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The utility of pectoral drain in patients undergoing modified radical mastectomy-an observational study

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ABSTRACT

Background: Breast cancer is one of the most common malignancies in female and in developing countries majority of them present in locally advanced stages. Modified radical mastectomy (MRM) is the main surgical management & axillary drain is deployed to tackle the leaking axillary lymphatics. However, if at all the pectoral area between the skin flaps and pectoral muscles requires drainage can be contested since the skin flaps are snugly approximated to the chest wall obliterating any potential space. The study is conducted to evaluate the output of pectoral drain & axillary drain in patients of MRM.

Methods: This is a prospective study of 120 consecutive patients over a 2-years period who presented with breast cancer and undergone MRM in a teaching hospital. Two separate drains equal in all parameters were inserted in axilla and pectoral area and the collection in these drains studied post operatively.

Results: The contribution of pectoral drain to total drain output was only 7.97%, while the axillary drain contribution was 92.03% in total drain output. So, the contribution from the pectoral drain was statistically insignificant (p=<0.001).

Conclusions: MRM can be performed without drainage at the pectoral area.

Keywords: Axillary, MRM, Pectoral, Seroma, Suction drain

INTRODUCTION

Drains in surgical practice have always been a controversial point with its proponent citing its diagnostic and prophylactic advantages while its opponents vehemently highlight it as of being significant portal of morbidity in terms of infection, increased hospital stay etc.

However, modified radical mastectomy (MRM) is one surgery where the utility of drainage has been accepted by most authorities to be offering prophylaxis against seroma formation, flap necrosis and infection. A review of the literature pertaining to the use of drain in MRM reveals that while surgeons appreciate the utility of draining, they also acknowledge the fact that drain is one

of the important factors contributing to increased postoperative stay in the hospital. Therefore workers have suggested ways to decrease the duration of drainage by promoting early closure of open lymphatic channels by various means such as fibrin glue, ligation of lymphatic trunks, decreasing the suction pressure deployed and ultrasonic dissection. 2-6

The traditional convention employs two drain tubes, one put over the chest wall and the other in the axilla and both these drain tubes are connected to a single self-expanding plastic reservoir bottle. The self-expanding property of the compressed plastic bag provides the suction effect at the area being drained. The negative pressure thus created causes cooptation of the surrounded tissue thereby obliterating the potential dead space and early closure of

leaking lymphatic capillaries.⁷ The effect of suction and other adjunctive measures to decrease lymph leak has been evaluated by daily collection in the suction bottle and duration in which drain output decreases to less than 30ml/day when it can be safely removed8.

It may be interesting to note that it has perhaps never been attempted to document the relative contribution of pectoral and axillary drains to the total drain output. Although there have been attempts to decrease the total drain output by fixation of skin flaps to pectoralis major, it has never been objectively studied the relative contribution of pectoral and axillary drain to the total drain output. It stems from common logic that drains are placed in potential spaces where there is a possibility of collection. It is well known that the skin flaps in modified radical mastectomy are closed under a fair amount of tension and thus they are snugly approximated to the chest wall obliterating any scope of potential space.

Hypothesis

The flaps of MRM are approximated under a fair amount of tension and are closely applied to the chest wall, thereby obliterating any potential space for collection. Since there is no potential space between the flaps and chest wall there would be no or insignificant collection beneath the flaps, thus putting a serious question over the utility of pectoral drain. It is hypothesized that the contribution of the pectoral drain to the total drain output is insignificant and thus it may be omitted. With this background in mind we conducted an observational study in which the axillary and pectoral drain tubes equal in all other parameters were connected to separate suction bottles to document the contribution of each to the total drain output.

METHODS

A total of 120 patients who underwent modified radical mastectomy (Scanlon technique) over a 2-year period from July 2014 to June 2016 in a teaching hospital were enrolled into this observational study. All patients had received 3 to 6 cycles of neoadjuvant chemotherapy. MRM (Scanlon technique) with level III axillary clearance was performed in all cases. The minimum margin of the flap from palpable tumor was 2cm while attempting to maximize it to the extent that primary closure of the defect would be possible under mild tension. Large T3 and T4 tumors requiring LD myocutaneous flap closure of the defect were excluded from the study. Two perforated drain tubes 16Fr in diameter (Romsons TM Romovac Suction Drain) were employed one in axillary space (over subscapularis muscle) and the other was put over pectoralis major muscle upto clavicle. Both the drain tubes were connected to two separate suction bottles and identical suction pressure was deployed. The daily drain volumes in both the suction bottles and their duration to removal were recorded separately.

RESULTS

Drain outputs

The total mean collection in the axillary drain was 337 ml ranging from 250 ml to 400 ml as shown in Table 1. The total mean collection in the pectoral drain was 29 ml as shown in Table 2.

Table 1: Total axillary drain output till its removal.

Total axillary drain collection	No. of patients (n=120)	Percentage
250-300ml	28	23.33%
300-350ml	28	23.33%
350-400ml	40	33.33%
400-500ml	24	20%

Table 2: Total pectoral drain output till its removal.

Total pectoral drain collection	No. of patients (n=120)	Percentage
20-25ml	16	13.33%
25-30ml	56	46.66%
30-35ml	40	33.33%
35-40ml	8	6.66%

Relative contribution of axillary and pectoral drains to total drain output

Table 3 and 4 compare the relative contribution of axillary and pectoral drains to the total drain output respectively.

Table 3: Relative contribution of axillary drain to total drain output.

Average	Average total	Contribution of
axillary	(axillary +pectoral)	axillary drain to
drain	combined drain	the total drain
output	output	output
336.67 ml	365.83 ml	92.03%

Table 4: Relative contribution of pectoral drain to total drain output.

Average	Average total	Contribution
pectoral	(axillary +pectoral)	of pectoral
drain	combined drain	drain to the
output	output	drain output
29.16 ml	365.83 ml	7.97%

Applying the unpaired t test to compare the axillary with the total drain output yields a p value < 0.6800 (Table 5), which shows insignificant difference between the two-drain output. In contrast when the same test is applied to compare the pectoral drain collection with the total drain output yields a p value < 0.0001 (Table 6). It is obvious

that contribution of pectoral drain to the total drain output is insignificant.

Table 5: Unpaired t-test analysis of axillary drain contribution to the total drain output showing insignificant difference.

Type of drain	Total output (mean ±SD)	Unpaired t test
Axillary	336.67±48.58 ml	T=0.4146
Both (axillary+pectoral)	365.47±49.66 ml	p value =0.6800

Table 6: Unpaired t test analysis of pectoral drain contribution to the total drain output demonstrates the highly significant difference between their outputs.

Type of drain	Total output (mean±SD)	Unpaired t- test
Pectoral	28.8±3.77 ml	T=6.7600
Both	365.47±49.66	P value
(axillary+pectoral)	ml	< 0.0001

DISCUSSION

Tradition has taught that whenever surgeon expects a postoperative complication like bleeding, seroma it would be wise to insert a drain prophylactically to enable an early diagnosis as well as drains serving a therapeutic function too. With the drain being associated with wisdom, surgeons in the 19th and early 20th century extensively used drains perhaps also to avoid criticism for any post-operative complication. However, with the birth and evolution of evidence based medicine in the 20th century and the tenets of drain tube being put to question, at many places the drains were not found to be offering any significant prophylactic diagnostic or therapeutic advantages. Terrel G et al conducted a RCT on 84 patients undergoing MRM and demonstrated noninferiority of deploying only a single drain tube draining the axillary space over two drains, one in axilla and another beneath the pectoral flap in terms of hematoma and seroma formation and overall complications (35% in single drain group versus 31.9% in two drain group). Instead the data did suggest a trend toward an increased incidence of flap necrosis in whom a pectoral drain was put. The study concluded that using only a single axillary drain in MRM did not increase complications, was less costly and may help in reducing flap necrosis.9

The results of the current study also clearly show that it is the axillary drain which contributes the most (92%) to the total drain bag collection whereas the pectoral drain contribution stands at a meager 8%. Even the absolute amount of collection in pectoral drain (mean 29 ml range 20-40 ml) is so little it's omission will not have any complication. A careful search of the literature identified a very similar study published in J Med Assoc Thai in 2003 by Puttawibul P.¹⁰

The Thai publication compares well to our study (Table 7, Table 8).

Table 7: Comparing the absolute drain outputs with Puttawibul P et al.

Total drain output(mean value)	Current study (percentage contribution)	Puttawibul P et al (percentage contribution)
Axillary	336.67 ml (92.03%)	231 ml (92.4%)
Pectoral	28.8 ml (7.97%)	19 ml (7.6%)
Total	365.47 ml	250 ml

Table 8: Comparing the axillary drain output with total drain output between the two studies and both demonstrate insignificant difference.

Type of drain	Total output (mean)	
	Current	Puttawibul P
	study	et al
Axillary	336.6 ml	231 ml
Both(axillary+pectoral)	365.4 ml	250 ml
	p=0.680	p =0.796

Both the studies clearly demonstrate the insignificant contribution of the pectoral drain to the total drain output in terms of both relative (to axillary) as well as absolute scale.

CONCLUSION

Modified radical mastectomy can be safely done without drainage at the pectoral (chest wall) area.

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Ethical approval: The study was approved by the

 $institutional\ ethics\ committee$

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