International Journal of Surgery 8 (2010) 199–202

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.theijs.com

Review

Current status and advances in management of early breast cancer

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ARTICLE INFO

Article history:
Received 26 July 2009
Received in revised form
31 January 2010
Accepted 6 February 2010
Available online 4 March 2010

Keywords:
Breast cancer
Advances
Diagnosis
Surgery
Histopathology
Radiotherapy
Chemotherapy
Hormonal treatment

ABSTRACT

Breast cancer is the most common female cancer. Worldwide, more than a million women are diagnosed every year. However despite this increase, the mortality rate is declining. This is due to combination of factors including early diagnosis and effective treatment. This manuscript which is presented in two sections outlines the current status in management of early breast cancer. Section 1 focuses on the advances in diagnosis and surgical treatment of breast cancer and give an overview of the histopathological aspects. The focus of section 2 is on advances on adjuvant treatment of breast cancer including radiotherapy, chemotherapy and endocrine treatment.

1. Introduction

Breast cancer is the most common female cancer. Worldwide, more than a million women are diagnosed every year. In 2005 more than 45,500 women were diagnosed in the UK with breast cancer. In the last ten years, female breast cancer incidence rate in the UK have increased by 13%, however despite this increase, the mortality rate is declining (Fig. 1). There were 12,082 deaths from breast cancer; 11,990 (99%) of these were in women and 92 (1%) were in men.[1–3]

Multidisciplinary team (MDT) approach in management of breast cancer patients, joint clinics and weekly MDT meetings for diagnosis and treatment planning, remain central to the management and is regarded as one of the major advances in this field. It has led to tailoring therapy to the individual patients' needs with the involvement of all members of the team.

2. Breast cancer diagnosis

Diagnosis of breast cancer is carried out by triple assessment which includes clinical evaluation, breast imaging and tissue diagnosis (cytological or histological assessment).

Full-field digital mammography has allowed more confident identification and characterisation of microcalcifications, particularly in dense breast tissue. Digital equipment, although more expensive than analogue units, provides a major advantage in stereotactic procedures for impalpable lesions including guide wire placement, core biopsy and vacuum-assisted excision where small lesions can be completely removed percutaneously using a mammotome. Advances in the sensitivity of breast imaging and the extension of mammographic screening programmes in Europe and North America have undoubtedly contributed to the reported rising incidence of breast cancer, and the current controversy surrounding overdiagnosis of clinically unimportant lesions with potentially harmful overtreatment in some women.[4]

Breast magnetic resonance imaging (MRI) has become a widely-used second-line imaging modality with well-defined roles in assessing tumour multifocality and planning surgery[5] and in

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doi:10.1016/j.ijsu.2010.02.004

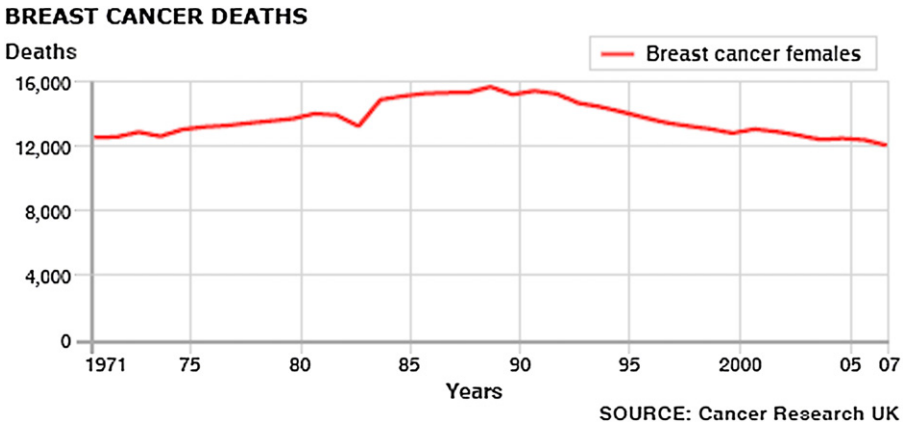

Fig. 1. Declining breast cancer mortality in the UK. (http://info.cancerresearchuk.org/cancerstats/types/breast/mortality/).

monitoring local tumour response to neoadjuvant chemotherapy. MRI screening is advised in high-risk young women such as those with a BRCA gene mutation or with previous mantle irradiation for lymphoma, and in assessing gel implants for leak or rupture.

3. Advances in surgical treatment

Over the last 30 years the major change in the surgical treatment of early breast cancer has been the shift towards breast conservation treatment. Breast conserving surgery (BCS) was introduced to reduce the physical and psychological consequences of removing the whole breast. Trials performed in the 1970s demonstrated equivalent survival when comparing BCS and radiotherapy with mastectomy.[6] Local recurrence rates were higher in the BCS and radiotherapy group. However patients developing local recurrence were salvaged by a mastectomy. Radiotherapy is now accepted as standard treatment for patients with early breast cancer undergoing BCS.

The meta-analysis conducted by the Early Breast Cancer Trialist's Collaborative Group comparing BCS with BCS and radiotherapy demonstrated that the addition of radiotherapy reduced the risk of local recurrence by 75% and resulted in a disease free survival advantage, with a decrease in the 15 year risk of dying of breast cancer from 31% to 26% in node negative patients and 55–48% in node positive patients.[7,8]

Between 1980 and 2004, the mastectomy rate at the Mayo Clinic fell from 91% to 36%.[9] Currently in the UK about two-thirds of newly diagnosed cancers are amenable to breast conservation (wide local excision and radiotherapy) but in the remaining third, mastectomy is still undertaken because of tumour size, location within the central breast, tumour multicentricity, or patient preference.

For patients undergoing breast conservation, breast surgeons trained in newer oncoplastic procedures can achieve better outcomes with regard to long-term cosmesis. Glanduloplasty techniques using local breast tissue flaps reduce the cavity left in the tumour bed and allow wide tissue margins around the tumour to be resected so that cancer clearance is not compromised.

In patients with large breasts, therapeutic mammoplasty can achieve better cosmetic outcomes and maintain breast symmetry. Here the tumour and surrounding margins are excised widely as part of a reduction mammoplasty, with the design of the nipple-areolar pedicle tailored to the area of tumour excision. Contra lateral breast reduction can be undertaken at the same time or at a later date. For the surgical team there is inevitably a considerable increase in requirements for operating theatre time with more complex oncoplastic surgery.

BCS aims to achieve good local control of both the primary tumour and regional nodes, and attention to histological clearance of margins is essential to ensure complete tumour excision. Local recurrence rates following BCS are the prime quality indicator for adequacy of surgery and the recommended minimum standard, and targets for local recurrence after BCS have now been revised to a maximum of 5% at 5 years and a target of <3% at 5 years.[10]

4. Advances in mastectomy and breast reconstruction

The technique of mastectomy has evolved steadily over the last 50 years with abandonment of the radical Halsted mastectomy in favour, initially of a modified procedure sparing the pectoral muscles, and more recently adopting skin-sparing techniques, where only the skin of the nipple–areola complex is included in the resection, to allow the uninvolved skin envelope to be conserved for breast reconstruction. Endoscopic breast surgery is an emerging technique which aims to reduce still further the extent of scarring on the breast, and is currently being undertaken in the context of clinical trials.[11]

UK and European guidelines for breast cancer treatment recommend that reconstruction should be available to women requiring mastectomy.[5] Immediate reconstruction can make the prospect of mastectomy easier to bear in some women, but not all patients will be suitable for immediate reconstruction. Some women may decline because of personal preference[12] and some women will be advised against immediate reconstruction for oncological reasons. The expanded indications for post-mastectomy radiotherapy (see Section 2 of this paper) has resulted in a move away from immediate reconstruction in patients with large or high-grade tumours or where lymphovascular invasion or nodal involvement predict the likely recommendation of chest wall radiation.

The concerns previously raised on the use of silicone gel implants have largely been dispelled[13] and implants are considered safe and effective components of the reconstructive armamentarium. Advances in gel cross-linking have reduced silicone “bleed” and cohesive gel implants are likely to experience fewer problems with late extracapsular rupture. Myocutaneous flaps using the latissimus dorsi (LD) muscle from the back or lower abdominal tissue based on the deep inferior epigastric perforators (DIEP flap) can replace relatively large volumes of breast tissue, either alone or in combination with implants, and are used both for immediate and delayed reconstruction. The LD flap is a robust reconstructive technique and is within the current training repertoire of most breast surgeons. The free DIEP flap technique requires