and the lack of anaesthesia.

Early in the 18th century, there was no concept of scrubbing, gloves or wearing masks. There is even an account of surgery being performed on a patient by a professor of surgery at the University of Edinburgh with the patient's dog in the theatre.[9] Hand washing was introduced sometimes in the mid nineteenth surgery at the University of Vienna. There were 2 obstetric units, one where midwives delivered babies and the other where doctors and medical students delivered babies. The maternal mortality rate was very high in the doctors unit, and it all came down to the observation that doctors performing post mortems would go straight to the delivery unit without washing their hands. By simply washing hands in chlorine solution, the mortality rate dropped from 18% to just 1%.[10] Learning of Pasteur's discovery of microbes, Joseph Lister, a surgeon at the Glasgow Royal Infirmary, started washing hands, surgical instruments and the surgical field in carbolic acid.[11] This lead to a dramatic fall in surgical infections. Anaesthesia was introduced by William Morton (Boston, 1846) when he successfully anesthetized a patient undergoing removal of a facial tumour.[12] However, it was not until late in the century that its use became widespread. The introduction of asepsis and anaesthesia paved the way for more radical surgery.

Halsted's contribution – The radical mastectomy

William Stewart Halsted (1852-1922) was the first surgeon in chief and the first professor of surgery of the John Hopkins hospital and university. He popularized radical mastectomy which involved removal of the breast, axillary nodes and both chest muscles in a single en-bloc procedure. Halsted demonstrated the relationship between tumour staging and prognosis and described better results prior to involvement of regional lymph nodes.[6]

It is interesting to note that Halsted was addicted to cocaine. This was while experimenting with cocaine as a surgical anaesthetic resulting in a complete breakdown in 1886. He checked himself twice into a Psychiatric facility in Rhode Island and eventually managed his addiction, though from what we understand, he never recovered from the addiction.[13]

Era of Super Radical Surgery

Hadley (early 20th century) described that 'cancer spreads in a centrifugal pattern along the plane of deep fascia tissue beneath the skin and along lymphatic vessels'. This resulted in a trend towards more radical surgery with extrapleural dissection of the internal mammary nodes (Margottini, 1952), supraclavicular and internal mammary node dissection through a sternal split (Owen Wangensteen, 1949), and en-bloc resection of the internal mammary chain by means of resection of the sternum together with the medial ends of the second to the fifth ribs.[14] Severe blood loss and infective complications hindered the move towards extensive surgery, but the onset of blood transfusion following the discovery that sodium citrate retarded blood clotting and of penicillin by Alexander Fleming heralded the era of super radicals.

The first use of oophorectomy and hormone manipulation in the management of breast cancer was described by George Thomas Beatson, Surgeon to the Glasgow Cancer Hospital, in 1896. As a background, he described his observations of links between lactation and ovarian control; reduction in lactation often seen in calving cows following resumption of menstruation could be prevented by removing the ovaries. In 1895, he surgically removed the ovaries and fallopian tubes of a woman with post-mastectomy recurrent advanced breast cancer as an experimental procedure, and described significant improvement in tumour size and vasculature.[15]

Surgery to cut off estrogen production gradually gained popularity, and bilateral oophorectomy would often be combined with radical mastectomy, which understandably, was debilitating.[16] Oophorectomy yielded varying results as the estrogen production would be taken over by the adrenals. By the mid twentieth century, bilateral adrenalectomies would be offered to women who had radical mastectomy and bilateral oophorectomy.[17] Removal of the pituitary gland similarly followed.[18]

Adjuncts to surgical treatment

Radiation therapy

Emile Grubbe (late nineteenth century) was a medical student with Professor Ludlum in Philadelphia, funding his studies by working in a plant that manufactured Crookes tubes that gave off cathode rays. Complaining of dermatitis on his hand, they wondered if the invisible rays might be destroying skin cells. They offered this as a treatment to a patient with recurrent breast cancer. The treatment, lasting 18 days in a row, resulted in partial shrinkage of the tumour.[19]

Marie Curie and Henry Becquerel discovered radium, polonium and the principles of radioactivity in the early 20th century. They noticed skin changes upon exposure to these agents. Several physicians thereafter used these for a variety of tumours with varied results. Ironically, Marie Curie herself died of radium-induced leukaemia in 1934.[20]

Chemotherapy

Adolf Hitler is considered to have played a significant role in the development of chemothereutic agents. He was a victim of an Allied attack with mustard gas (1914) which caused him to go into coma and a temporary blindness. Post war, forensic pathologists noted bone marrow aplasia, degeneration of lymphoid tissue and ulceration of the intestine in patients exposed to mustard gas. Nitrogen Mustard similarly caused severe bone marrow aplasia in those exposed during the war. This was thereafter used in treating lymphoma by Goodman and Gilman in Yale. The next decade saw the discovery of several other anti cancer agents.[21]

Other 'treatments' for breast cancer

Several 'unproven' remedies for breast cancer were introduced and popularized in the past. Glover Serum was an invention of Thomas Joseph Glover, a Toronto Physician around 1920. He is reported to have obtained, from many breast cancer patients' blood cultures and breast cancer tissues, a pleomorphic organism (virus?). Filtrates from the culture were injected into horses which were later bled. This antiserum was used as breast cancer treatment. After sev-

eral studies, the American Cancer Society found no evidence of benefits with its use in breast cancer. Several other drugs also found their way into the market for breast cancer treatment. This included glycoxide antitoxin by William Koch, Herbal tonic by Harry Hoxey and Krebiozen by Steven Durovic. Laetrile was introduced in the market around 1951, with a claim that an enzyme in breast cancer cell hydrolyzes this to release tumoricidal hydrogen. Subsequent clinical trials (FDA) refuted these claims. Around the same time, nutritionist promoted various 'diets', arguing that the disease was linked to toxins and impurities in the body. These included diets such as those containing catabolic fatty acids and the Beverly Hills diet. Psychotherapy was also used with the suggestion of a link between cancer and cancer personality.[22]

The move towards breast conservation

Geofrey Keenes (St Bartholomew's Hospital, 1927) investigated radium needles in advanced and inoperable breast cancer and demonstrated encouraging local control. He subsequently performed lumpectomies followed by interstitial radiation for operable breast cancer with results comparable to those obtained by radical mastectomy.6 Around the same time, David Patey (Middlesex Hospital) experimented with preservation of pectoralis minor and demonstrated survival and local recurrence rates similar to radical mastectomy.

By mid twentieth century, surgeons started to question the value of radical mastectomy. Francois Baclesse (Curie Foundation, Paris; 1960) demonstrated that the 5 year survival of simple excision of tumour and radiation was equivalent to Halsted's.[23] George 'Barnie' Crile (Cleveland, Ohio) started questioning the logic of radical mastectomies. He argued that breast cancer also spreads by the vascular route, and good local control does not always lead to a cure.[24,25] Two trials published in the New England Journal of Medicine in 1981 and 1985 clearly describe that segmental resections showed no significant survival disadvantage compared with the classical total mastectomy.[26-28] Conservation of the breast gained popularity thereafter.

Changes in attitude to breast cancer

In the early 1970s, decision making was very different to what it is today with patients having no involvement in the decision making process. The procedure would often be an excision biopsy followed by surgery in the same procedure if a frozen section showed cancer. Patients going in for surgery would not know before hand whether they will be having a mastectomy. This gradually changed with efforts from several women who underwent the ordeal themselves. Terese Lasser (1952) founded a mastectomy support group called Reach to Recovery, visiting patients in hospitals. The American Cancer Society now assumes formal direction to this, and there were more than 1700 volunteers by 2001.[29]

Shirley Temple, an American celebrity, insisted on a two step procedure when she developed breast cancer; an excision biopsy only followed by further surgery at a later date based on histology. She also brought a significant change in society's attitude to breast cancer by 'going public' and breaking the associated taboo that prevented women from coming out in public with their breast cancer. This change in attitudes and the development of less mutilating surgery encouraged women to present earlier with breast cancer.[30]

Rose Kushner's decisions on her treatment for breast cancer were also very significant. She was an American journalist and when she developed breast cancer, she was not prepared to undergo the one stage excision-frozen section-mastectomy procedure. She decided to have an excision biopsy first and struggled to find a surgeon to undertake a modified radical mastectomy as she wished.[31] She later established the Breast Cancer Advisory Centre (Maryland, 1975) to provide all the information women need to make informed decisions. She raised concerns over the single stage procedure and the dangers of estrogen that was increasingly being used. Filing suit against several organizations including the FDA, warnings were applied on birth control pills regarding its links to breast cancer. Eventually, the women's health movement forced doctors to listen to patients and involve them in the

decision making process. Formal recommendations were issued that biopsy and mastectomy be performed as separate procedures in 1979 by the National Institute of Health. Kushner received the James Ewing Award for her contributions in fighting breast cancer by the American Society of Surgical Oncology (1990).[9]

Conclusion:

The management of breast cancer has undergone significant changes with time, and continues to change constantly. Fortunately, the days of super-radical surgery are gone and very few surgeons today may have performed radical mastectomy. Improvements in earlier cancer detection and emerging non-surgical treatments have enabled a more conservative approach with emphasis on breast conservation. Newer oncoplastic techniques allow breast conservation with better cosmesis in situations which would previously have required mastectomy. The emergence of sentinel lymph node biopsy is also allowing accurate axillary staging whilst avoiding unnecessary, and debilitating, axillary surgery. With changes witnessed in the last few decades alone, one may wonder what the future of surgical approach may hold in managing patients with breast cancer. The management of breast cancer is now undertaken by multidisciplinary teams rather than by surgeons alone and this has dramatically improved prognosis and cosmesis. However, despite advances in knowledge, surgery remains a mainstay of treatment of breast cancer, and is likely to be so for the foreseeable future.

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