

REVIEW ARTICLE (META-ANALYSIS)

Incidence and Time Path of Lymphedema in Sentinel Node Negative Breast Cancer Patients: A Systematic Review



Nick Gebruers, PhD, PT,^a Hanne Verbelen, PT,^a Tessa De Vrieze, PT,^a Dorith Coeck, PT,^a Wiebren Tjalma, PhD, MD^{b,c}

From the ^aDepartment of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health Sciences, University of Antwerp, Antwerp; ^bMultidisciplinary Breast Clinic, Antwerp University Hospital, Edegem; and ^cDepartment of Medicine, Faculty of Medicine and Health Sciences, University of Antwerp, Antwerp, Belgium.

Abstract

Objective: To systematically assess the incidence/prevalence and time path of lymphedema in patients with sentinel node–negative breast cancer.

Data Sources: A systematic literature search up to November 2013 was performed using 4 different electronic databases: PubMed, Embase, Cochrane Clinical Trials, and Web of Science.

Study Selection: Inclusion criteria were as follows: (1) research studies that included breast cancer patients who were surgically treated using the sentinel lymph node biopsy (SLNB) technique; (2) sentinel node–negative patients; (3) studies that investigated lymphedema as a primary or secondary outcome; (4) data extraction for the incidence or time path of lymphedema was possible; and (5) publication date starting from January 1, 2001. Exclusion criteria were as follows: (1) reviews or case studies; (2) patients who had an SLNB followed by an axillary lymph node dissection (ALND); (3) results of ALND patients and SLNB patients not described separately; and (4) studies not written in English.

Data Extraction: After scoring the methodological quality of the selected studies, the crude data concerning the incidence of lymphedema were extracted. Data concerning the time points and the incidence of lymphedema were also extracted.

Data Synthesis: Twenty-eight articles were included, representing 9588 SLNB-negative patients. The overall incidence of lymphedema in patients with sentinel node–negative breast cancer ranged from 0% to 63.4%. The studies that have assessed lymphedema at predefined time points, instead of a mean follow-up time, demonstrated an incidence range at ≤ 3 , 6, 12, 18, or >18 months postsurgery of 3.2% to 5%, 2% to 10%, 3% to 63.4%, 6.6% to 7%, and 6.9% to 8.2%, respectively.

Conclusions: In SLNB patients, lymphedema is still a problem, mostly occurring 6 to 12 months after surgery. Because of different assessments and criteria, there is a wide range in incidence. Clear definitions of lymphedema are absolutely necessary to tailor therapy.

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Breast cancer is the most common malignancy in women in the Western world. Unfortunately, the incidence is still increasing.¹ At some time during their life, breast cancer will be diagnosed in 1 of every 8 women.² In the past, breast surgery was very extensive; present-day surgical procedures have become more refined. Many women have undergone and still undergo axillary lymph node dissection (ALND), which can cause several arm and shoulder

morbidities including numbness, pain, limitation of arm movement, and lymphedema.³ Over the years, surgical techniques have changed dramatically with the introduction of breast-conserving techniques and sentinel lymph node biopsy (SLNB). SLNB is widely used as a standard assessment procedure in breast cancer patients. The number of patients treated with SLNB is increasing because women with limited sentinel lymph node involvement are no longer treated with ALND.⁴ SLNB can reduce unnecessary axillary clearance; therefore it is expected to substantially decrease arm and shoulder morbidity, including upper limb lymphedema.⁵ In the literature, patients who have had SLNB and

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ALND are often compared, with beneficial results in favor of SLNB.⁶ Despite a strong reduction in morbidity after the SLNB procedure, the complication rate may be underestimated. The occurrence of lymphedema, a condition characterized by fluid accumulation in the interstitial space,⁷ is expected to be minimal with SLNB.⁸ However, a recent systematic review by Verbelen et al⁹ demonstrated that lymphedema might be a morbidity in SLNB-negative patients.

The aim of this systematic review is to provide answers concerning the following questions: (1) What is the incidence/prevalence of lymphedema related to breast cancer surgery in sentinel node-negative patients? and (2) What is the time path of this lymphedema?

Methods

The literature was systematically reviewed, based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, addressing the following research questions mentioned above. Four electronic databases were screened online to identify eligible studies: PubMed (October 14, 2013), Web of Science (October 22, 2013), Embase (October 23, 2013), and Cochrane Clinical Trials (October 29, 2013). In order to retrieve eligible studies, Medical Subject Headings and keywords were combined in a Boolean search strategy to describe the patient population (P: breast cancer), the intervention (I: SLNB), and the outcome (O: lymphedema). We did not define any comparison (C: not applicable) or study design (S: not applicable), and all articles had to be written in Dutch or English. The specific search strategy used for PubMed is shown in detail in appendix 1. An equivalent search strategy was used for the other 3 databases but included a number of modifications regarding the differences in the use of indexing terms (Medical Subject Headings for PubMed and Cochrane, Emtree for Embase).

All references were screened by title and abstract in order to decide whether further reading was necessary (first screening). Three raters (N.G., T.D.V., D.C.) screened the selected full texts, based on predefined inclusion and exclusion criteria (second screening). In case the 3 raters had diverging opinions, consensus was sought during a meeting. The inclusion criteria used during both screenings were as follows: (1) research studies that included breast cancer patients who were surgically treated using the SLNB technique; (2) sentinel node-negative patients; (3) studies that investigated lymphedema as a primary or secondary outcome; and (4) data extraction for incidence or time path of lymphedema was possible. Exclusion criteria were as follows: (1) reviews or case studies; (2) patients who had an SLNB followed by an ALND; (3) results of ALND patients and SLNB patients not described separately; and (4) studies not written in English or Dutch.

Data on patient characteristics, method of assessment, definition of lymphedema, incidence of lymphedema, and time path of lymphedema were independently abstracted by 3 reviewers (N.G., T.D., D.C.). In case of diverging opinions, a consensus meeting was held.

List of abbreviations:

ALND	axillary lymph node dissection
ARM	axillary reverse mapping
RCT	randomized controlled trial
SLNB	sentinel lymph node biopsy

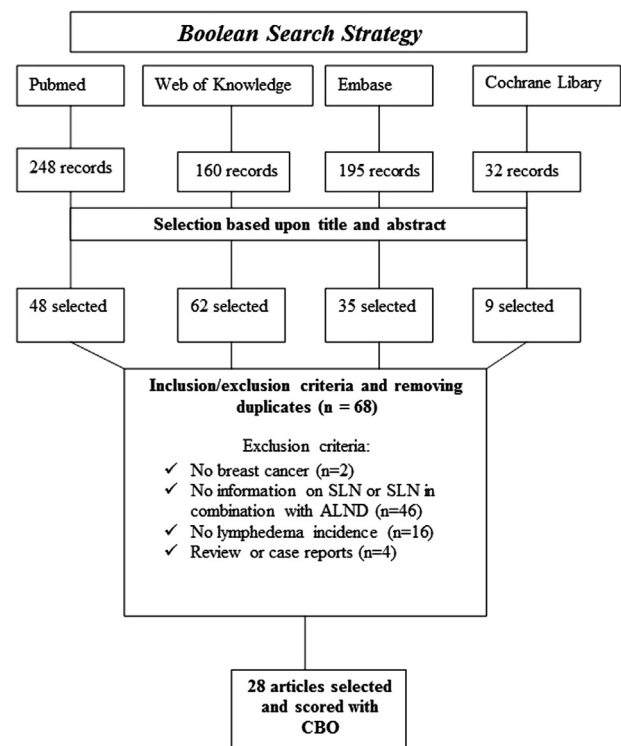


Fig 1 Search strategy flowchart. Abbreviations: CBO, Centraal BegeleidingsORgaan; SLN, sentinel lymph node.

Quality assessment

The methodological quality of the selected articles was assessed using checklists for cohort studies, cross-sectional studies, and randomized controlled trials (RCTs) (<http://dcc.cochrane.org/beoordelingsformulieren-en-andere-downloads>). Three reviewers (N.G., T.D., D.C.) evaluated the selected articles independently. Items could be rated as “1,” “0,” or “?” An item was rated 1 if sufficient information was available and bias was unlikely. An item was rated 0 if sufficient information was available but the article did not meet a specific criterion. An item was rated ? if no information was available. If disagreement persisted about assigning a score to an item, consensus was sought during a meeting. Nine items were scored for RCTs and cohort studies, whereas only 5 items were scored for the cross-sectional studies.

Results

Initially the search yielded 635 citations. After the first screening and removal of duplicates, 96 full-text articles were retrieved. After the final screening based on the full texts, 28 studies^{6,8,10-35} were found eligible and included in this review. The results of this systematic review are based on 21 cohort studies,^{8,14-20,22-30,32-35} 3 RCTs,^{6,12,21} and 4 cross-sectional studies.^{10,11,13,31} Four studies^{16,17,24,25} reported from the same sample of patients; these data were extracted only once. Consequently, the selected studies represent a total of 9588 SLNB-negative patients. The literature search and study selection process are shown in figure 1.

Overall, including all methods of assessment and all definitions used, the incidence/prevalence of lymphedema is very broad, ranging from 0% to 63.4% (table 1). When the included studies were categorized based on the assessment methods, the following

Table 1 Summary of lymphedema incidence/prevalence and time path of selected studies

Author, Year Design (Methodological Score) N (No. of SLNB-Negative Patients)	Lymphedema Assessment Method Definition Used	Incidence of Lymphedema in SLNB	Time Points/Follow-Up
Armer et al, ¹¹ 2004 Cross-sectional (5/9) N = 9	Circumference measurements >2cm of difference between sides	2/9 patients or 22.2%	4–14mo after surgery; median 8.5mo after surgery
Ashikaga et al, ¹² 2010 RCT (6/9) n = 2008	Water displacement <5% difference/5–10% difference/>10% difference	16.7% of 1151 patients have excess volume after 3y of follow-up (patients with >5% difference who had <5% difference at baseline). A ≥10% difference was between 7% and 9% at the different follow-up measurements.	>10% difference at baseline, 6, 12, 18, 24, 30, and 36mo of follow-up are, respectively, 8%, 9%, 8.6%, 6.6%, 8.2%, 6.9%, and 7.5%
Blanchard et al, ¹³ 2003 Cross-sectional (6/9) n = 685	Questionnaire	39/683 patients or 6%	Mean ± SD follow-up: 2.4±0.9y
Celebioglu et al, ¹⁴ 2007 Cohort (6/9) n = 30	Water displacement >10% difference between arms	0/30 patients or 0%	Follow-up: baseline, 1, 2, and 3y
Goldberg et al, 2010, ¹⁷ 2011 ¹⁶ Cohort (6/9) n = 600	Circumference measurements Difference of >2cm: presence of edema Difference of >5cm: severe edema Interview	5% (31/600) had edema of which 3/600 had severe edema 3% (18/600) reported edema	Median follow-up: 5y (2.7–8y)
Golshan et al, ⁸ 2003 Cohort (3/9) n = 77	Circumference measurements Difference of >3cm between arms	2/77 or 2.6%	Minimum 1y postoperative
Haid et al, ¹⁸ 2002 Cohort (5/9) n = 57	Circumference measurements Difference of >2cm between arms	2/57 or 3.5%	Mean follow-up: 25mo (range, 14–60mo)
Langer et al, ¹⁹ 2007 Cohort (7/9) n = 449	Circumference measurements Difference of >2cm between arms	15/431 or 3.5%	Mean follow-up: 31.0mo (range, 11–62mo)
Leidenius et al, ²⁰ 2005 Cohort (4/9) n = 92	Circumference measurements Difference of >2cm between arms	1/92 or 1%	3y postoperative
Lucci et al, ²¹ 2007 RCT (6/9) n = 446	Circumference measurements Difference of >2cm between arms	Range: 5.5%–7.7%	Subjective assessment 6mo: 19/339 or 5.6% 12mo: 16/268 or 6% >12mo: 14/253 or 5.5% Objective assessment 30d: 17/272 or 6.3% 6mo: 21/271 or 7.7% 12mo: 14/226 or 6.2%

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Table 1 (continued)

Author, Year Design (Methodological Score) N (No. of SLNB-Negative Patients)	Lymphedema Assessment Method Definition Used	Incidence of Lymphedema in SLNB	Time Points/Follow-Up
Lumachi et al, ²² 2009 Cohort (5/9) n = 54	Circumference measurements Difference of >2cm between arms	2/54 or 3.7%	Median follow-up: 22mo (range, 18–28mo)
Husted Madsen et al, ³⁵ 2008 Cohort (6/9) n = 164	Water displacement Questionnaire	Range 7%–10% (questionnaire)	6mo: 10% (questionnaire) 18mo: 7% (questionnaire)
Mansel et al, ⁶ 2006 RCT (8/9) n = 478	Circumference measurements Self-assessment	3.2%–5% (self-assessment)	1mo: 3.2% 3mo: 5% 6mo: 4.5% 12mo: 5%
McLaughlin et al, ^{24,25} 2008 Cohort (6/9) n = 600	Circumference measurements Difference of >2cm: presence of edema Difference of >5cm: severe edema Interview	5% (31/600) had edema of which 3/600 had severe edema. 3% (18/600) reported edema.	Median follow-up: 5y (range, 2.7–8y)
McLaughlin et al, ²³ 2013 Cohort (5/9) n = 67	Circumference measurements 10% or more increase in volume Questionnaire Interview	2%–3% 5%–6% 6%–11%	6mo 2% (1/67) had measured edema. 5% (3/67) had edema based on the questionnaire. 11% had perceived edema based on the interview. 12mo 3% (2/67) had measured edema. 6% (4/67) had edema based on the questionnaire. 6% had perceived edema based on the interview.
Ozcinar et al, ²⁶ 2012 Cohort (8/9) n = 80	Circumference measurement >2cm of difference between arms	1.9%–8%	Midterm (9–12mo postoperative): 8% Late-term (>12–64mo postoperative): 1.9%
Paim et al, ¹⁰ 2008 Cross-sectional (3/5) n = 48	Circumference measurement >1cm of difference between arms	4.2% (2/48)	Mean: 23mo postoperative (range, 6–60mo)
Rönkä et al, ²⁷ 2005 Cohort (7/9) n = 43	Circumference measurement Increase in limb volume of \geq 5% Self-reported lymphedema (visual analog scale score)	12% (5/43) Mild: 9% Moderate: 3.5%	1y after surgery

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Table 1 (continued)

Author, Year Design (Methodological Score) N (No. of SLNB-Negative Patients)	Lymphedema Assessment Method Definition Used	Incidence of Lymphedema in SLNB	Time Points/Follow-Up
Roumen et al, ²⁸ 2001 Cohort (4/9) n = 90	Questionnaire	0%	Median: 24mo (range, 16–40mo)
Schijven et al, ²⁹ 2003 Cohort (6/9) n = 180	Questionnaire	1.1%	<1–3y postoperative
Schulze et al, ³⁰ 2006 Cohort (7/9) n = 31	Circumference measurement for the arm in combination with a water displacement for the volume of the hand >10% difference Questionnaire	15.8% (3/19) 10.5% (2/19)	Both incidence percentages are presented for long-term morbidities (>20mo postoperative; mean 49mo for SLNB)
Velloso et al, ³¹ 2011 Cross-sectional (3/5) n = 45	Circumference measurements ≥10% increase in volume	4.4%(2/45)	Mean: 21.3mo (range, 10–42mo)
Wernicke et al, ³² 2013 Cohort (7/9) n = 111	Circumference measurement >1cm of difference between arms Self-assessment by patients	5.4% (6/111) 9.1% (10/111)	Mean: 9.4y after surgery (range, 8.3–15.3y)
Wilke et al, ³³ 2006 Cohort (6/9) n = 4069	Circumference measurement >2cm increase in comparison with baseline measurement	0%–7%	0% at 30d of follow-up (n = 4069) 7% at 6mo of follow-up (n = 2904)
Yen et al, ³⁴ 2009 Cohort (6/9) n = 319	Self-assessment by telephone survey	7%	Median: 48mo postsurgery
Francis et al, ¹⁵ 2006 Cohort (6/9) n = 41	Circumference measurements >5% difference in comparison with preoperative volume	63.4% (26/41)	1y postsurgery >5% difference (17/41 or 41%) ≥10% difference (9/41 or 22%)

Table 2 Overview of incidence ranges at predefined time points with regard to diagnostic definition used

Definition Used	≤3mo FU	6mo FU	12mo FU	≥18mo FU	References Used*
Water displacement ≥5% difference		22.4	12–21.6	19.6	12, 27
Water displacement ≥10% difference		2–9	0–8.6	0–8.2	12, 14, 23, 27
Circumference measurement ≥2cm difference	0–6	7–8	6–8	1	20, 21, 26, 33
Questionnaires/subjective assessments		5–10	2–6	6–7	21, 23, 35

NOTE. Values are percentages or as otherwise indicated.

Abbreviation: FU, follow-up.

* Only the studies that provided data on predefined time points were used to create this table. Studies with a mean or median follow-up were omitted because of the potential bias that is created by mixing different follow-up times.

incidences were demonstrated. For the studies^{8,10,11,15-27,30-33} that used a circumference measurement, the incidence varied between 1% and 63.4% (see [table 1](#)). When a water displacement method was used, the incidence varied from 0% to 15.8% (see [table 1](#)).^{12,14,30} Water displacement and circumference measures are both objective assessments, whereas questionnaires and interviews are subjective tools. When looking at the studies^{6,13,17,23,25,28-30,32,34,35} that used these subjective tools, the incidence varied from 0% to 11% (see [table 1](#)).

In the above described results, no distinction was made based on the different follow-up times or measuring intervals. Therefore, the incidence at specific time points was then looked at (see [table 1](#)). These results were extracted from the studies that specifically reported the incidence at predefined time points. Most commonly, lymphedema assessment was done at 3, 6, 12, 18, or >18 months postsurgery. The longest follow-up time was 9.4 years in the study by Wernicke et al.³² The studies^{6,12,15,21,23,33,35} that assessed lymphedema at predefined time points, instead of a mean follow-up time, demonstrated an incidence range at ≤3, 6, 12, 18, or >18 months postsurgery of 3.2% to 5%, 2% to 10%, 3% to 63.4%, 6.6% to 7%, and 6.9% to 8.2%, respectively.

Combining the information about the diagnostic criteria and the defined time points, an informative overview can be presented ([table 2](#)). [Table 2](#) clearly shows that the incidence changes depend on the chosen definition, and that lymphedema is most common between 6 and 12 months of follow-up. Also, the long-term incidence is not negligible. Incidences are within narrow ranges when compared with the range presented by all studies (see [table 1](#)).

Discussion

The results of our systematic review clearly demonstrate that lymphedema is a nonnegligible complication in patients with SLNB-negative breast cancer. The overall range of the lymphedema incidence (0%–63.4%) is very broad. Two studies^{11,15} are mainly responsible for this broad range. Both studies have clear limitations, and their results should be appraised critically with regard to the incidences found. Armer et al¹¹ reported on a very low number (n=9) of SLNB patients, of whom 2 (22%) received a diagnosis of edema. Francis et al¹⁵ used a very liberal definition, namely, a 5% volume difference between preoperative and postoperative arm volumes. Additionally, weight alterations were only corrected when the patients' weight changed by ≥10lb. Therefore, this approach is totally different and not comparable to the other studies. If both studies^{11,15} were discarded from the results, the incidence range would be 0% to 15.8%. The aforementioned incidence rate is less than that of lymphedema after ALND, which has a reported range of 13.5% to 28.2%.³⁶ Therefore, the answer

to our first research question is that the incidence of lymphedema is lower with SLNB than ALND. However, clinicians and therapists should still be aware of the possibility of lymphedema formation in patients who have had SLNB. Usually, the lymphedema in SLNB-negative patients is mild; however, if untreated, this lymphedema will become more severe. The results of our review reveal that severe lymphedema (≥10% difference or >5cm difference) is encountered significantly less in patients who have had SLNB than in those who have had ALND. However, severe lymphedema was diagnosed in 0.2% to 9% of the SLNB patients with lymphedema.^{6,12,13,15-17,20,24,27,30}

Several limitations among the selected studies need to be discussed. Not surprisingly, a wide variation of assessments and accompanying measuring protocols were used by the different research groups. Four studies^{13,28,29,34} relied totally on subjective assessments such as a questionnaire or an interview (incidence of lymphedema, 0%–7%). Since lymphedema is a complex morbidity, it is doubtful that a patient is able to correctly answer questions regarding the presence or absence of lymphedema. Therefore, objective assessment methods such as the water displacement or circumference measures are recommended. However, we also found that the objective assessments used in the selected studies had a number of limitations. In the case of the circumference measurements and water displacement method, widely varied definitions are used (eg, >1cm difference, 2cm difference, >2cm difference, 5% difference, >10% difference). Clearly, when a higher difference is required to diagnose edema, the incidence will decrease. On the contrary, a limited difference in circumference (eg, >1 or 2cm difference) can also be found in healthy subjects. The latter is very well demonstrated in 2 studies^{37,38} that compared the incidence based on common lymphedema definitions. In the same sample of breast cancer patients, the incidences varied between 21% and 70%³⁷ or 41% and 94%,³⁸ based on the chosen definition to diagnose lymphedema. It is essential that international consensus among clinicians/therapists is established concerning the definition of lymphedema. In 2007, we proposed using prediction formulas based on water displacement to diagnose edema/lymphedema.³⁹ Another apparent limitation is that none of the selected studies have mentioned taking into account the patient's arm dominance when defining the lymphedema volume. For unilateral edema, most researchers use the contralateral limb for comparison, stating that both limbs have the same volume. Unfortunately, both arms are not identical. The dominant arm of a healthy person has been shown to be 3.3%±3% (mean ± SD) larger than the nondominant arm.³⁹⁻⁴² Based on these findings, prediction formulas for the upper limbs were developed to account for dominance in unilateral edema.³⁹ We suggest taking into account

these volume differences when assessing the edema volume in patients. Since none of the studies corrected for dominance, it is plausible that the incidence rates of lymphedema presented in this review might still be underestimated.

Concerning the second research question regarding the time path of lymphedema after SLNB, diverging results were found (see table 1). Again, if we omit the studies of Armer¹¹ and Francis¹⁵ and colleagues, a more focused result can be displayed and discussed. Until 3 months postsurgery, the incidence of lymphedema after SLNB is relatively low (range, 3.2%–5%).⁶ At 6 months postsurgery, the incidence increases (range, 2%–10%).^{6,21,23} The most common follow-up period to assess lymphedema in SLNB was 12 months postsurgery, with reported incidences of between 3% and 12%.^{6,21,23,27} Follow-up periods of ≥ 18 months resulted in incidences between 6.9% and 8.2%. A follow-up of ≥ 5 years was only seen in 5 studies,^{16,17,24,25,32} of which 4^{16,17,24,25} reported from the same cohort. The long-term (≥ 5 y) incidence was 5% to 5.4%.^{17,32}

Clinicians and therapists need to be aware that lymphedema remains a complication to consider when assessing patients who have had SLNB. As demonstrated by the different studies, 6 to 12 months after surgery is a critical follow-up period for assessing the presence of lymphedema in these patients.

Overall, we have found that the incidence of lymphedema in patients who have had SLNB is less than that in patients who have undergone ALND. This can be well explained by the less invasive surgery that needs to be performed. Nevertheless, lymphedema does occur in SLNB-negative patients. Therefore, new techniques are tested and implemented by surgeons to further reduce the risk of breast cancer—related lymphedema—for instance, the use of axillary reverse mapping (ARM), a technique first described in 2007.⁴³ ARM provides a way to visualize the lymphatic routing of the arm, breast, and axilla. This way, surgeons are able to preserve as much of the normal lymph pathways as possible. The evidence on ARM is not yet conclusive⁴³; however, in SLNB patients the results are very promising.^{44–47} We have found no evidence that ARM was used in any of the studies presented in the current literature review. However, ARM studies have also demonstrated that about 20% of the SLNB patients have a lymphatic route from the upper limb that passes the same (sentinel) nodes. Sakurai et al⁴⁵ have demonstrated that only these patients were at risk of developing lymphedema. Additionally, they demonstrated that 5 (6.6%) of 76 patients who had a lymphatic route from the upper limb involving the sentinel lymph node developed lymphedema. By contrast, none of the patients with an alternative route from the upper limb had lymphedema. This evidence demonstrates that in some patients it is almost inevitable to prevent lymphedema after surgery.

The current systematic review reveals that lymphedema after breast cancer therapy remains a complication even in patients with SLNB-negative breast cancer. Lymphedema after breast cancer is a complication that needs lifelong attention.⁴⁸ It is essential to treat the lymphedema, not only to improve the quality of life,^{49,50} but also to prevent the worsening and additional complications related to lymphedema.^{50,51} Physicians and therapists need to be aware that lymphedema is a possible complication in patients with SLNB-negative breast cancer. The real problem exposed by the current review is the lack of a uniform diagnostic definition of lymphedema. We have found subjective as well as objective assessments. The incidence rates found by both types of assessments differ within a same sample of patients; this can be explained by the fact that some patients will have complaints related to

lymphedema without having objective volume differences. Vice versa, some patients will demonstrate significant volume differences without complaining about the lymphedema. Therefore, the authors suggest combining an objective assessment with a subjective assessment. We suggest the water displacement method with correction for hand dominance as the objective assessment.³⁹ The subjective assessment should be a questionnaire that relates to the limitations based on the *International Classification of Functioning, Disability and Health* criteria—for instance, the Lymphedema Functioning, Disability and Health Questionnaire⁵²; none of the selected studies have used such an approach. Patients with a volume difference between 5% and 10% and limited complaints on the questionnaire are instructed in self-management of their lymphedema, whereas patients with severe complaints or a severe volume increase receive full treatment based on compression, manual drainage, and exercise.⁵³ Not only therapists but also the patients should be attentive to all possible complications, including lymphedema, that could arise after breast cancer treatment, enhancing the early detection of these complications.⁹ Therefore, providing sufficient information, not only about lymphedema but all possible complications^{9,54} after breast cancer treatment, is essential.

Study limitations

Very few RCTs could be included in the current review; because of the randomization process, the results concerning the SLNB-negative patients were not depicted separately. Because the assessments and definitions used for lymphedema varied greatly, it is difficult to reach a general conclusion concerning the incidence of lymphedema. We do suggest an alternative diagnostic approach.

Conclusions

In patients who have had SLNB, lymphedema is still a problem, usually occurring 6 to 12 months after surgery. Because different assessments and criteria have been used for lymphedema, there is a wide range of reported incidence rates. Clear definitions of lymphedema are absolutely necessary to tailor therapy.

Keywords

Breast neoplasms; Lymphedema; Rehabilitation; Review; Sentinel lymph node biopsy

Corresponding author

Nick Gebruers, PhD, PT, Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium. *E-mail address:* nick.gebruers@uantwerpen.be.

Appendix 1 Boolean Search Strategy Performed in PubMed

("Lymphedema"[MeSH] OR "Lymphedema"[All Fields] OR "lymphoedema" [All Fields]) AND ("Breast Neoplasms"[MeSH] OR "Breast Neoplasms"[All Fields] OR "breast cancer" [All Fields]) AND ("Sentinel Lymph Node Biopsy"[MeSH] OR "Sentinel Lymph Node Biopsy"[All Fields] OR "Sentinel"[All Fields] OR "Sentinel lymph node" [All Fields] OR "Sentinel

lymph node dissection” [All Fields] OR “ lymph node excision” [MeSH] OR “ lymph node excision”[All Fields]) NOT review NOT case report.

Abbreviation: MeSH, Medical Subject Heading.

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