Ginekol Pol. 2013, 84, 696-699

Total number of lymph nodes and number of metastatic lymph nodes harvested during radical mastectomy did not influence early postoperative drainage volume

Całkowita liczba węzłów chłonnych oraz węzłów przerzutowych usuniętych podczas radykalnej mastektomii nie wpłynęła na objętość wczesnego drenażu pooperacyjnego

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Abstract

Objectives: *We aimed at evaluation of the influence of the extent of axillary lymph node dissection, measured by the total number of lymph nodes harvested, on the drainage volume. We also looked at the lymph node positivity (N+) and the number of metastatic axillary lymph nodes as a potential prognostic factors in this regard.*

Material and methods: *We have analysed the data of 63 patients (F/M: 62/1) with breast cancer, who underwent radical modified mastectomy in 2008-2009 in the single department of surgical oncology.*

Results: *We observed no significant correlation between the 1) total number of axillary lymph nodes harvested during lymphadenectomy, 2) presence of metastatic lymph nodes (node positive disease), 3) number of metastatic axillary lymph nodes and: drainage volume on the day of surgery, drainage volume on three consecutive postoperative days and drainage volume from the day of surgery to drain removal.*

Conclusion: *The extent of axillary lymph node dissection, measured by the total number of lymph nodes excised, did not influence drainage volume after radical modified mastectomy. Neither total number of metastatic lymph nodes excised nor the node positivity (N+) were associated with increased drainage volume after mastectomy with axillary dissection.*

Key words: **breast cancer** / **axillary drainage** / **axillary lymphadenectomy** / / **mastectomy** / **metastatic lymph nodes** /

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Otrzymano: **29.03.2013**
Zaakceptowano do druku: **10.06.2013**

Streszczenie

Cel pracy: *Celem pracy była ocena zależności pomiędzy całkowitą liczbą węzłów chłonnych wyciętych podczas limfadenektomii pachowej (jako składowej radykalnej mastektomii) a objętością drenażu pooperacyjnego. Oceniono także zależność pomiędzy obecnością przerzutów w węzłach chłonnych (cechą N+) oraz liczbą przerzutowych węzłów chłonnych jako potencjalnymi czynnikami wpływającymi na objętość drenażu.*

Materiał i metody: *Przeanalizowano dane 63 chorych na raka piersi (K/M: 62/1), których w latach 2008-2009 poddano radykalnej zmodyfikowanej mastektomii. Wszystkich chorych operowano w jednym ośrodku.*

Wyniki: *Nie zaobserwowano znamiennej zależności pomiędzy 1) całkowitą liczbą węzłów chłonnych usuniętych podczas limfadenektomii, 2) obecnością przerzutowych węzłów chłonnych (N+), 3) liczbą przerzutowych węzłów chłonnych a objętością drenażu: w dobie operacji, łącznie w trzech pierwszych dobach po operacji i łącznie do chwili usunięcia drenu.*

Wnioski: *Zakres usunięcia węzłów chłonnych podczas radykalnej mastektomii, wyrażony poprzez całkowitą liczbę wyciętych węzłów chłonnych, nie wpływał znamiennie na objętość drenażu pooperacyjnego. Nie wykazano także zależności pomiędzy całkowitą liczbą przerzutowych węzłów chłonnych lub obecnością przerzutów w węzłach chłonnych (N+), a zwiększoną objętością pooperacyjnego drenażu.*

Słowa kluczowe: **rak piersi** / **drenaż pooperacyjny** / **limfadenktomia pachowa** / / **mastektomia** / **przerzutowe węzły chłonne** /

Introduction

Drains are routinely placed in the axilla after axillary clearance during radical modified mastectomy to close dead space, allow early diagnosis of postoperative bleeding and prevent seroma formation [1]. Despite promising attempts to use other techniques, like axillary padding [2], there is no universally accepted alternative to postmastectomy axillary drainage [3]. Unfortunately drains interfere with daily physical activity and cause important psychological burden in patients who otherwise already on their first postoperative day are fully mobilized and could be discharged home. Excessive drainage volume is the key factor limiting the ability to remove the drain and could potentially increase the risk of seroma formation [1, 3, 4]. There are several factors influencing drainage volume, including obesity [5] and high BMI [6], however direct impact of the extent of axillary dissection on the postoperative drainage volume was not reported in the available literature.

Objectives

We aimed at evaluation of the influence of the extent of axillary lymph node dissection, measured by the total number of lymph nodes excised, on the drainage volume. We also looked at the lymph node positivity and the number of metastatic axillary lymph nodes as a potential prognostic factors in this regard.

Materials and methods

Study population

We have analysed the data of 63 patients (F/M: 62/1) with breast cancer, who underwent radical modified mastectomy in 2008-2009 in the single department of surgical oncology. All patients were operated on by staff surgeons, who followed the same surgical technique in the reference to the mastectomy and axillary lymph node dissection. In all patients single vacuum-assisted Redon type drainage (UnoVac, UnoMedical, Denmark) was inserted through separate skin incision and located in the axillary space, with the drain's tip directed to the apex of the axilla. Decision to remove drain was at the discretion of attending staff surgeon on the basis of declining daily drainage volume (no specific volume threshold was applied) and clinical appearance of the wound. Table 1. presents clinical and demographic characteristics of the studied population.

Statistical analysis

Drainage volume's dependence on quantitative variables was assessed using appropriate coefficient of correlation. If both variables appeared to be normal (Shapiro-Wilk test was applied as a normality checking procedure), Pearson coefficient of correlation was used, otherwise Spearman rank correlation was applied. Drainage volume's dependence on qualitative variable (i.e. for node positivity) was assessed using appropriate significance test. If both drain volume appeared to be normal in both node positive and node negative groups (Shapiro-Wilk test was applied as normality checking procedure), t-Student test was used, otherwise Mann-Whitney test (also called Wilcoxon test for two independent samples) was applied. Multinomial analysis was conducted using linear regression framework.

Results

Mean total number of lymph nodes harvested was 17 [6–29]. We observed no significant correlation between total number of axillary lymph nodes harvested during lymphadenectomy and drainage volume on the day of surgery ($p = 0.416$). Total number of excised lymph nodes had neither influence on the total drainage volume on three consecutive postoperative days ($p = 0.511$) nor on the total drainage volume from the day of surgery to drain removal ($p = 0.703$).

Table I. Clinical and demographic characteristic of the study population.

Clinical parameters	Mean (range)
Age at operation	61 years (36–83)
Diabetes	8 patients (12.7%)
Neoadiuvant chemotherapy	10 patients (15.9%)
Tumor size	2.8 cm (0.7–7.0)
Total number of lymph nodes harvested	17 (6–29)
Total number of metastatic lymph nodes harvested	2.7 (0–18)
Number of node positive cases (%)	36 patients (57.14%)
Drainage volume:	
day of operation	154 ml (30–400)
1st postoperative day	188 ml (10–350)
2nd postoperative day	195 ml (20–470)
3rd postoperative day	170 ml (0–400)
4th postoperative day	167 ml (35–400)
5th postoperative day	145 ml (0-290)
6th postoperative day	154 ml (100–280)
7th postoperative day	148 ml (50–250)
8th postoperative day	85 ml (50–120)

The number of node positive cases was 36 (57% of patients). We looked at the potential correlation between the presence of metastatic lymph nodes (node positive disease) and: drainage volume on the day of surgery (p = 0.727), total drainage volume on three consecutive postoperative days (p = 0.535) and total drainage volume from the day of surgery to drain removal (p = 0.582). No significant correlations were noted.

Mean number of metastatic lymph nodes harvested was 2.7 [0–18]. We observed no significant influence of the number of metastatic axillary lymph nodes on the drainage volume on the day of surgery (p = 0.665), total drainage volume on three consecutive postoperative days (p = 0.884) and total drainage volume from the day of surgery to drain removal (p = 0.582).

On the multinomial analyses neither total number of lymph nodes excised, total number of metastatic lymph nodes nor node positive disease were influencing drainage volume on the day of surgery, total drainage volume on three consecutive postoperative days and total drainage volume from surgery to drain removal.

Discussion

Timing of drain removal and factors influencing drainage volume after radical mastectomy are widely debated since many years. So far no consensus is set and different hospital policies are applied, according to the local health care systems [7]. Recent systematic review by Kelley et al. failed to show optimal timing of drain removal following axillary dissection, mainly due to heterogeneity of available studies. Despite reports showing effective alternative to the axillary drainage, like axillary padding , one or two drains left in the wound remain standard of care [2]. The recent study by Taylor et al. suggested that "no drains" policy can result in earlier hospital discharge and similar risk of seroma formation [8]. Most surgeons are however still reluctant not to place drains after axillary clearance. At the same time it is accepted that drains interfere with the physical activity of patients and cause important psychological burden in patients who are otherwise fully mobilized and could be discharged home. In some hospitals patients are discharge home with drains, this approach however depends on local health care environment and is not always possible due to social and cultural factors. After all, physiological burden associated with the drain kept *in situ* stays irrelevant to the patient's location (in hospital or at home).

Different factors are attributed to greater postoperative drainage volume seen after axillary clearance: high body mass index (BMI) , body mass, greater breast volume, longer operation time, higher American Society of Anaesthesiologists (ASA) score, arterial hypertension [5, 6, 9, 10]. In the analysis presented in the article we did not took these factors into consideration, because they were already reported by us and other authors [5, 6, 9, 10]. Instead we evaluated the impact of the extent of axillary dissection, presence of positive lymph node disease and number of metastatic lymph nodes on the drainage volume. To our knowledge there are no studies directly correlating the extent of the axillary clearance objectively measured by the total number of lymph nodes excised and postoperative drainage volume. There is related study by Christodoulakis and co-workers, who showed that the total number of harvested lymph nodes >10 was associated greater drainage volume [11]. Their observation has however little clinical consequences, as currently axillary lymph node dissection should result in at least 6 harvested lymph nodes in the pathology report, and for detailed nodal staging in node positive cases at least 10 nodes should be evaluated [12]. Contrary to our expectations, we did not see correlation between the total number of axillary lymph nodes excised and the drainage volume, although the range of harvested lymph nodes in our group was fairly wide (from 6 to 29).

The total number of axillary node metastases was not associated with greater drainage volume in our group. The same observation was confirmed by Christodoulakis et al. – they also found no correlation between number of metastatic lymph nodes harvested and drainage volume [11]. Purushotham et al. observed inversed correlation between arm lymphedema rate in mastectomized patients and node positive disease. The authors postulated that presence metastatic lymph nodes *in vivo* enhances development of collateral lymphatic vessels bypassing the axilla [13]. This phenomenon could explain no increase in the drainage volume in the node positive patients seen in our series, as collateral lymphatic vessels omitting axillary nodes are patent in these patients.

Conclusions

The extent of axillary lymph node dissection, as measured by the total number of lymph nodes excised, did not influence drainage volume after radical modified mastectomy. Neither total number of metastatic lymph nodes excised nor the node positivity (N+) were associated with increased drainage volume after mastectomy with axillary dissection.

Conflict of interest: none declared.
Funding sources and/or financial interests: none declared.

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