



Evidence-based advice for patients following axillary surgery

J Michael Dixon^{*1}, Kenneth Elder² & Sarah McLaughlin³

¹Edinburgh Breast Unit, Western General Hospital, Crewe Road South, Edinburgh, EH2 4XU, UK

²ST6 General Surgery Trainee Edinburgh Breast Unit, Western General Hospital, Edinburgh, EH4 2XU, UK

³Associate Professor of Surgery Mayo Clinic, 4500 San Pablo Rd Jacksonville, FL 32225, USA

*Author for correspondence: Tel.: +44 131 537 2907; Fax: +44 131 537 2653; jmd@ed.ac.uk

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More than 3.1 million women with a history of being treated for breast cancer were alive in January 2014. Most of these women will have undergone breast surgery with sentinel node biopsy (SLNB) and/or axillary lymph node dissection (ALND). For women with more than two positive lymph nodes, axillary clearance or ALND remains the mainstay of treatment. Lymphedema after axillary surgery is a feared complication for breast cancer survivors with one in five reporting life changing side effects as a consequence of developing lymphedema [1].

A lack of evidence based data has resulted in confusion regarding risk reduction strategies for prevention of lymphedema and patients often receive mixed messages as to what they can and cannot do with their arm after axillary surgery. Much of the currently available patient information is well intended yet anecdotal and has been based on outdated, underpowered studies. The 2016 International Society of Lymphology guidelines [2] note *“the risk of secondary lymphedema is much less with conservative breast cancer treatments (i.e., SLNB) such that the standard use of some of these ‘don’ts’ for the risk reduction of lymphedema may not be appropriate and possibly subject patients to therapies that are unsupported. . . ”*. The aim of this review is to provide up-to-date evidence-based advice regarding safe activities after axillary surgery.

Can patients exercise or lift weights after surgery?

The evidence suggests that this should be encouraged. Patients should start slowly, with light weights and few repetitions, increasing gradually and ceasing if painful. Schmitz *et al.* randomized unaffected at-risk women with greater than five lymph nodes removed to routine care or exercise. Fewer women in the exercise group developed lymphedema (7 vs 22%; $p = 0.003$) [3]. The Physical Activity and Lymphedema trial randomized 141 women with lymphedema to weight training or routine care and found no change in arm volumes between cohorts [4]. An additional meta-analysis by Kwan *et al.* of aerobic and resistance exercises supports the benefits of exercise in at-risk and affected survivors [5].

Is it safe to fly after axillary surgery?

In a study using bioimpedance surveillance for lymphedema, the authors concluded air travel did not affect bioimpedance values (or cause lymphedema) in 95% of at-risk women [6]. Although many clinicians have advocated wearing a prophylactic compression garment on planes, some data suggest this may be counterproductive [7]. Recently, Ferguson *et al.* also concluded that there was no increased risk related to either the number of flights or duration of flights in a study using a perometer to measure arm volumes [8]. These data collectively suggest flying is safe for patients following axillary surgery.

Can women shave under their arms after axillary surgery?

There are no data suggesting shaving results in an increase in lymphedema rates. Anecdotal advice has been there to use an electric rather than a manual razor but this is based on old unfounded evidence relating to trauma following ALND. There seems no reason to advise women that they cannot shave axillary hair following axillary surgery. If sensation is altered in the axilla, shaving in front of the mirror may be reasonable to avoid unnecessary injury.

Can patients have blood pressure measured in the treated arm?

Although blood pressure cuffs cause temporary stasis, there is no clear evidence that they cause prolonged lymphedema [8–10]. Women should be advised that there is no reason they cannot have their blood pressure measured in the arm on the side of axillary surgery.

Can patients have blood tests, an intravenous cannula or immunizations in the treated arm?

Any puncture can act as an entry point for infection but in the general, nonimmunocompromised population the risk is minimal. Retrospective studies that have evaluated the link between skin puncture and lymphedema are confounded by recall bias as patients with lymphedema are more likely to remember needle sticks. The largest study evaluated 188 women of whom 18 remembered any type of skin puncture. Of the 18, eight had lymphedema after 3 years [11]. More recent prospective studies with 18–24 month follow-up have shown no relationship between venepuncture or intravenous line placement in the at-risk limb and the risk of lymphedema [8,12,13].

The evidence for immunizations is less clear due to lack of studies but is likely to parallel the emerging safety data related to venepuncture and intravenous line placement. For patients who have had an SLNB or an axillary node sampling there is no concern for such women having immunization, venepuncture or siting of a venous access cannula [8,12,13].

For patients who have had an axillary lymph node clearance or ALND, evidence-based options have been proposed by Jake and Twelves [14]. If possible, venepuncture should be performed on the contralateral arm but where this is not easily achieved, in the absence of lymphedema, it is preferable to consider venepuncture or siting a venous access cannula in the ipsilateral arm rather than making further attempts in the contralateral arm or resort to other sites with higher infection rates, such as the foot. If further chemotherapy is planned, a central venous device is recommended.

Can patients have intravenous fluids in the treated arm?

Providing there is a well-placed cannula in a moderately sized vein with no obvious fluid extravasation, then there is no concern about giving intravenous fluids into the arm after SLNB. Peripherally inserted central venous catheters in the at-risk limb should be avoided given their increased infection and venous thrombosis risk. The advice on giving intravenous fluids in patients who have had ALND by Jake and Twelves should otherwise be followed and intravenous fluid can be delivered through a venous access cannula if access in the opposite arm cannot be easily obtained [14].

Can women go to the sauna after axillary surgery?

A subanalysis of the Physical Activity and Lymphedema trial found patients using saunas were more likely to develop lymphedema [12]. However, prospective, randomized evidence shows that other sources of heat such as exercise, sunlight, sunburn and hot baths do not increase this risk [10]. This is an area where the overall evidence base is very limited. At least for now women should be warned to avoid saunas until there is more evidence of how they influence arm swelling.

Should patients who have had previous axillary surgery undergo breast reconstruction?

Breast reconstruction does not increase lymphedema risk. A study of 444 women having breast reconstruction after axillary surgery showed low lymphedema rates [15]. In patients who developed lymphedema following mastectomy, a study of 712 patients by Lee *et al.* showed subsequent reconstruction may reduce the frequency of lymphedema (18.5 vs 9.4% incidence pre- and post-reconstruction) [16].

Does reduction in weight improve lymphedema?

Obesity and elevated body weight have been consistently shown to influence arm swelling risk. While weight loss is advised for maintaining a healthy active lifestyle, it is unclear if weight loss improves lymphedema symptoms

or if it merely reduces arm fat content and so reduces arm volume [17]. Obesity is known to impair lymphatic drainage, and impaired drainage leads to deposition of local adipose tissue, although the exact mechanisms are not fully understood.

Can patients who have had axillary surgery have an operation on their arm or hand?

Little high-quality data exist, with most available data being from retrospective studies limited by significant patient recall bias and incomplete information on lymphedema assessment or follow-up. Hershko *et al.* [18] reviewed 27 patients having elective hand surgery after ALND. None developed new lymphedema. Two of four with previous lymphedema had temporary worsening of symptoms but these resolved. A similar study of 15 women undergoing carpal tunnel syndrome surgery after axillary surgery found none developed new arm problems [19]. This evidence does lend some support to previous statements regarding procedures such as venepunctures. Although hand and arm surgery results in larger scars and breaks in skin integrity there is no current evidence it makes lymphedema worse.

Dietary advice

There is a substantial amount of advice regarding dietary changes that have been reported in social media to reduce lymphedema but no evidence exists supporting any particular diet other than the evidence that obesity may aggravate pre-existing lymphedema.

Is limb elevation helpful?

There is no evidence that this is beneficial. Arm elevation has little effect on long-term lymphedema due to the relatively higher oncotic pressure of lymphatic fluid compared with venous fluid.

What advice should we be giving to those undergoing bilateral procedures?

Around 20% of patients diagnosed with breast cancer will require bilateral surgery. This causes significant anxiety for such patients as clearly there is no contralateral arm available for medical procedures. Asdourian *et al.* [20] recently looked at a cohort of 327 patients undergoing bilateral procedures and concluded that blood pressure monitoring, injections and blood tests inferred no increased risk of lymphedema in patients undergoing bilateral procedures. In line with previous studies [6,8], they also concluded there was no increased lymphedema risk with number or duration of flights.

Patients in general overestimate their risk of developing lymphedema with 75% ALND and 50% SLNB patients worrying about lymphedema [9]. Patients need to be counseled that lymphedema is unpredictable, and that if it does develop it can be permanent. Educating patients regarding their risk is critical but it is important not to increase anxiety or give advice that is not evidence-based. In general we conclude that patients having an SLNB need to take no precautions. For patients who have had ALND this review demonstrates that most women do not need to make major changes either.

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