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The role of surgery in the management of older women with breast cancer

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ABSTRACT

Standard treatment for early breast cancer usually involves multi-modality treatment with a combination of surgery and one or more adjuvant therapies. These may include chemotherapy, radiotherapy, endocrine therapy and Trastuzumab. The treatment schedule for an individual patient may be complex, prolonged and associated with significant morbidity. The benefits of such regimens are clear to see in the improving mortality statistics for this breast cancer.

However, such protocols may not appropriate for all women. Older women (over 70 years) have increasing rates of co-morbidities, reduced life expectancy and generally have more favourable breast cancer disease biology. Competing causes of death mean that they are less likely to die of their breast cancer, stage for stage, than a younger woman. In addition, their tolerance to some of the therapies is reduced which increases treatment related morbidity and reduces the risk to benefit ratio.

It may therefore be appropriate to modify treatment protocols in selected older women. This should be done in consultation with the multi-disciplinary team with input from specialists in Medicine for the Elderly. The views and wishes of the patient should be respected during these discussions.

This article reviews these issues.

1. Introduction

The 'Gold Standard' treatment for breast cancer is a complete surgical excision of the tumour and staging of the axillary lymph nodes, followed by appropriate combinations of adjuvant therapies.

This strategy may be inappropriate for older women (over 70 years) for a variety of reasons.

Breast cancer is a less biologically aggressive disease in older women, although this is partially counterbalanced by a slightly later stage of diagnosis. Competing causes of death assume a greater importance with increasing age, with 80% of older women having one or more significant co-morbid diseases which impact substantially on life expectancy.[1] Physiological reserves are reduced independently of defined co-morbidities. The risk to benefit ratio of treatment alters, with increased treatment toxicity and reduced breast cancer specific mortality. Consequently, applying the same treatment practices to older women may be inappropriate.

Older women with breast cancer are currently treated differently to younger women, with reports of age dependent variance in practice from the UK,[2,3] USA,[4,5] and Europe.[6] This may improve quality of life and reduce treatment related morbidity and mortality. Whether this adversely affects disease control and breast cancer mortality is not known.

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A number of clinical trials are currently on-going to evaluate optimal treatment strategies for older women. Until these trials provide guidance, older women should ideally be treated according to standard protocols, tailored to their tolerances and wishes. A multi-disciplinary approach to assessment (involving surgeons, geriatricians, anaesthetists and oncologists) is recommended to optimise treatment.

These issues are discussed in more detail in this review.

2. Characteristics of breast cancer in older women

Breast cancer in the elderly differs from the disease in younger women in both stage at diagnosis and biological characteristics. The biological features of breast cancer are more favourable in older women, with tumours being of lower grade with increased oestrogen receptor (ER) expression (Table 1). This is counterbalanced by higher rates of locally advanced and metastatic disease at diagnosis and larger primary tumours (Table 1). Nodal disease is slightly less common. These differences may be explained by a combination of decreased breast awareness and reduced screening in older women. How these variations in disease stage and biology interact with patient and treatment factors to determine survival is poorly understood.

Overall survival is substantially worse in older women with breast cancer. Much of this difference is due to competing causes of death, although the breast cancer is responsible for a proportion of deaths, even in the oldest age groups. However, as age and co-morbidity levels increase, the impact of breast cancer on survival is reduced.[4,19] Stage and variance in treatment are less relevant in these women.[19,20] At the extremes of age and ill health, breast cancer has little impact on life expectancy. The difficulty for clinicians is to decide at which point treatment should be moderated to reduce morbidity, without the loss of disease control or reduced survival.

Whether breast cancer specific survival is worse in older women (when co-morbidity related deaths are controlled for) is more difficult to assess due to the widespread understaging of older women, the use of less aggressive treatment schedules and poor data on co-morbid diseases. Data from existing audit studies are therefore unreliable.

3. The physiological and pathological effects of aging

The effects of ageing can be categorised as physiological (or senescent), psychological or disease related. The changes are substantial, affect all bodily systems and significantly influence treatment tolerances. Physiological changes are summarised in Table 2 and co-morbid diseases are summarised in Table 3.

These age-related senescent changes and co-morbidities interact with disease stage. A number of researchers have tried to quantify their impact on predicted life expectancy by devising 'Co-Morbidity Indices'. The most frequently cited Indices are reviewed in Table 4.

The most comprehensive scoring system, the Comprehensive Geriatric Assessment (CGA), is currently being used in the PACE (Preoperative Assessment of Cancer in the Elderly) audit to determine whether it can accurately predict outcomes in older cancer patients. Preliminary analysis has shown good correlation with the Karnofski performance status, but it is likely that the additional information will refine its predictive accuracy. As yet, the CGA has not been incorporated into any randomised trials which would allow its use to predict which treatment should be advised for women with co-morbidity. How these systems relate to breast surgery, which has a very low mortality (<1%), is also unclear.

These scoring systems are all effective in estimating survival to some degree and may aid in decision making in older patients. However, in practice most surgeons either use no risk assessment tool or use the American Society of Anaesthesiology Classification (ASA), when deciding on fitness for surgery,[31] which is of limited sensitivity in elderly women.

4. Treatment preferences

There has been little research relating to older women's preferences for breast cancer treatments. It is not known whether they would prefer less aggressive therapies with reduced morbidity to standard treatment, if given full information concerning outcomes. Older women are more passive in their information seeking behaviour[32] and are more likely to allow doctors to advise them. Cosmesis may be less important to older women [33], although most older women would choose breast conservation over mastectomy despite the need for

Table 1 – Summary of stage and biological characteristics of breast cancer in older women

Tumour characteristic	Age related variance	Reference
Size of primary tumour	Larger primary size in elderly	[4,7–9]
Axillary nodal disease	~30% reduction in rate of node positivity in elderly	[2,4,6,10–13]
Locally advanced at presentation	Rate ~doubled in elderly	[6]
Metastatic disease at presentation	Rate ~doubled in elderly	[2]
Grade	Reduced % grade 3 in elderly	[14,15]
S phase fraction	Reduced in elderly	[4,16]
ER positivity	Strong positive correlation with older age	[4,17]
Progesterone receptor positivity	Positive correlation with older age	[4,9,14]
c-erb-B2 receptor over expression	Negative correlation with older age	[4]
Histological sub-type	Increase in lobular, mucinous and papillary tumours with age	[9,18]

Table 2 – Summary of the physiological changes associated with normal ageing

Organ/system	Overall change	Pathophysiology	Clinical impact
Cardiac	Reduced cardiac reserve	↓ Number of myocytes ↓ Number of pacemaker cells ↓ Arterial compliance ↓ Exercise levels ↓ Maximal heart rate ↑ Afterload Stiffening of myocardium, reducing diastolic filling	↓ Tolerance to cardiac stress ↓ Tolerance to rhythm disturbance ↑ Risk of anaesthesia
Respiratory	Reduced respiratory reserve	↓ Vital capacity ↓ Lung elasticity ↓ Strength/endurance respiratory muscles ↓ Mucous production ↓ Ciliary function ↓ Oxygen diffusion capacity	↓ Respiratory reserve during exertion ↑ Risk chest infection ↑ Risk of anaesthesia
Renal	Reduced renal reserve	↓ Number of nephrons by 50% by age 70 ↓ Renal blood flow by 50% ↓ Creatinine clearance by 30% ↓ Ability to conserve water ↓ Sensitivity to thirst and therefore poor self regulation ↓ Ability to conserve sodium and excrete hydrogen	↓ Ability to maintain fluid and electrolyte balance under stress ↑ Risk of dehydration and fluid overload ↑ Risk of anaesthesia
Sensory-motor and CNS	Reduced cognitive and motor functions	40% Incidence significant cognitive impairment by age 90, Reduced balance and agility, Reduced muscle strength	Risk of poor convalescence from therapy, falls, worsening of global function caused by anaesthesia

radiotherapy.[34] Clinicians should be aware of these preferences when counselling older patients about treatment options.

As can be seen from the above, treatments for breast cancer may need to be modified to suit the patient more carefully in the older age groups. The physician should have a good understanding of the risks posed by surgery, chemotherapy and radiotherapy in older women and how these risks are modified by other disease states. Physicians should be aware that their recommendations will carry greater weight with older patients who will often passively accept a treatment recommendation.

Despite the above, even the frailest elderly women can usually be offered effective therapies, often including surgery. Surgical strategies for the elderly are discussed below.

5. Surgery: timing, techniques and optimisation

5.1. *Anaesthesia*

5.1.1. *General anaesthesia for breast surgery*

The increased incidence of co-morbidity in the elderly renders general anaesthesia more hazardous. Breast surgery itself is generally regarded as low risk body surface surgery with low reported mortality rates. The mortality rate for mastectomy under general anaesthesia 20 years ago was approximately 1% in the elderly[35,36], and may well be less than this now with modern anaesthetic and surgical techniques. Wide local excision either under local or general anaesthesia in the over 70s has a mortality rate of 0.3% (two deaths in 658 patients[2]).

Older people, however, do have different responses to anaesthesia (Table 5) and as a result anaesthetic techniques may need to be modified.

In those patients at very high risk from general anaesthesia, alternative strategies may be available, such as regional or local anaesthesia, or avoidance of surgery altogether.

6. Alternatives to general anaesthesia

6.1. *High thoracic epidural*

This technique gives excellent anaesthesia and post-operative analgesia, is well tolerated and permits a wide range of surgical procedures, including mastectomy and axillary clearance.[37] However, it is technically demanding due to the anatomy of the thoracic spine and the high incidence of spinal degenerative disease in the elderly. Complications include back pain, sympathetic blockade and reduced respiratory capacity.[38]

6.1.1. *Paravertebral block*

This technique is similarly well tolerated and permits both mastectomy and axillary clearance[39] and requires a lower dose of local anaesthetic than local infiltration. However, the technique is technically demanding and time consuming. Complications include pneumothorax and in some cases, an incomplete block may necessitate general anaesthesia.

6.1.2. *Intercostal nerve block*

This technique is well tolerated, permits wide excision and mastectomy (but not axillary surgery), and gives good post-operative analgesia.[40] Complications are infrequent but include pneumothorax.

Table 3 – Age related prevalence of some co-morbid diseases

Disease	Age group	Prevalence (%)	Reference
Diabetes	45–54	6	[21]
	55–64	5	
	65–79	8	
Angina	45–54	0.68	[22]
	55–64	1.62	
	65–74	3.37	
	75+	4.71	
Stroke	55–59	203	[23]
	60–64	629	
	65–69	940	
	70–74	926	
	75–79	1271	
	80–84	890	
	85–89	757	
Dementia (Mini mental state score <18/30 women only)	65–69	0.9	[1]
	70–74	1.7	
	75–79	3.3	
	80–84	11.5	
	85–89	20	
	90+	40.5	
Arrhythmia	45–54	0.6 Prevalence	[24]
	55–64	1.5	
	65–74	4.2	
ECG changes of left ventricular hypertrophy	45–54	0.25 Prevalence	[24]
	55–64	0.75	
	65–74	2.2	
COPD	61–62	14.6	[25]
	76–77	18.7	

6.1.3. *Local anaesthesia (LA)*

Wide local excision under LA can usually be safely performed on any tumour suitable for breast conserving surgery. Mastectomy may also be undertaken under LA,[41] although this is not appropriate for women with larger breasts, as the increased area of tissue requiring infiltration may increase pain and the risk of toxicity. Limited surgery to the axilla, such as SLNB where one or two nodes are excised, can be performed under local anaesthesia. Sampling of four nodes is more difficult and axillary clearance is not possible under LA. Therefore, for older women with axillary disease who are unable to undergo general anaesthetic alternate strategies may be required for disease control (see below).

7. Surgery

(a) *Surgery to the breast*

There are two main strategies to remove the primary cancer: mastectomy or wide local excision plus radiotherapy. Older women may be more likely to be offered wide local excision than mastectomy and adjuvant radiotherapy is often omitted post-operatively.[2] The preference of older patients given a choice between mastectomy and wide local excision is for breast conservation surgery.[34] A number of studies have compared wide local excision with and without radiotherapy in the older patient and the local recurrence rates vary between 3% and 47%, in some cases with very early recurrence (reviewed in [7]). However, in many of these studies, surgical margins were not recorded or were inadequate by modern standards and many of the studies included patients with large tumours (T3), where local recurrence rates are high even with mastectomy. Wide excision alone may be adequate for frail women with clear surgical margins and low risk tumours and this issue is addressed in the PRIME trial.[96]

8. Axillary surgery

Axillary surgery aims to control axillary metastases if present and to determine disease stage for selection of adjuvant therapies such as chemotherapy. As older women rarely receive chemotherapy, axillary surgery is often omitted.[7,42–44] However, therapies other than chemotherapy may depend on nodal status, e.g. chest wall radiotherapy after mastectomy,[45] and therefore omission of axillary staging may result in under-treatment as well as inadequate staging.

For decades the gold standard axillary treatment has been a complete axillary lymph node dissection (ALND). However, recently, less invasive alternatives have been developed including axillary sampling and sentinel lymph node biopsy (SLNB). These have a lower morbidity and a 95–97% accuracy rate. However, if nodal disease is identified, further axillary surgery or axillary radiotherapy is required.

It is likely that many frail, older women may gain no benefit from axillary surgery, which could be omitted altogether or replaced by axillary radiotherapy.

These options are discussed in terms of regional disease control, side effects and survival.

(1) *No axillary treatment*

In view of the reduced life expectancy of older women, reduced disease aggression and the lower rate of axillary disease, the option for no axillary surgery may be appropriate for some patients. Omission of axillary surgery has little impact on survival for older women, with no effect on breast cancer specific survival in women over the age of 75 in a large Canadian audit.[44] Similarly a randomised trial of omission of axillary surgery in women over 60, with clinically negative axillas and 6.5 years of follow-up, found no difference in either disease free or overall survival.[46]

The rate of failure of regional disease control in women who have no initial axillary therapy, varies between 1.5% and 8% (age ranges of trials varies[7,47,48]) compared with axillary clearance which is associated with axillary recurrence rates of 1.7–2.7%.[49–51] However, in most cases, this recurrent axillary disease is controllable with either surgery or radiotherapy.

(2) *Axillary radiotherapy*

Axillary radiotherapy as sole treatment may give good local control and survival rates but is associated with similar rates of shoulder stiffness and lymphoedema as ALND. There is little or no survival difference between radiotherapy and ALND,[52–54] although few studies have focussed on the elderly. Local disease control rates are acceptable with axillary radiotherapy, varying between 0.5% and 12%.[52,55–57] The excellent 0.5% recurrence rate was seen in women with small (<1.2 cm) tumours. Again few studies have focussed on older women where rates of axillary disease are lower,[4] and life expectancy is shorter.

Table 4 – Summary of co-morbidity indices for outcome prediction

Index	Factors assessed	Evaluation	References
Charlson Index	Weighted index of the number and severity of defined co-morbid diseases	Can predict 1 year mortality in a population of women with breast cancer with moderate accuracy. Disease spectrum included is limited and disease interactions cannot be accounted for	[26]
Satariano and Ragland	Weighted index of 7 co-morbid diseases, (MI, heart disease, other cancer, respiratory, gallbladder and liver problems	Has been validated to predict 3 year survival for women with breast cancer aged 40-84 years. Limited by small number of conditions assessed but has the advantage of simplicity	[20]
Comprehensive Prognostic Index	Assesses age, stage of cancer and co-morbid disease	Broader range of co-morbidities and enables interactions between diseases to be taken into account. Can be used to predict 1 year mortality	[27]
Comprehensive geriatric assessment (CGA)	Detailed assessment of co-morbidity, functional status, cognitive function and depression scores	More complex to administer, but may be at least as effective as the Karnofski PS at outcome prediction, although further work is being done to establish its efficacy	[28,29]
Karnofski performance status	Widely used but crude scoring system of functional status in oncology patients of any age	Does correlate with mortality post treatment for a variety of cancers and is easy to use. May be insensitive in the elderly where multiple co-morbidities may be present and interact	[29]
ASA	Widely used but crude scoring system of co-morbidity for patients of any age	Multiple co-morbidities in the elderly diminish its sensitivity in groups 2 and 3. Probably most widely used scoring system for pre-operative risk assessment. Not a cancer specific tool	
Functional status	Assessment of the Activities of Daily Living, (ADL) and the Instrumental Activities of Daily Living, (IADL)	These measures of functional ability have been used to predict non-cancer specific mortality with some success	[30]

Table 5 – Factors affecting general anaesthetic tolerance in older people

Elderly characteristic	Effect on anaesthetic tolerance
↑ Body fat	Larger lipid reservoir for distribution volume of lipid soluble anaesthetic agents (e.g. inhalational agents). Reduced sensitivity to acute effects of these agents and increased period of washout
↓ Total body water	↓ Volume of distribution of water soluble agents such as muscle relaxants, thereby increasing sensitivity
↓ CNS mass, number of synapses and neurotransmitter levels, cognitive impairment, cerebral atherosclerosis	↑ Sensitivity to most sedatives and anaesthetic agents ↑ Risk of prolonged post-operative cognitive dysfunction in up to 10% of women at 3 months (correlates with age and duration of anaesthesia) ↑ Risk of post operative CVA
↓ Cardiac reserve and increased prevalence of coronary atherosclerosis	↑ Risk of cardiac decompensation with fluid overload or rhythm disturbance. 6× increase in risk of cardiac complications of GA between ages 50 and 80
↓ Renal reserve	↓ Tolerance of peri-operative dehydration or overload. Increased risks of drug toxicity due to impaired excretion of renally excreted agents
↓ Respiratory reserve (see Table 2 for details)	↑ Risk of post operative basal atelectasis and hypoxia ↑ Risk of post operative chest infection (4-fold increase)
Polypharmacy	↑ Risk of drug interactions

(3) *ALND*

This has been the gold standard treatment for many years and despite its high morbidity results in excellent staging and local disease control. However axillary clearance can only be performed under general or regional anaesthesia and causes significant morbidity. Therefore for some older women it may be inappropriate.

(4) *SLNB*

SLNB is the targeted removal of one or two lymph nodes, which are identified by the injection of blue dye and radioisotope into the breast. It has an accuracy of between 95% and 97% compared to ALND at 99–100%. Sentinel node biopsy compared to 'standard axillary therapy' (mainly ALND) was the subject of the recently published ALMANAC trial which found reduced morbidity, better quality of life and no difference in mortality or local recurrence in the axilla, although a median follow-up period of only 12 months has been presented to date.[58]

SLNB is an attractive option for the elderly because it has a lower morbidity, can be performed under local anaesthetic,[59] and only those women with positive nodes will need definitive therapy which can be either ALND, radiotherapy or in

frail elderly women with ER positive tumours, endocrine therapy.

(5) *Axillary sampling*

Axillary sampling is the removal of four nodes from the axilla, without radioisotope localisation. Staging accuracy is comparable to SLNB. Axillary sampling and radiotherapy for those patients with nodal disease compares favourably with axillary clearance in terms of regional disease control and survival.[60] Compared to SLNB, it is more difficult to perform under local anaesthesia.

Based on the above it is advised that women who are fit for surgery under GA should be offered standard axillary treatment, to optimise local control and ensure that appropriate adjuvant therapy is offered. This should be an ALND for those with known axillary disease and either sentinel node biopsy or sampling for those without. In frail women with a reduced tolerance to general anaesthesia, sentinel node biopsy may be performed under local anaesthesia with a view to providing additional disease control with a combination of axillary radiotherapy and/or adjuvant anti-oestrogen therapy. Finally, in the least fit, it may be appropriate to offer no axillary therapy. If disease progression occurs, the option for axillary radiotherapy is available.

9. Breast reconstruction

Older women are less likely to have breast reconstruction following mastectomy than younger women.[61,62] This reflects the fact that older women are less likely to have reconstructive surgery,[63] as physical appearance is less important to older women than to younger.[64,65] although body image is still an important consideration for some.[66,33] and there are a number of reported series of women over the age of 65 having reconstructive surgery with good results, including autologous tissue techniques (Latissimus dorsi and TRAM flaps).[67] There are few series with many cases over the age of 75 and in general, older women are less likely to have autologous tissue transfer methods used.[61] These are longer, more complex procedures, which rely on good vascular perfusion of the flap which may be compromised in older women due to co-existent health problems such as hypertension, diabetes and atherosclerosis, all of which are more common with increasing age. It is well known that complications are more likely following breast reconstruction in smokers, diabetics, hypertensives and also in older women (over 60 years), probably largely due to the increased frequency of these conditions with age. In addition, there is a generally worse outcome in terms of long-term physical function after reconstruction with older age.[68]

Concerns about safety are a prominent feature involved in decision making when older patients were asked why they did not seek reconstructive surgery and women will often cite fear of complications or of being 'too old' for this type of surgery.[69,70]

Finally, many older women will never be offered the option of reconstruction as their surgeon may perceive that the risk will be too great, or in the belief that older women are not concerned about their appearance. This may deny some older women the freedom to choose, especially in light of the good results from reconstruction in some series.

10. Surgical complications

Although the mortality rate for breast cancer surgery is very low, the morbidity may be substantial and should not be ignored simply because this type of surgery is rarely life threatening. The complications may be physical or psychological.[71]

The physical complications of breast surgery include scarring, acute and chronic wound pain, seroma formation, haematoma, infection and skin necrosis after mastectomy. Complications of axillary surgery include paraesthesia, seroma, haematoma, lymphoedema, breast oedema, shoulder stiffness, damage to the long thoracic nerve and chronic neuropathic pain.[72,73]

Arm morbidity (swelling and limited movement), is a long-term consequence of axillary surgery in 13–38% of women who undergo axillary clearance.[74,76,77] Axillary sampling and sentinel node biopsy have a reduced risk of these complications, with less than half the rate of lymphoedema formation compared with axillary clearance. However lymphoedema may still occur in up to 7% of women following a SLNB[75] compared with 13–38% following full axillary clearance, and 7% after sampling alone.[74,76,77] The impact of age and comorbidity on complications following surgery has been demonstrated to be minimal in a recent population based study from the Netherlands.[78]

The psychological morbidity of breast cancer surgery is substantial, affecting a woman's body image, sexuality and relationships, regardless of the type of surgery undertaken. Uniquely in the older age group we have randomised clinical trial data relating to psychological distress in older women treated with surgery for their breast cancer compared to those treated non-surgically, with primary endocrine therapy. This demonstrated short-term impairment of psychological well-being at 3 months in the surgery group, but by 2 years this difference had disappeared.[71]

The incidence of surgical complications and the variation with age are summarised in Table 6.

11. Non-surgical options

11.1. *Primary endocrine therapy*

The anti-oestrogen Tamoxifen is widely used as an adjuvant to surgery. In the United Kingdom (UK), however, recent audits demonstrate that 40% of women over 70% and 55% of women over 80 are treated with tamoxifen only for their breast cancer, omitting surgery completely.[2,87] This is called primary endocrine therapy (PET). It has much to recommend it from the patient's perspective: avoidance of surgery, few side effects and efficacy in up to 90% of oestrogen receptor (ER) positive cancers. However many patients develop disease resistance and relapse 2–3 years after therapy commences, necessitating a change of management.

There have been six previous randomised trials of PET versus surgery in fit women over the age of 70.[88–93] None of these trials has been individually powered adequately to detect a survival difference between these two treatment types. Meta-analysis of the data from these trials has demonstrated no significant survival difference, although a trend in favour of surgery was observed.[94] However, age sub-group analysis

Table 6 – Effect of age on the incidence of complications following breast surgery

Complication	Incidence (all ages)	Effect of older age on incidence	Reference
Seroma	Variable, 10–30% depending on procedure	Increased Odds ratio of 2.4 between women under or over 70 years	[79–82]
Haematoma and wound infection	8–10%	No difference with age	[2]
Skin flap necrosis	1–6%	No difference with age	[83–85]
Axillary paraesthesia	5–13%	Decreased in older women	[82,86]
Lymphoedema	Variable, up to 30%, depending on procedure	Decreased in elderly	[82]
Arm symptoms after axillary surgery (pain, stiffness, numbness, weakness)	Variable, up to 73% depending on procedure	Decreased in elderly	[74,75]
Ability to self-care after ALND	25–35%	Elderly more likely to have difficulty with house hold chores, OR of 0.44 (CI 0.21–0.91)	[86]

of these trials show two populations: the 70–75 year age group where treatment type is a dominant factor in outcome, with surgery being superior, and the 75+ age group where age is the dominant factor and the survival advantage for surgery disappears.[95] The previous trials were flawed in that they did not select women with ER positive tumours and they recruited only women who were fit for general anaesthesia. A large UK based multicentre trial (ESTEEM) is evaluating the role of primary endocrine therapy (anastrazole) versus surgery with adjuvant endocrine therapy in patients aged 75 years or over. In addition to overall and disease specific survival this non-inferiority designed randomised controlled trial will incorporate comprehensive geriatric assessment and will also evaluate quality of life, patient attitudes and health economics. The ESTEEM trial will provide valuable information to help physicians and patients select the optimal therapy. The reality of PET use, at present, is that it is mainly offered to the frail elderly, where anaesthesia may be associated with a higher risk of morbidity and mortality, and where baseline life expectancy will be shortened because of co-morbid disease. In such women it is likely that PET will provide excellent disease control with minimal morbidity and no detriment to survival.

Endocrine therapy may also be used in the elderly as a neo-adjuvant treatment to reduce the size of the primary cancer. This may facilitate breast conservation for reasons of patient choice or allow easier surgery under local anaesthesia.

12. A surgical management strategy for the treatment of breast cancer in older women

For patients who are fit for general anaesthesia (Fig. 1a) the management algorithm is similar to that for younger women where patients with tumours suitable for surgical treatment by breast conservation (tumour size $\leqslant$5 cm with an appropriate tumour to breast size ratio) can be offered a choice between breast conservation and mastectomy whereas patients with tumours unsuitable for conservation (e.g. T3 tumours, or multi focal tumours) should be offered mastectomy. Treatment with adjuvant therapies including endocrine therapy, radiotherapy and chemotherapy should also follow standard protocols adjusted for patients' co-morbidity and preferences. With regard to the surgical treatment

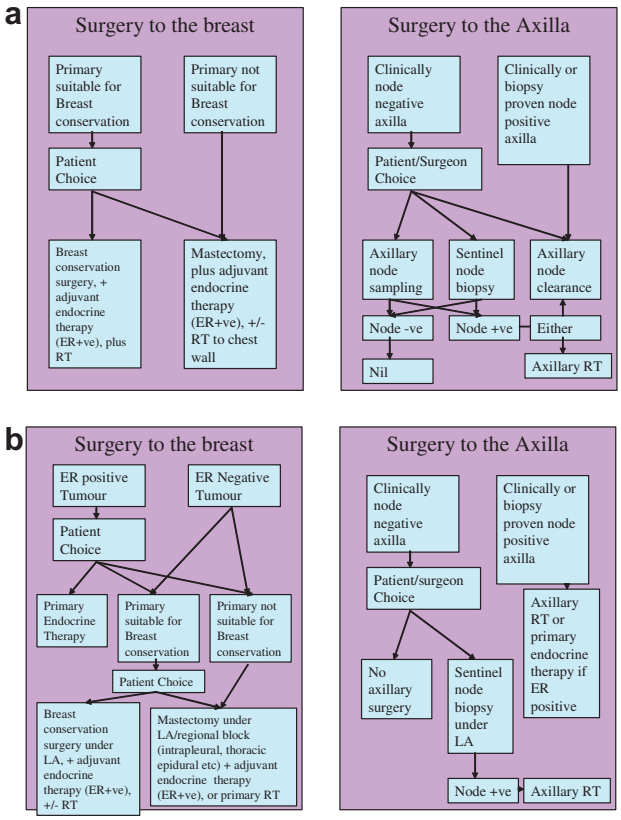

Fig. 1 – (a) Management algorithm for patients fit for surgery under GA. (b) Management algorithm for patients unfit for surgery under GA.

of the axilla, this should include staging for all patients, followed by axillary node clearance or radiotherapy for those found to have node positive disease. In patients where the axilla is not clinically involved initial staging can be by sentinel node biopsy or axillary node sample. Fig. 1b outlines a suggested management algorithm for patients who are too frail to undergo general anaesthesia. As noted above such patients are very unlikely to receive any benefit in terms of overall survival from the surgical treatment of their breast cancer and the main aims of treatment in this situation are to

achieve local disease control with minimum risk of morbidity and mortality and to offer appropriate adjuvant systemic endocrine therapy where appropriate. With regards to surgery to the breast, patients with oestrogen receptor positive tumours may benefit from primary endocrine therapy or breast surgery under local or regional anaesthesia with adjuvant endocrine therapy. Patients with oestrogen receptor negative tumours can be offered breast surgery under local or regional anaesthesia without adjuvant endocrine therapy.

With regard to axillary surgery in a frail patient with a clinically or biopsy proven node positive axilla, these patients may be treated with radiotherapy or primary endocrine therapy if their tumour is oestrogen receptor positive. For those patients with a clinically node negative axilla, sentinel node biopsy can be performed under local anaesthetic with follow-up radiotherapy for those found to be node positive. As an alternative, a conservative approach to the axilla may be adopted, with endocrine therapy for those patients with oestrogen receptor positive tumours. The role of adjuvant radiotherapy and systemic therapies is discussed in detail in other contributions to this edition of the European Journal of Cancer (see P. Scalliet manuscript in this edition).

13. Summary of recommendations

This overview of the surgical treatment of breast cancer in the elderly highlights the lack of an adequate evidence base for treatment planning, in stark contrast to the situation for younger women (<70 years) with breast cancer. The physiological changes and increased frequency of co-morbidity in this group of patients should not be ignored. For the majority of patients and particularly those aged <75 there is good evidence for a beneficial effect of surgical treatment in terms of local or regional control and possibly overall survival. However, there is a significant minority of patients who have co-morbid conditions or are of advanced age ('frail' elderly patients) in whom surgical treatment will have no beneficial impact on overall survival and may represent a substantial risk in terms of morbidity and even mortality. These patients are best managed in a multi-disciplinary environment with specialist geriatric assessment included. In these patients the surgical approach may need to be reduced or even omitted and their management is described in Fig. 1b. The evidence base for this approach is not currently complete but large randomised controlled trials currently underway (such as ESTEEM) should address this deficit.

14. Conclusions

Older women should be offered a tailored approach to the treatment of their breast cancer which takes into account their disease stage, fitness level, personal preferences and predicted life expectancy. Selective omissions of some treatments may be appropriate without detriment to survival or local disease control because of the altered risk to benefit ratio of therapies in this age group. Surgery may be possible using local or regional anaesthetic techniques and is safe and well tolerated in this age group.

Conflict of interest statement

None declared.

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