

Methylprednisolone for Prevention of Seroma Formation after Mastectomy

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ABSTRACT

Background: Breast cancer is the most common cause of death in middle aged women. Seroma formation is claimed to be a very common problem after axillary dissection in patients with breast cancer.

Aim: To conduct this study to see if injecting methyl prednisolone can improve the post-operative outcomes of modified radical mastectomy in terms of seroma formation

Methods: This Study design is a randomized control trial, done at Surgical Department, Khyber Teaching Hospital, Peshawar from October 12th 2019 till April 12th 2020. Randomization was done through lottery method. Sample size was 38 in each group. All the data was analyzed in SPSS (version 22). Mean + SD was calculated for continuous variables like age, BMI and volume of seroma. Frequency and percentages were calculated for categorical variables like stage of breast cancer, whether neoadjuvant chemotherapy was received and efficacy. Efficacy in both groups was compared using chi square test keeping p value of <0.05 as significant.

Result: Mean age in Group A was 38±12.72 years whereas in Group B was 40±11.83 years. Efficacy of both the groups was analyzed as Group A (Methyl prednisolone) was effective in 76% patients in preventing seroma formation. Normal Saline injection in Group B was effective in preventing seroma formation in 53% patients. Methylprednisolone being statistically significant in prevention of seroma formation with a p value of 0.03.

Conclusion: Our study concludes that local methyl prednisolone is more effective than normal saline injection in preventing seroma formation after modified radical mastectomy for carcinoma breast.

Clinical Implications: This study will not only add to the national and international literature that is available on the topic but would also help us in modifying in treatment guidelines if proven efficacious in order to improve patient management.

Keywords: Breast Cancer, Methylprednisolone, modified radical mastectomy, seroma, normal saline

INTRODUCTION

Breast cancer is the most common cause of death in middle aged women. In 2004 approximately one and a half million new cases were diagnosed world wide¹ with an increase in breast cancer cases incidence over the past four decades. Breast cancer incidence rate in the recent years has increased to 0.5% annually with a decrease in mortality rate to 1.3% per year from 2011 to 2020.² Incidence rate of breast cancer in Pakistani women is 50/100,000³.

Unfortunately for patients presenting at a later stage Modified radical mastectomy (MRM) is the only option as the surgical control is concerned.¹ MRM is associated with a lot of post-operative complications that can be partly avoided with careful surgical technique and post-op care⁴. Absence of breast after MRM has future mental health problems specially in the young⁵ with more young patients opting for Breast conserving surgery with improved aesthetics of breast conserving treatment⁶.

Seroma formation is claimed to be a very common problem after axillary dissection in patients with breast cancer⁷. Previous studies have reported its incidence to be from 18% to 59%⁸. Fifteen RCTs including a total of 1766 patients undergoing MRM had 24.2% incidence of lymphocele or seroma⁹. Seroma while is a problem on its own, further increases the likelihood of other complications like wound infection, flap necrosis and upper extremity lymphedema¹⁰.

The mechanism of formation of seroma has been described by many theories, each explaining it differently and hence suggestion a different management. The most convincing etiology seems to be the inflammatory response caused by surgery. The approach of controlling this inflammatory response by means of steroid administration has been performed for different types of operation, such as major abdominal surgery, colonic resection, head and neck surgery, plastic surgery and cardiac surgery^{11,12}. COX-2 inhibitors and steroids decrease prostaglandin and leucotriene-

synthesis and may prevent the occurrence of seroma formation¹³. Moreover, local steroids may be associated with a potential risk of wound infection and complicated wound healing¹⁴.

In one study after modified radical mastectomy, 46% of women developed seroma in the methyl prednisolone group, compared with 78% in the saline group (P <0.001)¹¹. In another study, there was a tendency towards a higher seroma formation in the methyl prednisolone group, but the tendency was not significant and there was no significant difference in the number of seroma aspirations after surgery between methyl prednisolone and control groups¹⁴.

We aim to conduct this study in our set-up to see if this simple treatment of injecting methylprednisolone can improve the post-operative outcomes of modified radical mastectomy in terms of seroma formation. This will not only add to the national and international literature that is available on the topic but would also help us in modifying in treatment guidelines if proven efficacious in order to improve patient management.

Hypothesis of our study is that local methyl prednisolone is more effective than normal saline injection in preventing seroma formation after modified radical mastectomy for carcinoma breast.

MATERIAL AND METHODS

After ORB permission, this randomized control trial study was conducted in Surgical Department of Khyber Teaching Hospital, Peshawar over a period of 6 months from October 12th 2019 till April 12th 2020. All women in age range 20-60 years diagnosed with carcinoma breast and booked in for modified radical mastectomy were included in the study. Patients with a BMI>27, comorbidities including diabetes, hypertension, asthma and conditions requiring systemic steroid therapy were excluded from this study. After informed consent randomization was done through lottery method for the first patient followed by consecutively alternating them into two groups. Sample size was 38 in each group using 46% proportion of seroma in methyl prednisolone group and 78% in the control group¹², 95% confidence interval, and 90% power of the test using WHO sample size calculator using the

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consecutive non-probability sampling technique. History and physical examination was done and base line investigations were performed. A dose of antibiotic was given 30 minutes prior to the induction. All procedures was performed by surgeons with more than five years of post-fellowship experience using the same technique. A single vacuum drain was placed and skin was closed with interrupted non-absorbable sutures. On the first postoperative day, the drain was removed regardless of drainage volume and 80mg methylprednisolone acetate dissolved in 10 ml isotonic saline was injected into the mastectomy cavity in group A while 10 ml of normal saline only was injected in group B (control group). All women were followed on 14th post-operative day to determine the presence of seroma formation clinically and confirmed on ultrasound and aspiration. All the above mentioned information including age, name, address, hospital number, BMI, initial histopathology report, whether or not neoadjuvant therapy was received, operative findings, formation of seroma on day 7 and 14 was recorded in a pre-designed proforma.

All the data was entered in SPSS Vr. 22 and analyzed. Mean±SD was calculated for continuous variables like age, weight, height, BMI, and volume of seroma. Frequency and percentages were calculated for categorical variables like stage of breast cancer, whether neoadjuvant chemotherapy was received and efficacy. Efficacy in both groups was compared using chi square test keeping p value of <0.05 as significant. Efficacy was stratified among NACT received and was compared using chi square test. All the results were presented as table and charts.

RESULTS

In our study age distribution in Group A was 15(39%) patients had age between 20-40 years and 23(61%) patients were in age range 41-60 years. Mean age was 38 years with SD±12.72. Whereas in Group B, 14(37%) patients were in age range 20-40 years, 24(63%) patients were in age range 41-60 years. Mean age was 40 years with SD ± 11.83.

Stages of breast cancer among two groups was analyzed as in Group A 4(11%) patients had stage I cancer, 20(53%) patients had stage II cancer, 14(36%) patients had stage III cancer. 34 (89%) of patients in Group A had neoadjuvant chemotherapy while 4 (11%) patients had upfront surgery. Whereas in Group B 3 (8%) patients had stage I cancer , 20(53%) patients had stage II cancer, 15(39%) patients had stage III cancer. 35(92%) patients had neoadjuvant chemotherapy and 3 (8%) patients had upfront surgery in Group B.

Efficacy of both the groups was analyzed as Group A (Methyl prednisolone) was effective in 29(76%) patients in preventing seroma formation whereas methylprednisolone was not effective in preventing seroma formation in 9(24%) patients. Normal Saline injection in Group B was effective in preventing seroma formation in 20(53%) patients and was not effective in 18(47%) patients. Hence it was concluded that methylprednisolone was statistically significant in prevention of seroma formation with a p value of 0.03.

Table 1: Stratification of efficacy w.r.t neoadjuvant chemotherapy

Neoadjuvant chemotherapy	Efficacy	Group A n=38	Group B n=38	P value
Yes	Effective	26	18	0.0304
	Not effective	8	17	
Total		34	35	
No	Effective	3	2	0.8091
	Not effective	1	1	
Total		4	3	

Group A: Methyl prednisolone acetate, Group B: Normal saline

Stratification of efficacy with respect to Neoadjuvant chemotherapy was analyzed and it was found that 26 (76%) patients in group A (methylprednisolone group) did not develop seroma versus 8 (23%) patients in group B (normal saline) being statistically significant with a p value of 0.03. (as shown in table no.1). Stratification of efficacy with respect to BMI was analyzed to see seroma

formation with respect to body mass index. However it was not established that BMI has an impact on seroma formation after injecting methylprednisolone or normal saline as in table 2.

Table 2: Stratification of efficacy w.r.t BMI distribution

BMI	Efficacy	Group A n=38	Group B n=38	P value
≤23 Kg/m ²	Effective	8	5	0.2523
	Not effective	4		
	Total	10	9	
>23 Kg/m ²	Effective	21	15	0.0685
	Not effective	7	14	
	Total	28	29	

Group A: Methyl prednisolone acetate, Group B: Normal saline

DISCUSSION

Breast cancer is the most common cause of death in middle aged women. In 2004 approximately one and a half million new cases were diagnosed world wide.¹West has Breast cancer being diagnosed more in elderly women more than 60 years whereas in Pakistan it has more incidence among younger age women with an incidence rate of 50/100,000 Pakistani women².

Srinivasa S et al¹² observed efficacy of local methylprednisolone after modified radical mastectomy, 46% of women developed a seroma in the methylprednisolone group, compared with 78% in the saline group (P <0.001). In another study conducted by Okholm M et al¹⁴ had reported that there was a tendency towards a higher seroma formation in the methylprednisolone group, but the tendency was not significant and there was no significant difference in the number of seroma aspirations after surgery between methyl prednisolone and control groups.

Local injections were given in mastectomy cavity at time of removal of drain by Axelsson who studied local injection of methylprednisolone acetate versus saline¹⁵ while latissimus dorsi reconstruction was studied by Taghizadeh et al¹⁶. He randomized the patients and injected triamcinolone or saline in the mastectomy at the initial seroma puncture. Another double blind RCT was performed by Qvamme G who injected methylprednisolone vs saline into the mastectomy cavity to assess seroma formation in the postoperative period and stated an observable reduction in the volume of the seroma formed and the duration it took to seroma formation.¹¹ A similar study was done via same phenomenon done on rats model by injecting 30mg/kg methylprednisolone sodium succinate after 7th postoperative day into the mastectomy cavity to note the volume of seroma. It also stated effectiveness of methylprednisolone in preventing seroma but also stated that it causes higher chances of wound infection in same patients.¹³

In our study mean age in Group A was 38 years with SD±12.72 while mean age in Group B was 40 years with SD±11.83. Methyl prednisolone acetate was effective in 76% patients and was not effective in 24% patients. Where as normal saline was effective in 53% patients and was not effective in 47% patients.

CONCLUSION

Our study concludes that local methyl prednisolone is more effective than normal saline injection in preventing seroma formation after modified radical mastectomy for carcinoma breast.

Conflict of interest: Nil

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